Spring 2022

A Study of the Integration of Environment, Social, and Governance Policy in the Mining Industry

Ryan Isto

A Study of the Integration of Environment, Social, and Governance Policy in the Mining Industry

by

Ryan Isto

A thesis submitted in partial fulfillment of the
requirements for the degree of

Master of Science, Mining Engineering

Montana Tech

2022

Abstract

In a push to reach more responsible and sustainable business practices, extractive resource industries like the mining and oil industry have faced increasing pressures to update their policies to reflect the global trend of improving environmental and social responsibility. Industries have adopted numerous corporate social responsibility (CSR) frameworks to shape policies to improve sustainability, mitigate risk, and increase marketability. A CSR that has become increasingly relevant within the mining industry is the use of environmental, social, and governance (ESG) to influence sustainability policy. Mining companies have adopted ESG as a method to influence their corporate policy to manage public relations, environmental concerns, and leadership-related risks. The objective of this thesis is to investigate how companies within the mining industry use ESG to shape their corporate guidelines and understand the growing trend of how mining companies use ESG to manage sustainability-related risk and improve their financial potential. This thesis will analyze three major companies within the mining industry by studying how they use ESG as a corporate social responsibility framework using publicly available data.

Keywords: ESG, Environmental, Social, Governance, Sustainability

Dedication

This thesis is dedicated to my loving parents, Mark and Ann, who have supported me throughout my life and have taught me the values that it takes to be an Oredigger.

Acknowledgements

First and foremost, I would like to thank Montana Tech for providing me with the resources and faculty that have provided me with the exceptional education that I have received. I owe both my professional and academic accomplishments to all the faculty that I have had the privilege to study from. Secondly, I would like to acknowledge and give my thanks and utmost respect to my committee. Their expertise and willingness to work alongside me inspired me to pursue a graduate degree. Dr. Thomas Camm, as my advisor you provided me with all the intellectual insight and guidance, I need to pursue this daunting task. You inspired the nature of the research with the idea of being one of the first to document how ESG is being used within the mining industry. This idea propelled into authoring a thesis I can be proud of. Chris Roos, you helped me make the intimidating jump from the oil industry to the mining industry and gave me the courage to take the big step of becoming a masters student. Guiding me through this period has pushed me into areas I never believed I had the capability to be in. Kumar Ganesan, your expertise on the environmental side of this project and working alongside me is a testament to the future of the mining industry with mining engineers and environmental engineers working side by side to make the world a better place.

Table of Contents

List of Tables

List of Figures

List of Equations

1. Introduction

Over the last century, mining companies have faced many challenges in their attempts to produce the earth's natural resources. Challenges they experience include, but are not limited to, complying with changing regulations, difficulties predicting commodity prices, and extracting more complex orebodies. Most of these problems affect how a mining company operates as it determines where they prioritize spending which ultimately influences the company's profitability. Mining companies have specialized in finding new ways to optimally produce resources to increase their profits. Most of these specialized techniques focus on ways to reduce developmental and operational costs of mines.

In today's social climate there are new, less tangible, challenges that mining companies must overcome. To appease their stakeholders, companies must work towards obtaining a social license to operate (SLO). Komnitsas describes SLO as "an informal social contract that aims to bridge the gap among the view of the most important stakeholders involved in mining activities" (Komnitsas 2020). SLO represents the social and environmental obligations that stakeholders expect mining companies to take on when operating in their communities. This concept was developed to hold mining companies more accountable for how their operations impact the host communities. This ensures that the work they are doing is ethical and beneficial to the local ecosystems and communities. As a result, mining companies are faced with the challenge to develop new policies and strategies to satisfy stakeholders so that local communities can grant mining companies a SLO.

Companies in the 21st century face more environmental and social challenges then they have in previous decades. Documents like the Paris Agreement create standards that pressures companies to work towards being more environmentally responsible. The public is looking for companies to be held more accountable for their social and environmental impacts and to be in accordance with standards like those set in the Paris Agreement. This has led to a big push in the mining industry called ESG or environmental, social, and governance.

ESG is a set of corporate policies laid out to specify a company's views and goals on how they address social or environmental issues. Having firm ESG policies provides a key component for companies to have their social license to operate. A social license to operate is critical as it shows that the mine works well with the local community. Examples of ESG policies would be pledging to be carbon neutral by a certain date or a commitment to spend more money on charitable work within local communities.

1.1. The Role of "Environmental" in ESG

The environmental component of ESG has been the biggest push for companies to address because mining operations work directly with the environment to produce commodities. The environment has been a large topic of discussion due to increasing concerns on greenhouse gas emissions alongside concerns over past and present industry practices. Events such as the Deepwater Horizon oil spill and The Mount Polley mine tailings dam collapse have thrusted industries like the petroleum and mining industry into a spotlight on their environmental practices and policies.

Companies are becoming increasingly involved in finding ways to become more environmentally conscious. One of the largest criticisms of the mining industry is their use of fossil fuels during the production phase. The mining industry requires excessive amounts of energy in the forms of diesel or coal to power their haulage fleet or their mills. The use of large diesel-powered vehicles, which consume enormous quantities of fuel, has been an area of criticism due to the large amount of greenhouse gases (GHG) they produce. To categorize emission types, companies and leading GHG experts produced the scope system. Scope 1 emissions refers to emissions that are created directly by operating practices, scope 2 is emissions used to power the operation, and scope 3 refers to indirect emissions caused by operating. On the global scale, the mining industry is responsible for around 7% of the world's scope 1 and scope 2 emissions and 28% of the world's scope 3 emissions (S&P 2020). With the industry playing a critical role in producing global emissions, companies must alter corporate policies to minimize their environmental impacts. Companies are now committed to net zero emissions by 2050 to comply with the Paris Agreement and have pledged more money to reclamation efforts.

1.2. The Role of "Social" in ESG

The social aspect of ESG is arguably the hardest part of ESG for companies to address. Whereas environmental expectations have been a prominent topic in today's culture, the methodology of cultivating strong relationships with stakeholders has been a challenge. The 'S' pillar in ESG plays a significant role in a company's ability to operate in an area as it provides a foundation for their social license to operate. The 'S' in ESG can be attributed to companies' social policies regarding their relationship with their employees, the ethical conduct and relationship with local communities, and their affiliations with other companies who share the same social policies.

Choices made by companies affect how investors and consumers perceive them. The social pillar can be described as how a company's image is perceived by the public and how it treats its employees. Primary reference documents for understanding the social goals and expectations of a company can be found within their sustainability reports. These documents detail the commitments made to their employees and sets a precedent for how a company can effectively cultivate a mutually beneficial relationship with their local communities.

It is expected that a company operating within a community strives to increase the quality of living within the community. This can come in the form of job placement. For example, Kinross Gold Corp prides itself on having 98% of their craft workers being from the local area on any project they work on (Kinross 2022). Some examples of how companies address the social pillar of ESG would be by supporting local communities through charitable donations or by procuring goods and services from local businesses. An example of how poor social policies can negatively impact a company would be the strike at the Lucky Friday mine in 2017. This would cause the public to be hesitant in investing in their business or refusing to seek employment at the Lucky Friday mine due to the company's poor relationships with their employees. S&P states that geopolitical issues are another factor that companies must address regarding the social pillar of ESG (S&P 2020).

Internal issues within the company can also play a role in the social aspect of the company. Hostile work conditions or pleasant working conditions can influence how a company is perceived. Companies that appear on employee happiness lists, as seen in Business Insider or MSNBC for example, shed positive light on the company. Poor company culture or publicity can affect a company's ESG rating. Examples of this would include the GMC automotive strike in 2019. This exhibits how poor internal policies can lead to dissatisfaction with their employees and cause a decrease in revenue due to not having workers to produce a product.

1.3. The Role of "Governance" in ESG

The development and expansion of corporate governance within a company's policy is the third pillar of ESG. Whereas the social pillar has a heavy focus on the company's workers and local communities, governance focuses on such aspects as the shareholders of the company and how governing bodies of the company implement sustainability policy. The governance pillar refers to how a company runs itself. Governance focuses on the board of directors, corporate structure, corporate policies, auditing, and legal compliance.

Ethics and transparency play the largest role on evaluating a company on their corporate governance. Stakeholders expect companies to comply with federal laws in accounting practices and reporting reserves. Companies produce annual and quarterly reports which detail their accounting practices and provide investors with financial information about their company and projects.

The board of directors and other leadership roles, such as CEO, make up a company's upper management and is a core component of what stakeholders look for in governance. The selection of board members and other top executives in a company is a focal point for investors. A board is expected to increase its priority in diversity and inclusivity. S&P claims that "research revealed that firms with more women on their boards of directors and in C-suite positions had greater financial performance than less diverse companies" (S&P 2020). The idea is that a diverse board will provide a wider insight on decision making and represent the community better. Another important aspect of the board regarding governance is the corporate policies that top executives implement. Documents like codes of conduct or risk management plans detail how a company conducts their business and can provide information to stakeholders on how companies govern themselves and ensure they are following the correct practices.

Governance also covers a company's ability to closely follow legal practices while conducting business. The public is looking for companies to abide by all federal laws in the areas they operate in and avoid legal conflict. This is especially important to globalized companies like Kinross or Rio Tinto who operate in developing countries which do not have the same legal standards as western countries.

Companies seek to demonstrate their commitment to improve governance by joining organizations like The Institutional Shareholder Services, International Council on Mining and Metals (ICMM), and the Gold Forum. These organizations create and continually improve guidelines on standard practices. The ICMM for example, states that "…legal compliance is a minimum expectation, so this should be guaranteed, but they also would expect ICMM members to go beyond these basic requirements" (ICMM 2022). This statement addresses how there is an expectation for companies who operate in developing countries to hold themselves to a higher standard in cases where local laws are inadequate. This would incorporate not bribing local governments for project or permit opportunities, conducting illicit accounting activities via offshore accounts, or engaging in other illegal practices.

1.4. Thesis Objectives

Within the mining industry, ESG is a more recent trend that companies are adopting. With ESG being a new part of the industry, very few companies have a firm grasp on what is expected of them in terms of creating ESG policies. Companies are spending a lot of money on people and resources to try to address ESG related concerns. The increase in implementing ESG policies in the industry will alter costs and change how projects operate. It will cost more money to produce commodities because of these policies. Companies will be spending money on changing equipment to meet environmental standards, put more money into local communities, and will have to pay more carbon taxes as time goes on.

The objective of this research is to investigate three companies within the mining industry to determine:

- The trend of ESG within the mining industry
- How ESG is used to mitigate risk
- How ESG policy is integrated into a mining company's corporate policy and business strategy
- How ESG can financially impact a company

2. Literary Review

2.1. History of ESG

The term ESG was first coined at a sustainability conference hosted by the UN Global Compact in 2004 (IFC 2004). The *Who Cares Wins* report was created at this conference to highlight the importance of ESG at the investment level and how it is mutually beneficial for both stakeholders and companies. The report was written by multiple authors including the UN Global Compact, the International Finance Corporation (IFC), the Swiss Government, and 23 financial institutions who all pushed for the implementation of ESG. The most important contribution from this conference was the findings that for a company to be socially responsible, they must adhere to the highest standards in environmental, social, and governance practices. This conference and the subsequent papers written after, effectively launched ESG into the corporate environment.

At the founding of ESG, there was a strong consensus among the parties listed above of ESG's importance within the investment community. It was communicated that the expectation was "…that ESG integration currently represents an important source of competitive differentiation and value creation for financial institutions that make it part of their strategy" (IFC 2004). This new financial tool needed the support of senior leadership at leading financial institutions. The awareness of ESG policies on the global scale was aided by the Principles for Responsible Investment as they implemented ESG as part of a list of expected corporate practices. The *Who Cares Wins* initiative puts pressure on governments to develop and update federal regulations to comply with new ESG expectations. The initiative defines that the role of governments "should not play an active role at the micro level but should focus on defining the right boundary conditions for the system as a whole" (IFC 2004). This initiative along with NGOs and CEOs helped define and begin the implementation of ESG.

Over the last couple of years, mining companies have been adopting ESG as part of their corporate structure. Many companies produce detailed reports on sustainability, with sections specifically targeting each component of ESG. Some companies show their commitment by employing people who specialize in incorporating and assessing ESG policies within the company.

2.2. Paris Agreement

The Paris Agreement was a document composed of a set of legally binding regulations that are used to combat climate change. The document was published at the United Nations Climate Change conference in 2015 and was ratified by over 175 nations. The objective of the Paris agreement was to reduce global temperatures to a minimum of 2° C or 1.5° C above preindustrial levels (UN 2016). Countries agreed to go through economic and social transformation to meet these goals. This includes abiding by stricter climate goals on a 5-year cycle and developing a long-term greenhouse gas emissions management strategy. For countries to reach this goal, the UN expects developed nations to lead by example and provide financial support to developing nations with lacking resources. These resources will go towards developing and implementing innovative technologies and infrastructure that would push towards the reduction in GHG emissions (UN 2016). The Paris agreement influences current sustainability goals and strategies for companies within the mining industry. To play a part in the reduction of global temperatures, companies have statements committing to becoming carbon neutral by a certain date.

2.3. UN Sustainable Development Goals

The integration of ESG on the corporate level is strongly influenced by the UN's continued research on ESG related goals and policies. From this research, the UN created the UN Sustainable Development Goals. These goals were amendments from the original Millennium Development Goals (MDGs) which were developed in 2000 (UN 2015). The key difference in the amendments was to encompass environmental and anticorruption development goals on top of the previous poverty focused goals created in 2000 (UN 2015). Figure 1 shows each of the 17 development goals used by the UN.

Figure 1 UN Development Goals (UN 2015)

All three pillars of ESG can be recognized through the UNSDGs and are applied by mining companies when defining their sustainability policies. The use of these goals by mining companies reflects the change to a stakeholder-oriented mentality. Relevant goals in the industry include good health and well-being, gender equality, climate change, and clean water and sanitation.

2.4. ESG Scoring

One common metric mining companies and other organizations use to quantify ESG policies are ESG scores. An ESG score determines how strong a company manages its ESG risks and how they address sustainability. ESG scores provide a method to assess the financial risks of a company by using their history on ESG topics to predict financial success (Chapman and Cutler 2021). The policies are then compared to similar companies within their respective industries, providing an industry median.

There are a large variety of data sources and companies who specialize in assessing a company's ESG policy. These companies use a variety of metrics to try to quantify an ESG score, looking at company reports, policies, and actions taken by a company. ESG scores are used in two different scenarios. The first scenario is publishing the scores publicly. Public scores help investors identify financial risks with the company and provides stakeholders with a quantifiable metric to judge a company's sustainability policy. Internal auditing of a company's sustainability strategy is the second scenario in which ESG scores are used. Companies would pay to have themselves reviewed by a third party to understand the effectiveness of their sustainability strategy.

The accessibility of ESG information to the public plays a heavy influence on a company's score. Each industry is given a baseline for how relevant the environmental and social components are to their industry and adjusts the weight of each component accordingly. Within the mining industry, a company's environmental policies play a critical role in their score as they directly deal with the environment and are responsible for reclamation. An example of this would be the environmental risk of water treatment within the mining industry. Not polluting or damaging local waters is an important part of a mining company's environmental plan, as poor planning could cause damage and economic loss. Thus, environmental policies play a larger role in a mining company's ESG score in comparison to a consumer finance company. A consumer finance company does not worry about directly damaging the environment so their scores would be less affected by their stances on environmental topics like damaging local waters (MSCI 2021).

2.5. Sustainability Reports

Sustainability reports are annual reports published by mining companies to demonstrate how they are addressing sustainability issues that are relevant to the company. These reports are a company's method to publicly display the progress they are making in meeting sustainability goals based on the Global Reporting Initiative (GRI) framework (Fonesca et al 2014). On the financial side, mining companies view sustainability reports as a method to assure stakeholders that internal company practices are held at the highest standard which helps deter the notion of being labeled as 'a dirty business' (Bohling et al 2017). This is important within the mining industry as the public wants to know that companies are working with legitimate behavior on sustainable topics and are taking measures to mitigate larger scale disasters (Bohling et al 2017).

Sustainability reports use ESG as a guideline for how the reports are written with an introduction that addresses ESG. Throughout the report, each pillar of ESG is clearly stated as to how important it is to their company's business. Companies address ESG within the sustainability report by including such topics as the steps they are taking to address each pillar, the sustainability risks that their company faces, and the establishment of sustainability goals which benchmarks their progress. For the Environmental pillar, for example, companies will detail their climate goals like their reduction of greenhouse emission or methods they utilize to clean and preserve freshwater surfaces on projects. This is done using corporate data to report what they are doing. Figure 2 shown below details how Barrick presents some environmental data in their 2020 sustainability report.

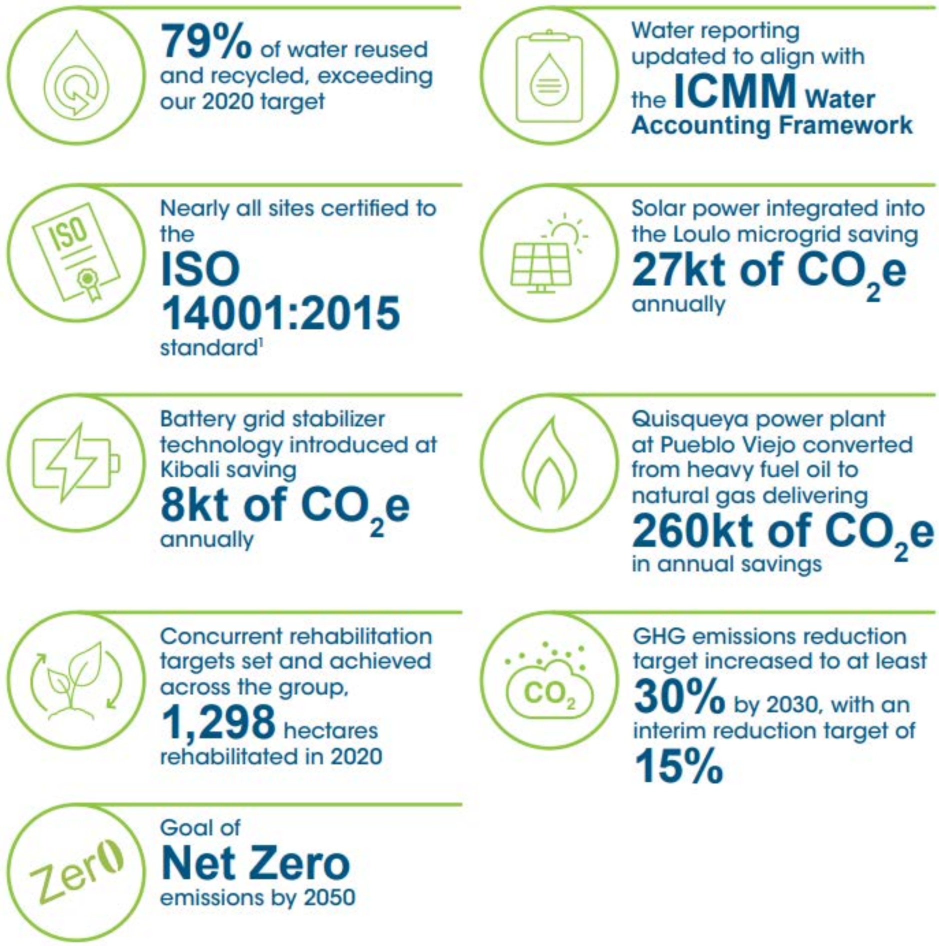

Figure 2 Barrick Environmental Facts (Barrick 2020)

3. Research Methodology

3.1. Initial Company Research and Criteria Selection

To get a better understanding of how ESG is used in the mining industry, it is important to look at specifically how companies address and integrate ESG into their corporate structure and within their operations. Information regarding ESG is typically found on public documents and pages on company websites. Relevant sources of information that will be considered in this study are sustainability reports, annual reports, company presentations, core values, climate change reports, transparency reports, and any sustainability related sections or documents that can be found on corporate websites. The sifting of this information will give context to the growth of ESG in the mining industry and determine how each company utilizes ESG within their company. This research will highlight three different companies and how they present their ESG information to the public through resources found on their website. Each company will be thoroughly reviewed on their ESG policies, and a discussion will detail how they deal with each ESG pillar.

This section provides insight on the selection criteria for the initial analysis of the three reviewed companies. The choice of using three companies is to provide a diverse perspective of the integration of ESG in the mining industry. Each of the companies chosen are industry leaders in production of the commodity(s) they produce. This is important as there will be a higher access to information available and it provides insight into how industry leaders are performing in ESG. The second criteria for this study are that each company must be publicly traded. Publicly traded companies will have more information available as means to appeal to stakeholders and will provide context as to how companies use ESG as an investment tool. The next criteria are that companies must have globalized operations. This requirement specifies that a selected company must have an operating mine in more than three different countries. This was a selected requirement as different jurisdictions have different ESG standards that companies must adhere to. This will provide insight as to how companies manage governance or social risks in different countries and how they use ESG to build sustaining relationships with local communities. The final criteria are that each of the three companies will be based out of different countries. This criterion is relevant because it shows a broader picture of how ESG is used across the entire mining industry and is a global trend, not relevant to one country or commodity.

Based off this criterion, the three companies selected for this study are Rio Tinto, Glencore, and Newmont. All the companies selected meet the requirements of publicly traded, globalized, industry leaders, and all are based in different countries. Table 1, shown below, details how each company meets the selected criteria for the study.

Table 1 Company Criteria Check

Company	Commodities	Stock Markets	Head Office Location	Number of Countries Operated in
Rio Tinto[1]	Iron ore, Aluminum, Copper, Borates, Lithium, Diamonds, Salt, Titanium Oxide	ASX: RIO LSE: RIO NYSE: RIO	Melbourne, Australia	35
Newmont[2]	Gold, Copper, Silver	TSX: NGT NYSE: NEM	Greenwood Village, Colorado	9
Glencore[3]	Copper, Nickel, Ferroalloys, Iron Ore, Zinc, Cobalt, Coal	LSE: GLEN JSE: GLN	Baar, Switzerland	35

1-Rio Tinto 2022a, company website
2- Newmont 2022a, company website
3- Glencore 2022a, company website

Rio Tinto is a large diversified industrial metal producer that is based in Australia with operations in 35 countries. Behind BHP, Rio Tinto is the second largest mining company in the world based on market capitalization (Garside 2021). Rio Tinto is a world leader in producing aluminum and iron ore while also producing other commodities. Rio Tinto's presence as one of the largest mining companies in the world and a leader in iron ore made them a selection for this study. Newmont was selected for this study as they are based in the United States. This provides context as to how an American company implements ESG. Newmont also has the largest gold reserve base in the industry, thus proving their status as an industry leader in their commodity (Newmont 2022a). Researching a gold company in this study broadens the understanding of how ESG is used in the mining industry. Glencore was selected because they are one of the world's largest globally diversified resource companies (Glencore 2022a). Glencore is an Anglo-Swiss based company which is important as it shows how ESG is utilized by a European based company. Their diversified assets, including coal, will detail how a company uses ESG for multiple commodities. Figure 3 shown below compares the leading market caps for mining companies. All companies selected in this study are in the top five in the world based on market capitalization.

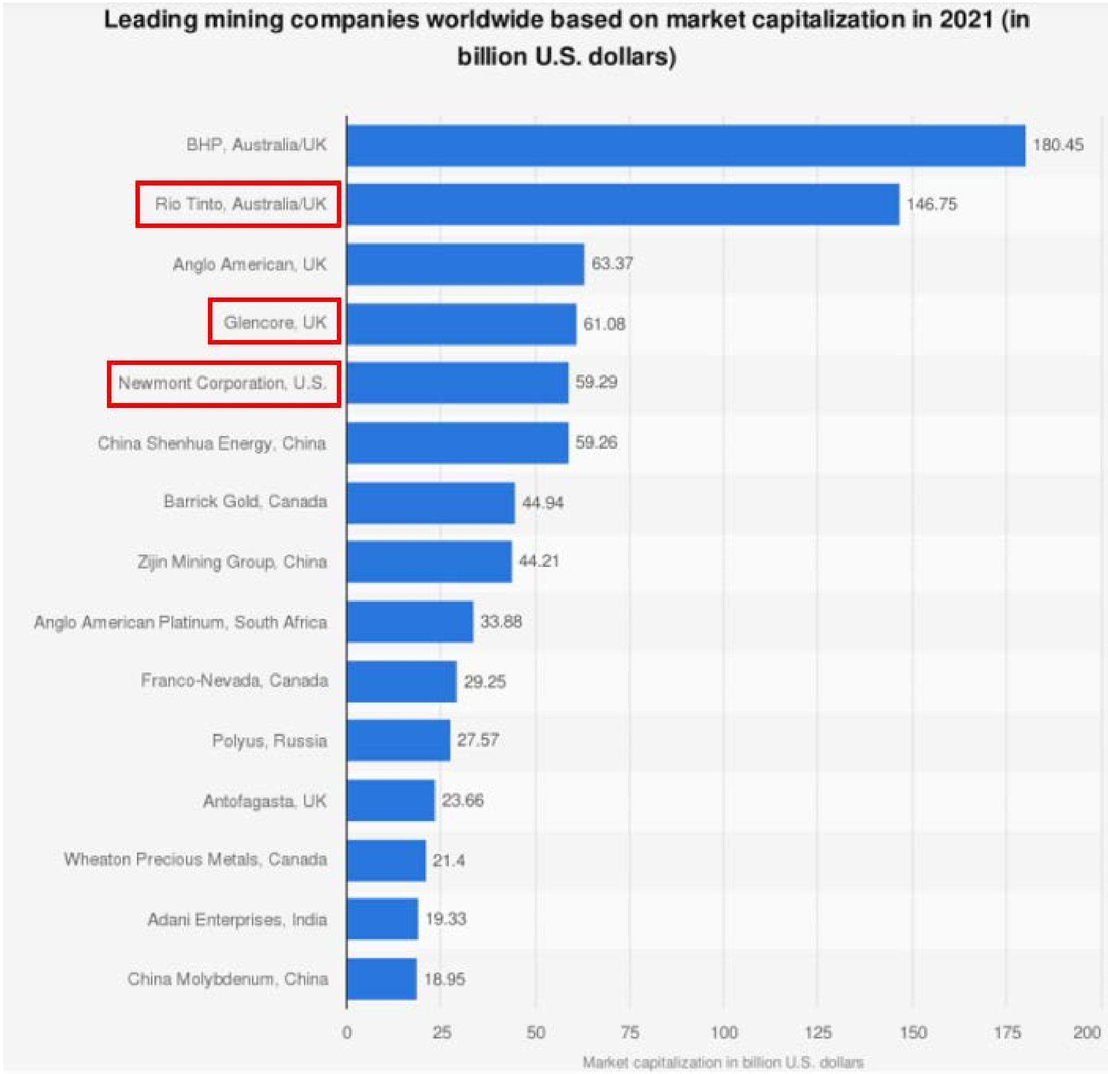

Figure 3 Largest Mining Companies by Market Cap 2021 (Garside 2021).

3.2. Sustainability Reporting

Sustainability reporting became relevant to the corporate world as an answer to the growing pressure of stakeholders in understanding how a company manages economic, environmental, and social interests (Hahn and Küknen 2013). Sustainability reporting, in its modern form, stemmed from the movement in the 1990s which called for companies to publish sustainability data within a financial report or as its own report for the public to see (Hahn Küknen 2013). The publishing of this data was heavily influenced by the Rio Declaration and Agenda 21 which was approved at the Earth Summit held in Rio de Janeiro in 1992 (Perez and Sanchez 2009). The Rio

Declaration was a report that was created at the United Nations Conference on Environment and Development (UN 1992). This document declares that humans are entitled to sustainability information which is essential to environmental conservation (UN 1992). The document consists of 27 principles that defines both human's and countries' roles in environmental management. Principle 10 ratifies that a citizen of a state should have the appropriate access to information related to the environment that is held by public officials (UN 1992). This would pave the way for the first set of published environmental reports, thus a big step for sustainability reporting. The private sector would soon follow with the inception of Agenda 21 in the Aarhus Convention hosted by the United Nations Economic Commission for Europe in 1998 (Perez and Sanchez 2009). Chapter 30 of this report calls for businesses to annually report their environmental records, publishing such metrics as energy use and how they are using natural resources (Perez and Sanchez 2009).

Within the mining industry, a widely adopted framework used for sustainability reporting is the Global Reporting Initiative (GRI) which was launched in 1997 (Perez and Sanchez 2009). The GRI answers the call for companies to have a reliable set of standards that they could follow as opposed to companies following their own standards (Alonso-Almeida et al 2013). The GRI's standards, with standards specific to the mining industry, heavily influence annual sustainability reports published by mining companies. The ICMM is also a considerable influence on sustainability reporting within the mining industry. The ICMM requires its members to publish sustainability reports as a method of achieving better stakeholder relations and accountability within the industry (ICMM 2022).

3.3. Data Sources

One of the primary objectives of this research is to understand how ESG is being utilized by mining companies in their policies and to see what data is publicly available for stakeholders. ESG data can come in the form of quantitative or qualitative data. Qualitative data comes in the form of ESG being integrated into company policies like risk mitigation frameworks or core values. Quantitative data is harder to come by for ESG but can come in the form of greenhouse gas emissions, water usage, safety incidents, or other performance metrics. Most data collected and analyzed will primarily focus on qualitative data with a small focus on quantitative data.

Corporate websites for the selected mining companies were a primary resource in determining their ESG policy. A corporate website is a resource for a company to publicly display their policies, projects, and states the objectives of the company. The selected companies will be analyzed by how they use the ESG pillars on their website to gauge how important ESG is becoming in the industry. A Company's corporate values, code of ethics, business strategy, and leadership teams are analyzed to see if ESG framework is used. Each company selected has a sustainability tab on the main part of their website. These sections provide overviews on important sustainability policies, strategies, and topics that the company deems relevant to display to stakeholders.

Over the course of the fiscal year, mining companies release several different reports that update stakeholders on topics like the state of the company, ore reserves and resource estimates, and financial statements. One relevant report that is examined for this research is a company's annual report. Annual reports are one of the largest documents published by companies and their goal is to communicate with stakeholders on important topics like company objectives, finances, overviews of their projects, and any other information the company deems relevant. As they are one of the most important documents for companies, they will be examined to understand the extent in which ESG policy is used within these reports and what type of information is included. Another relevant report that companies produce is the publishing of sustainability reports. Sustainability reports are annual reports published by mining companies to inform stakeholders on sustainability related performance targets, goals, policies, and current sustainability practices used by the company. These reports cover and identify sustainability related risks that are important to the company. These reports use ESG to structure the report. Sustainability reports are important in understanding the approach mining companies take to address sustainability.

Mining companies also produce other documents that clarify, support, or expand upon their sustainability related policies. Relevant documents that were examined for this research included climate change reports, human rights reports, transparency reports, code of conduct, and community relations reports. These reports focus on niche areas of their sustainability policy and are relevant to the study as many of these reports follow ESG framework such as UN SDGs (Sustainable Development Goals) or ICMM principles. Companies also produce investor presentations throughout the fiscal year as a way of updating shareholders on the state of the company. This research took into consideration any presentation that would be relevant to the topic area of sustainability.

3.4. Environmental Data

Due to the nature of working directly with the environment, mining companies track and produce data pertaining to the environmental pillar of ESG. Mining companies' environmental policies are in accordance with the UN's sustainable development goals and the ICMM mining principles. The relevant ICMM principles that are followed in the creation and implementation of environmental policy are (ICMM 2022)

- Principle 6: Pursue continual improvement in environmental performance issues, such as water stewardship, energy use, and climate change.
- Principle 7: Contribute to the conservation of biodiversity and integrated approaches to land-use planning.
- Principle 8: Facilitate and support the knowledge-base and systems for responsible design, use, re-use, recycling, and disposal of products containing metals and minerals.

Relevant UN SDGs that influence mining environmental policy include (UN 2015):

- Goal 6: Clean water and sanitation
- Goal 7: Affordable clean energy
- Goal 12: Responsible consumption and production
- Goal 13: Climate Action
- Goal 14: Life below water
- Goal 15: Life on land

These principles and goals are the foundation for companies in the creation of performance targets and determines what data is relevant to collect. Mining companies define relevant environmental areas of concern to be greenhouse gas emissions, on site water usage, biodiversity management, reclamation and mine closure, tailings, and tailings dam facilities. Qualitative data regarding policies for each concern area are addressed in public documents like climate change reports or sustainability reports. Qualitative data includes environmental policy, sustainability goals, or policies created. Examples would include having a set procedure and standard on how tailings dams are monitored or having the framework to conduct studies to reduce harm on local biodiversity. Quantitative data is used in the environmental category to measure the performance of a company against their environmental topics. Data that can be collected in this regard include metrics like scope emissions or water usage on a job site.

3.5. Social Data

Social data that is available for mining companies pertains to a broad set of topics relevant to the sustainability policies for a mining company. Mining companies' social policies are in accordance with the UN's sustainable development goals and the ICMM mining principles. The relevant ICMM principles that are followed in the creation and implementation of social policy are (ICMM 2022)

- Principle 3: Respect human rights and the interests, cultures, customs and values of employees and communities affected by our activities.
- Principle 5: Pursue continual improvement in the health and safety performance with the ultimate goal of zero harm.
- Principle 9: Pursue continual improvement in social performance and contribute to the social, economic, and institutional development of host countries and communities.

Relevant UN SDGs that influence mining environmental policy include (UN 2015):

- Principle 3: Good health and wellbeing
- Principle 5: Gender equality
- Principle 8: Decent work and economic growth
- Principle 11: Sustainable cities and communities

Based on the UN SDGs and the ICMM principles, the mining industry places a high importance on social policies such as worker safety, host community relations, Indigenous community relations, human rights, child labor, cultural heritage, local employment, and whistleblowing. Most data related to the social pillar of ESG is qualitative. The implementation of the social pillar comes in the form of policies, standards, and risk management frameworks. This would include the policies, standards, and methods that a company uses to build a strong relationship with their host community. This would come in the form of policies rather than numeric data. Social data that is quantitative for example would be injuries or fatalities reported, number of local members of the host community employed, or the number of complaints received from the local community. Social data is found in public documents such as sustainability reports, human rights reports, or community relations reports.

3.6. Governance Data

The governance pillar of ESG is critical on how a stakeholder can evaluate a company's commitment to sustainability by examining their leadership structure and composition. Mining companies' governance policies are in accordance with the UN's sustainable development goals and the ICMM mining principles. The relevant ICMM principles that are followed in the creating and implementation of social policy are (ICMM 2022)

- Principle 1: Apply ethical business practices and sound systems or corporate governance and transparency to support sustainable development.
- Principle 2: Integrate sustainable development in corporate strategy and decision-making processes.

- Principle 10: Proactively engage key stakeholders on sustainable development challenges and opportunities in an open and transparent manner, effectively report and independently verify progress and performance.

The only UN SDG that directly impacts corporate governance is principle 5: gender equality (UN 2015). The governance structure of a company is important to understand as governance oversees implementing sustainability goals and policies. When analyzing a company's use of the governance pillar, the key areas focused on are how sustainability is tied to positions within the board and the executive team, diversity in leadership, determining the governing bodies that creates sustainability policy, risk management frameworks, and transparency on financial reporting such as taxes paid. Governance data is found on the company website in such resources like a page that highlights who makes up the board of directors and who is on the executive committee. Companies are analyzed based on if there are leadership positions that relate to sustainability topics, if leaders within the company have sustainability related roles such as leaders of sustainability related committees, and the number of sustainability frameworks such as committees or risk management bodies. Examples would be an executive officer who relates to stakeholder relations or committees that are related to sustainability. Transparency is analyzed by a company's goals or policies regarding transparency on taxes paid or business dealings. Quantitative data is limited in this pillar to areas like number of members on leadership teams or diversity makeup of the leadership teams. Other relevant documents and sources of information that contain governance data would be annual reports, sustainability reports, transparency reports, or a code of ethics document.

4. The Analysis of ESG by Selected Company

4.1. Newmont Corporation

4.1.1. Newmont ESG Overview

Environmental, Social, and Governance policies are central to Newmont's corporate strategy. "Newmont's Vision", as displayed on their website, is the first section on the companies "about page". This section mentions how Newmont is the only gold producer listed on the S&P 500 and is widely recognized for their principled environmental, social, and governance practices (Newmont 2022a). Newmont values the importance of ESG by using their prestige in ESG as an important descriptor of defining their company. On this page, Newmont also places their ESG accomplishments in the same sentence as a financial accomplishment showing how they value ESG and financial status as equally important parts of the company. To further describe their company, Newmont displays sustainability related awards that they have received in 2020 (Newmont):

1. Ranked 13th overall and top miner in 3BL Media's 100 Best corporate Citizens.
2. A company actively advancing qualified females in mining by Bloomberg's Gender Equality Index for two consecutive years.
3. Third most transparent company in the S&P 500 according to Bloomberg's 2019 ESD Disclosure Score.

Newmont uses these accolades to develop a better public image to stakeholders and to present themselves as forward thinking. Newmont highlights that they are recognized as being one of the most transparent public companies in the S&P 500, thus developing the notion that Newmont can be a safer investment. Displaying such an award is an example of a mining company integrating ESG into their business strategy to improve company performance.

Newmont uses ESG frameworks directly in their publicized corporate strategy. Newmont states that the purpose of their public strategy is to create value for all shareholders and stakeholders (Newmont 2022a). Newmont plans to create value for their shareholders and stakeholders by their strategies of (Newmont 2022a):

1. **Deliver superior operational execution** by ensuring fatality risks are managed at all times with strong leadership and systems, continually improving operational performance, and meeting commitments without fail.
2. **Sustain a global portfolio of long-life assets** by growing margins, Reserves and Resources from profitable expansions, exploration and value accretive investments.
3. **Lead the gold sector in profitability and responsibility** by consistently generating superior, returns, demonstrating our values, and leading in environmental, social, and governance performance.

Two of the three core values in Newmont's strategy directly use ESG principles. In the first value, Newmont utilizes the social and governance pillars to convey that the most important part of the company strategy is the safety of their employees and having strong corporate structure to ensure employee safety and increasing operational performance. This value is presented above profitability and asset management showing the growing importance of mining companies integrating sustainability into their business strategies. Newmont also states that they will have a long-term competitive advantage through being an industry leader in sustainability which will generate long term value for stakeholders (Newmont 2022a). The third value used in Newmont's corporate strategy combines being a financially successful company with being a leader in ESG. The third value exhibits how mining companies are using ESG as a tool to increase profitability and is becoming a key strategy for mining companies to use.

ESG is further implemented into Newmont's business strategy as seen in their core values (Newmont 2022a):

1. Safety
2. Integrity
3. Sustainability
4. Inclusion
5. Responsibility

Newmont prioritizes the social and governance pillars as four of the five values directly use these pillars. The first value reiterates their business strategy by using safety as their primary concern. This advertises that Newmont is a good place to work for potential stakeholders and can help facilitate a good relationship with local communities by providing sound employment. The second value of integrity is a combination of social and governance as Newmont believes that being ethically responsible to culture, customs, and laws is critical to a successful business. This value is labeled as important to Newmont as understanding a host community's culture and being compliant with laws mitigates public relations risks that can devalue their company and allows Newmont to have a social license to operate. Sustainability through being a catalyst of economic development and responsible stewards of the environment is Newmont's third value (Newmont 2022a). This value acknowledges the role Newmont plays in managing the environment and being responsible in the communities they work in. The inclusion value covers how diversity creates an inclusive environment in which employees can contribute and work together to achieve Newmont's goals (Newmont 2022a). This value emphasizes Newmont's commitment to having a social environment that mitigates workplace harassment, discrimination, and equal opportunity. The Responsibility value challenges Newmont's leadership to deliver on commitments and be leaders in challenging the way Newmont approaches operations and issues. This value utilizes the governance pillar as a sign to show that Newmont's leaders are always strategizing new ways to improve the company and that they will continue to mitigate risk for the company and stakeholders. Newmont encompassing ESG in all their corporate values is a testament to the increasing role of ESG in corporate structure and its relevancy within the mining industry.

4.1.2. Environmental Pillar Analysis-Newmont

Under Newmont's sustainability tab on their corporate website, Newmont uses ESG to highlight critical portions of their business strategy that are influenced by sustainability. The quote shown below is a statement from Newmont's sustainability tab that shows they are committed to combining finances with strong sustainability practices.

"Newmont is focused on delivering sustainable value for our people, stakeholders, and host communities, now and in the future. Delivering on our commitments is a key pillar of our business strategy. We believe the protection of the health and wellbeing of our people, environmental stewardship and being a catalyst for sustainable economic empowerment in our host communities are not just the right things to do, they are good for our business" (Newmont 2022a).

This statement exemplifies how Newmont uses ESG principles to influence their business strategy as developing strong relationships with local communities is beneficial to their business. This strategy deems that profitability can stem from delivering sustainable value to host communities, thus developing both strong relationships with stakeholders and being profitable.

4.1.2.1. Newmont's 2021 Climate Change Report

Climate change plays a fundamental role at Newmont in how they assess the risks that face their business. Newmont believes that climate change is one of the greatest existential threats to the mining industry (Newmont 2022a). To address the risk of climate change, Newmont has established climate change targets as defined in their 2030 climate change targets.

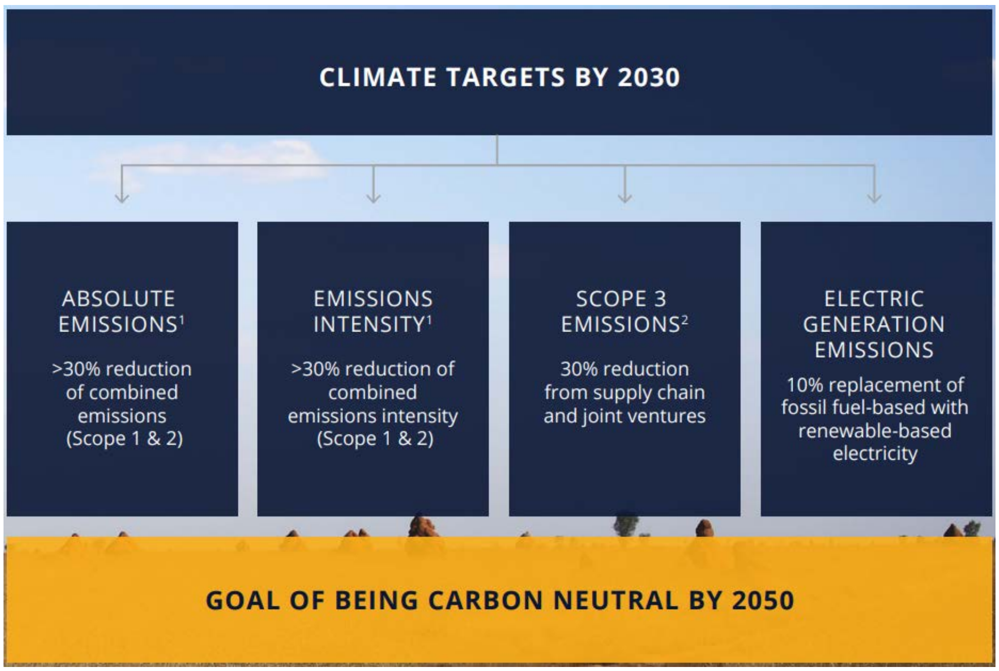

Figure 4 Newmont's Climate Change Targets (Newmont 2021a, pg. 5)

Newmont's climate change goals revolve around the reduction of combined emissions and emissions intensity for their projects. To achieve these goals, Newmont has committed to changing their haulage fleet at their operations. This includes using autonomous trucks at their Boddington mine and advanced electrification at their Borden mine (Newmont 2021a, pg. 5). Newmont's climate change goals are impactful in their finances as they have established a $500 million carbon reduction fund for climate change initiatives over a five-year period. These climate change goals affect the financial plan of Newmont and will directly play a significant role in the future of their operations. This demonstrates how ESG framework is being utilized by mining companies to appease stakeholders while also having a direct impact on their operations.

Climate change strategy in Newmont's corporate policies has had heavy influence from ESG framework. Newmont focuses on being an industry leader in ESG practices and states that Newmont has used ESG as a key part of how they make investment decisions (Newmont 2021a, pg. 6). Newmont also states that climate change plays a critical role in their operational decision-making process (Newmont 2021a, pg. 6). The areas in which they look to mitigate both financial risk and physical risks include extreme weather events and energy output cost. As these risks are Newmont's highest priority risks in combating climate change, Newmont has created five pillars to properly define their energy and climate change strategy (Newmont 2021a, pg. 9)

- **Supply** secure, consistent, and cost-effective electric power and fuel sources.
- **Cost Efficiency**
- **Collaboration** with internal and external resources in using energy policies and regulations.
- **Carbon Reduction**
- **Adaptation** of current operations and aid local communities to mitigate physical impacts related to climate change.

Newmont's five pillars combine climate change strategy, decarbonization, financial planning, and risk management to detail their plan to combat climate change. The supply and cost efficiency pillars call for Newmont's operations to reduce emission using a cost efficient and sustainable energy source. Newmont utilizes ESG framework both as an economic and a public relations tool in this strategy. Cost-efficient power methods will reduce operating costs, making Newmont have higher profit margins for shareholders and be more protected from fluctuating commodity prices. Switching to green energy sources will present Newmont as a forward-thinking company which will reduce backlash for their operations and allows them to develop stronger relationships with host communities.

Newmont states that energy and climate change play a critical role in how they invest money, especially for their long term 2050 climate commitments (Newmont 2021a, pg. 10). Carbon pricing plays a critical role in their future forecasting. "Carbon price mechanisms represent a significant financial risk to the business and incentivize a planned transition to a low-carbon economy" (Newmont 2021a, pg. 10). Thus, Newmont created an investment system that provides guidance for climate-related risks like land management, water management, and social relations. Identifying risks like carbon pricing and how it will influence the future of Newmont demonstrates the growing importance of how mining companies are identifying new risks critical to their business.

4.1.2.2. Environmental Pillar of ESG in the 2020 Sustainability Report

Newmont structures their 2020 sustainability report using ESG as an outline. Their sustainability report consists of a section detailing for each pillar of ESG alongside an economic section of the report. This indicates that Newmont values ESG data and financial data in the same merit and uses both as performance metrics for their business. The precursor to the ESG sections is a letter from Newmont's CEO Tom Palmer. Within the introduction to his letter, he states that "environmental, social, and governance (ESG) has developed and grown, and is now part of the fabric of the company and central to all our actions" (Newmont 2020a, pg. 4). This statement from the CEO affirms the critical role of ESG as a governing tool within the company and a critical part of how the company defines themselves.

Newmont defines 10 sustainability targets that are critical to their long-term business strategy. All the targets directly fall under ESG categories and four of the goals pertain to the environmental pillar as shown below (Newmont 2020a, pg. 23).

Water stewardship	
All sites achieve annual site targets for participating in multi-stakeholder watershed governance bodies that support collective action/management of water, and improving water quality and quantity	Water Stewardship
Water efficiency	
Sites to reduce fresh water consumption from the 2018 baseline (which reflects our current operating portfolio) — sites in water-stressed areas aim to reduce fresh water consumption by at least 10 percent, and the remaining sites aim to maintain our greater than 5 percent reduction target	Water Stewardship
Energy and climate change	
Achieve the following by 2030: • Reduce absolute GHG emissions (Scope 1 and 2) by more than 30% • Reduce GHG emissions intensity (Scope 1 and 2) by more than 30% • Reduce absolute Scope 3 emissions (i.e., joint venture assets and supply chain) by 30%	Energy and Climate Change
Achieve our goal of net-zero carbon emissions by 2050	
Closure and reclamation	
Achieve 95% of planned reclamation activities/associated actions across the Company	Performance Data

Figure 5 Newmont Environmental Sustainability Goals (Newmont 2020a, pg. 23)

These goals align with the UN sustainable development goals on climate action, clean water and sanitation, and responsible consumption and production. The UN SDGs are fundamental documents in the development of ESG framework and are used by Newmont as a way in defining industry relevant goals that are important to their business. As shown in figure 5 above, water stewardship is critical in maintaining complacency to permits and developing trusting relationships with host communities. As water is critical to the gold making process, Newmont states that the competition for limitedly available water is one of the most significant risks that the mining industry faces (Newmont 2020a, pg. 106). Using ESG framework, Newmont published their Global Water Strategy in 2014 to reduce water related risks. The policies used in the Global Water Strategy align with the ICMM’s water position statement and the UN SDGs (Newmont 2020a, pg. 108). They use ESG based policies and developed them into risk management policies demonstrating the critical need for ESG in mining companies to manage risk and guide their corporate policies.

Tailings management is another important environmental topic that Newmont includes in their sustainability report. A tailings storage facility collapse would lead to significant risk that would cause damage to Newmont's business, human rights, and the environment (Newmont 2020a, pg. 101). As a member of ICMM, Newmont has begun implementing strategies from the Global Industry Standard on Tailings Management in 2020 to develop a framework that will work to reduce the catastrophic risk of a tailings storage facility collapse. Newmont will integrate the tailings management lines of defense model as a means of avoiding these disasters. The figure shown below is a graphic Newmont uses in their sustainability report to provide a broad outline of their defense model.

Figure 6 Newmont's Tailings Management Lines of Defense Model (Newmont 2020a, pg. 100)

This strategy combines the environmental and governance pillars of ESG to fully manage their tailings facilities. Each level of defense within the model utilizes different leadership levels within Newmont to manage their tailings facilities. In the first line of defense, they have an engineer that directly manages the tailings at each relevant mine. This individual is specially trained in both Newmont's and federal tailings policies to ensure the proper installation of the tailings storage facilities. This job directly uses ESG principles as key parts of their duties, showing how ESG is used on all levels of the company. The second line of defense uses a third-party to periodically review their tailings storage facilities. This measure allows for checks and balances of the tailings management system as a third party provides an unbiased opinion. The third line of defense uses a dedicated "accountable executive" to oversee all tailings facilities at all operations. This position can be attributed to ESG framework as the role is designed to manage environmental risks. The accountable executive reports directly to the CEO. This shows that environmental risk is critical to Newmont's business. The final line of defense is the board of directors and executive leadership team. Newmont's Safety and Sustainability Committee continually monitors tailings storage facility data and adjust facilities or tailings policy when needed. This framework is built upon ESG principles and utilizes ESG to guide policy, create positions, and mitigate risk to protect Newmont from environmental, financial, and public relations disasters.

4.1.3. Social Pillar Analysis-Newmont

4.1.3.1. Social Pillar Overview

As part of Newmont's initiative to become an industry leader in ESG, Newmont uses the social pillar as a fundamental part of their business strategy. The quickest exposure a stakeholder would have with Newmont's social policies is through the "Our Approach to Social Responsibility" tab on Newmont's website. Newmont believes that aligning the long-term interests of stakeholders with their own business goals will be essential for success (Newmont 2022a). Newmont fosters relationships with current and potential host communities by stating that their business can catalyze economic development and social wellbeing of host communities (Newmont 2022a). Economic stimulation stems from job creation, provisioning local goods and services, community investments, and paying taxes (Newmont 2022a). Newmont relates how investing in local communities can be beneficial to their finances as they state that building strong relationships with local communities and governments can potentially reduce costs (Newmont 2022a). This statement communicates to investors that Newmont is a marketable company as they engage with local communities, thus mitigating public relations controversies while also reducing operating costs.

4.1.3.2. Social Pillar in the 2020 Sustainability Report

A methodology that Newmont uses to track sustainability within the company is to define target goals. For the social pillar of ESG, Newmont has defined goals relating to safety, local/indigenous employment, local/indigenous procurement, stakeholder complaints and grievances, community commitments, and human rights (Newmont 2020a). The social pillar comprises over half of Newmont's sustainability goals, thus demonstrating the importance of the social pillar to their business strategy. Newmont communicates the progress of their sustainability targets to transparently show stakeholders Newmont's progress on sustainable mining. For example, on the local/indigenous procurement goal, Newmont states that they have allocated over $846 million across six of their operations (Newmont 2020a pg. 21). The goal was a success in Africa and Australia but fell short in North America and South America (Newmont 2020a pg. 21). Newmont expresses the result of the goal in their sustainability report to convey to stakeholders that they invest resources into tracking sustainability data and to be transparent that they did not meet their goals. In this case, transparency is being used by Newmont to cultivate a trusting relationship with stakeholders and shareholders by disclosing the progress of their sustainability targets.

Newmont's social section within their sustainability report is the second pillar of ESG discussed in detail. The social section covers 16 pages of their report and is composed of four subsections including social acceptance, equity, human rights, and the final subsection of health, safety, and security. Health, safety, and security refers to the measures Newmont takes in protecting their employees and communities. To eliminate fatalities within the workplace, Newmont uses their "Fatality Risk Management" program as an example of ESG framework to reduce occupational fatalities (Newmont 2020a, pg. 67). To strengthen their safety program, Newmont conducted data driven, risk-based studies in 2020 to identify the causes and consequences of significant health risk scenarios that face their business (Newmont 2020b, pg. 68). Newmont is investing in resources to mitigate safety risks and collects ESG related data to perform risk analysis. Newmont benchmarks their approach to health and safety with lagging indicators like lost time incidents or fatalities as a method to drive continuous improvements in their safety record (Newmont 2020a, pg. 71). This approach to sustainability data collection reflects the effectiveness of their safety program and is a reactive approach to tracking performance. A leading indicator used by Newmont in health and safety is rapid response performance data. This type of data tracks the number of emergency simulations and training conducted and the number of response team members located at a specific project or region. Figure 7 shown below is how Newmont reports lagging indicators in their sustainability report and Figure 8 shows an example of leading indicators.

WORKFORCE SAFETY STATS

Employee-only safety rates: Trailing five years[1, 2, 3]

	2016	2017	2018	2019	2020
Fatalities	0	0	1	0	0
Lost Time Injury Frequency Rate (LTIFR)	0.20	0.30	0.24	0.27	0.18
Total Recordable Injury Frequency Rate (TRIFR)	0.44	0.49	0.36	0.41	0.30
Occupational Illness Frequency Rate (OIFR)	0.02	0.06	0.08	0.07	0.05

[1] *OIFR rates include illnesses related to airborne agents as well as noise-induced hearing loss (NIHL), infectious diseases (such as malaria, tuberculosis and dengue fever) and musculoskeletal disorders.*

[2] *2019 data includes former Nevada assets from Jan. 1 to June 30, 2019 and includes all office, metallurgy laboratory, project and exploration sites. As we integrate reporting systems, Goldcorp data will be included in future data sets. We do not disaggregate safety data by gender. Beginning in 2017, we began reporting TRIFR and LTIFR data in alignment with ICMM guidelines. Data for 2016 has been restated to reflect this reclassification.*

[3] *GRI Standards disclosures GRI 403-9: Work-related injuries; and GRI 403-2: Types of injury and rates of injury, occupational diseases, lost days and absenteeism, and number of work-related fatalities.*

Figure 7 Newmont Safety Rates (Newmont 2020a, pg. 159).

EMERGENCY PREPAREDNESS

Rapid Response performance data: Country level[1]

	Country[2]	Number of emergency response simulations and trainings[3]	Number of Rapid Response team members at this location
Africa	Ghana	0	121
Americas: North	U.S.	3	156
	Canada	2	136
	Mexico	0	45
Americas: South	Argentina	1	44
	Suriname	2	31
	Peru	1	68
	Chile	1	61
Australia	Australia	3	123
Other	Undefined	0	305
Global	**Total**	**13**	**1,090**

[1] *Due to the COVID-19 pandemic, many response teams had an active emergency response all year long. As such, some leeway was given to the standard requirement that all teams conduct an annual exercise.*

[2] *Non-mine sites are: Accra, Africa regional headquarters; Denver, Colorado (U.S.), corporate headquarters and metallurgy lab; Perth, Australia regional headquarters; Miami, South America regional office; Vancouver, North America regional office.*

[3] *This does not include the site exercises to support emergency response related to our tailings storage facilities.*

Figure 8 Rapid Response performance data by Country (Newmont 2020a, pg. 159).

The second important topic Newmont covers for social policy in their 2020 sustainability report is social acceptance. This topic is deemed as a top risk and is defined as the willingness for stakeholders to accept Newmont's business practices within their communities (Newmont 2020b, pg. 73). To deter the risk of damaging relationships with host communities, Newmont created the Social Baseline and Impact Assessment Standard for their projects. This standard includes the investigation of socio-economic, anthropologic, geo-political, and health information for the host community during the pre-feasibility stage of development (Newmont 2020c, pg. 1). The report is updated every five years and is publicly available (Newmont 2020c, pg. 1). The assessment uses extensive input from host communities and independent experts to carefully review and understand the host communities to ensure that Newmont will not negatively impact the community (Newmont 2020a, pg. 74). The assessment uses transparency, research, and community engagement as methods to gain social acceptance within host communities. Core ESG ideology is used by Newmont to structure their Social Baseline and Impact Assessment Standard in efforts to decrease social risk for projects.

To measure community relationships, Newmont tracks internal and external metrics to quantify their performance (Newmont 2020a, pg. 76). Newmont tracks complaints and grievances per project, resettlement or relocation activities, significant land or resource use disputes, and other performance metrics. Figure 9, shown below, is complaints and grievances performance data for the geographic regions where Newmont is working.

COMPLAINTS AND GRIEVANCES

Complaints and grievances: Site level[1, 2]

	Country	Number received	% resolved within 30 days
Africa	**Ghana**	**190**	
	Ahafo	115	94%
	Akyem	75	100%
Americas: North	**U.S.**	**14**	
	CC&V	14	100%
	Canada	**196**	
	Éléonore	24	N/A
	Musselwhite	0	N/A
	Porcupine	172	N/A
	Mexico	**82**	
	Peñasquito	82	N/A
Americas: South	**Argentina**	**84**	
	Cerro Negro[4]	84	N/A
	Suriname	**7**	
	Merian	7	100%
	Peru	**8**	
	Yanacocha	8	100%
Australia	**Australia**	**6**	
	Boddington	6	100%
	Tanami	0	N/A
Global	**Total**	**587**	**96.9%**

[1] *Tracking of the percent of complaints resolved within 30 days is expected to be available for former Goldcorp sites later in 2021.*
[2] *GRI Standards disclosure GRI 102-44: Stakeholder key topics and concerns raised.*

Figure 9 Complaints and Grievances by Country (Newmont 2020a, pg. 175).

This data demonstrates which geographic regions Newmont needs to address to have strong relationships with host communities. The largest levels of complaints came from noise, vibration, air quality and compensation practices. The tracking of these performance categories shows where Newmont struggles in their operations in community relations, but they are also transparent about their errors. By understanding where they struggle, they can build better relationships with communities by addressing severe problem areas. This presents Newmont as a better company as they show that they can work with the public.

The final topic listed as a pivotal risk to Newmont's business in the social section of the sustainability report is human rights. Newmont's human rights policies draw from the UN Global Compact. Newmont requires that all sites must identify and manage the potential for human rights risks to occur (Newmont 2020a, pg. 83). The UN SDGs also provide the basis for their Supplier Risk Management program (SRiM). This program uses pre-qualification screening, scope-of-work risk assessments, and human rights trainings to ensure that suppliers meet the UN SDGs and Newmont's human rights policies to ensure that Newmont is not correlated in human rights disasters (Newmont 2020a, pg. 83). SRiM is strengthened by Newmont's discovery in 2018 that automated processes are not enough to catch all human rights risks. Individuals within Newmont who have awareness of the supplier are used in flagging potential human rights risks (Newmont 2020a, pg. 83). The individual's role within the company is to enforce ESG policy to mitigate risks which validates ESG as a growing trend within the mining industry as new positions are being created to enforce ESG. Newmont's reporting commitments regarding human rights have earned them a ranking as a top company from the Corporate Human Rights Benchmark (Newmont 2020a, pg. 85). Newmont was ranked 19th out of 200 global companies, affirming the positive impact ESG has on the mining industry. Newmont includes in the report how they will continue to build on their human rights reporting policy with their "future targets" which can be seen in figure 10 below.

Future targets: Human rights and the supply chain

Year	Target definition	Target for regions/sites	Target for Company
2021	Manage human rights risks for applicable suppliers that have an elevated likelihood of impacting human rights	Risk mitigation plans are implemented for 60% of contracts with suppliers* identified as having an elevated likelihood of impacting human rights	100% of sites/regions achieve the annual targets
2022		Risk mitigation plans are implemented for 80% of contracts with suppliers* identified as having an elevated likelihood of impacting human rights	100% of sites/regions achieve the annual targets
2023		Risk mitigation plans are implemented for 100% of contracts with suppliers* identified as having an elevated likelihood of impacting human rights	100% of sites/regions achieve the annual targets

* *Target will apply to suppliers with new or updated contracts starting January 1, 2021, at Newmont sites where the SRiM program has been implemented.*

Figure 10 Newmont's Yearly Plan to Implement SRiM (Newmont 2020a, pg.86).

Newmont has plans over a two-year period to fully integrate strict human rights pre-screening processes to ensure the suppliers they are working with fully comply with Newmont's human rights policies. Strict human rights policies implemented by Newmont and enforcing these policies on vendors they work with limits the potential for human rights risks to occur. This keeps Newmont away from public controversy, which protects their integrity and marketability.

4.1.3.3. Additional Social Policies at Newmont

Newmont has a publicly available People Policy statement that establishes the corporation's relationships and commitments with its employees. This document is three pages in length and states a numerical list of commitments the corporation has made to its employees. The first commitment made is that Newmont is committed to the success of all their employees (Newmont 2020d). This goal states that Newmont will invest in training and performance management into their employees to maintain Newmont's competitive advantage within the industry and will also provide jobs for local workforces (Newmont 2020d, pg. 1). With this commitment, Newmont states that investing in their employees is a method that both provides them with financial advantages over competitors, making them marketable, while also being a catalyst for economic prosperity to host communities. This exhibits how ESG is intertwined with financial strategy within the mining industry to create value for the company and their stakeholders. The second commitment in the People Policy report is to treat people with respect. This statement states that they do not discriminate based on race, religion, gender, age, or disability and prohibits bullying of any kind (Newmont 2020d, pg.1). This commitment is geared towards establishing and maintaining a hostile free work environment which makes Newmont a more pleasurable place to work.

Another commitment in the People Policy is that Newmont promotes diversity and an inclusive environment and believes that this adds value within the company due to having a broader range of perspectives (Newmont 2020d, pg.1). This commitment stems from ESG as ESG policy theory dictates that a company is stronger with a more diverse background (S&P 2020b). The final relevant commitment is the commitment to investigate workplace complaints. Newmont deems it necessary to have open and honest communications between all levels of the organization (Newmont 2020d, pg.2). This structure keeps higher level members of the company accountable for their actions and provides frameworks to mitigate workplace harassment. This commitment gives more power to Newmont's employees.

Newmont's Code of Conduct uses the social pillar of ESG to shape their policies. Of Newmont's 15 standards in their code of conduct 9 of them directly correlate to the social pillar (Newmont 2020e, pgs. 3-5):

1. We work safely
2. We promote sustainability
3. We value diversity and inclusion and work respectfully
4. We make hiring and promotion decisions fairly
5. We work collaboratively
6. We follow established standards for operations and resource development

7. We speak up when we see issue or have questions, and cooperate candidly in investigations
8. We support and protect those who speak up
9. We are accountable for holding up the code

The codes listed above, and the People Policy report overlap in many of Newmont's key policies regarding social standards. Working collaboratively, diversity, resource development, and protecting whistleblowers are all ESG policies that Newmont has integrated in multiple corporate policy documents to shape who they want to be as a company. These two documents validate the role of ESG, through the social pillar, in major publicly traded mining companies.

4.1.4. Governance Pillar Analysis-Newmont

4.1.4.1. Newmont Leadership

To properly define the role of Newmont's governance structure to their stakeholders, Newmont created the Corporate Governance Guidelines document. This document outlines the responsibility of the governing bodies of Newmont, like the board of directors or the executive committee. This document states that the mission of the board is to comply with Newmont's governance principles in the following policies of safety, integrity, sustainability, inclusion, and responsibility (Newmont 2020f, pg. 1). Newmont will fulfill its corporate purpose in creating value and improving lives through the development of strong relationships with their stockholders, customers, communities, employees, and suppliers through sustainable and responsible mining (Newmont 2020f, pg.1). This affirms that sustainability is a key part of Newmont's business strategy as sustainability is a principal focus for leaders within the company.

Newmont's executive leadership team consists of seven members composed of a 4/3 split in male to female executives (Newmont 2022a). Within their executive team, many of the officers hold responsibilities that pertain to improving sustainability within Newmont. In Tom Palmer's bio on the company website, the CEO, he is described as having experience in delivering production, implementing safety programs, and improving diversity (Newmont 2022a). Describing the role of the CEO as being experienced in commodity production and integrating sustainability into the corporate structure shows that Newmont wants investors to know that they prioritize both sustainability and financial returns equally. Jennifer Cmil is Newmont's Executive Vice President of human resources (Newmont 2022a). Her role within the company is to focus on internal social affairs within the company, exemplifying how ESG contributes to the implementation of positions into the highest corporate governance bodies. Stephen Gottesfeld is Newmont's Chief Sustainability and External Affairs Officer alongside being an executive vice president (Newmont 2022a). Newmont's governance structure dedicates one of their executive positions to be fully in charge of sustainability affairs within the company. This is an indication that ESG policy is significant in the shaping of Newmont's business strategy.

Additionally, Newmont has 24 Senior Officers that fill other large-scale roles for the company. Some roles that contain ESG responsibilities are as followed (Newmont 2022a):

- Senior Vice President External Relations
- Senior Vice President Supply Chain
- Chief Integrity and Compliance Officer
- Senior Vice President Health, Safety, and Security

The positions listed above illustrate how leadership roles within mining companies have created positions that focus on integrating sustainability policy into their corporate policies.

4.1.4.2. Governance in the 2020 Sustainability Report

Governance is the first ESG section addressed within Newmont's 2020 sustainability report. Governance is an important method of risk management for Newmont as stated in the intro to the Governance section. Newmont states that strong corporate governance through the boards oversight is essential to mitigating risk and creating long-term value for stakeholders (Newmont 2020a, pg. 54). The essential governing bodies of Newmont that oversee their business strategy are the Audit Committee, the Leadership Development and Compensation Committee, Corporate Governance and Nomination Committee, and the Safety and Sustainability Committee (Newmont 2020a, pg. 54). All of Newmont's "core" committees use ESG elements to define their purpose within the company. Newmont defines the committees as the highest level of oversight within the company and each committee uses ESG. This demonstrates that ESG is integrated at all levels of Newmont's corporate hierarchy and is essential to their business.

ESG based governance policy is critical in the shaping of the number of directors on Newmont's board. Newmont reduced their board from 15 to 11 to have better accountability and to create a more diverse board (Newmont 2020b, pg. 55). Diversity is important to Newmont as having diversity in their directors will enhance their corporate strategy as there will be broader experiences and perspectives composing their board (Newmont, pg. 55). To convey their diversity in their board of directors, Newmont also put a pie chart into their report to show their stakeholders the diversity of their key decision makers.

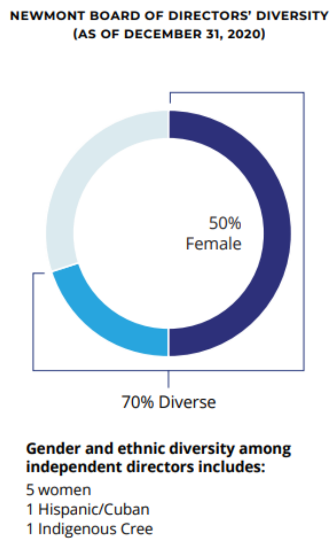

Figure 11 Newmont Director Diversity Chart (Newmont 2020a, pg. 55).

Their commitment to diversity in their board is a primary example of a mining company using sustainability in governance. Sustainability is critical to Newmont's governance structure, especially through their Safety and Sustainability (S&S) Committee. The committee's role within the company is to oversee health, safety, security, sustainable development, environmental management, stakeholder affairs, human rights, cultural heritage, and government relations policies and issues within the company (Newmont 2020b, pg. 55). The S&S committee is important to Newmont's sustainability strategy, and thus their business strategy, as they meet quarterly to discuss strategies to mitigate Newmont's top safety and sustainability risks, progress on internal metrics and public targets, and continuously improve Newmont's performance (Newmont 2020b, pg. 55). The S&S committee is a governance framework used by Newmont to implement ESG policy into their corporate strategy, which is governed by their board of directors. This demonstrates the shift in the role of the board of directors in the mining industry as they now focus on ensuring they are a sustainable company. The following image is a flowchart demonstrating the corporate structure of Newmont and how ESG is integrated into their governing bodies.

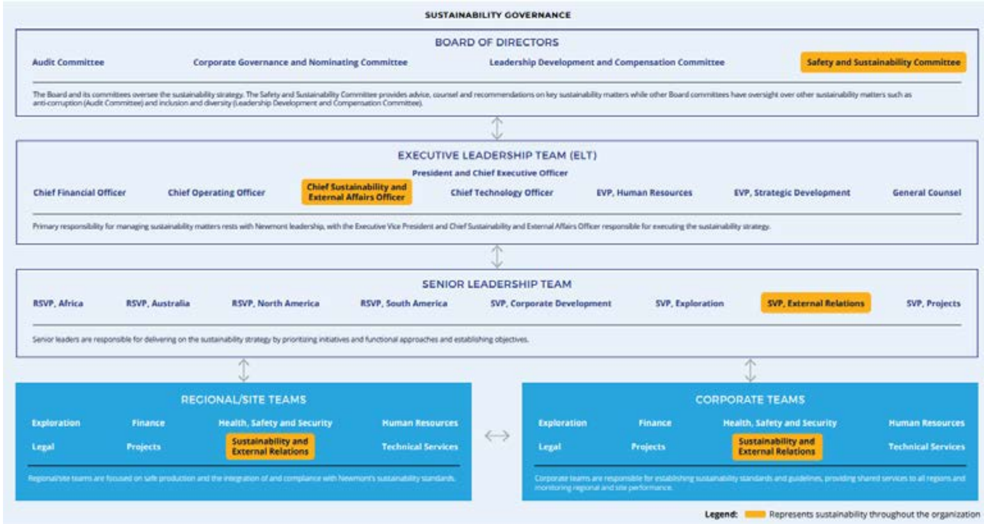

Figure 12 Newmont Sustainability Governance Flowchart (Newmont 2020b, pg. 57).

This graphic shows that at all major levels of Newmont's corporate governance there is at least one section that works with sustainability as a focus. This validates that ESG is being integrated as a key corporate policy for decision making and risk management throughout all structures of the company.

The executive team is the next stage in the implementation and utilization of ESG framework on Newmont's policies. The chief of sustainability implements Newmont's sustainability strategy and oversees the Sustainability and External Relations (S&ER) function. The S&ER team develops and implements management frameworks to ensure that Newmont is meeting the compliancy of standards and strategies set in place for their social and environmental goals (Newmont 2020b, pg. 56). Having an executive officer focus on sustainability strategy affirms stakeholders on Newmont's commitment to becoming leaders of ESG within the mining industry. This also exemplifies how Newmont is committed to sustainability by committing an executive officer position that strictly focuses on sustainability. Other executive officers also hold roles that relate to Newmont's sustainability strategy. Newmont's Chief of Technology acts as the Accountable Executive for Newmont's tailings storage facilities. Tailings is a major risk management topic within the mining industry and is critical to environmental sustainability policy and risk management. Committing an executive officer to oversee the tailings dam storage standards and upkeep demonstrates that ESG risks are being identified by Newmont as being critical risks that must be managed by the highest level of governance within the company.

The next major topic in the governance section of the sustainability report is Business Integrity and Compliance. Integrity is one of Newmont's core values as it protects Newmont's reputation, avoids financial harm, and helps maintain the trust of stakeholders (Newmont 2020a, pg. 58). To ensure strong compliance to business integrity across all operations, Newmont developed the business integrity and compliance BI&C program (Newmont 2020a, pg. 58). This program is led by the Chief Integrity and Compliance officer who works with the legal department, comprising of lawyers and auditors to implement the business integrity program across Newmont (Newmont 2020a, pg. 58). This program is overseen by the Board's Audit Committee who defined the program's scope, purpose, and responsibility to Newmont (Newmont 2020a, pg. 58). The BI&C programs existence demonstrates that mining companies are implementing ESG influencing governing bodies into their corporate framework as methods of risk management and policy creation. The BI&C program manages risks within Newmont by integrating training, communication, and personnel management practices to build and integrity culture within the company (Newmont 2020b, pg. 59). This is a process of using ESG to directly change the corporate culture and how can ESG affect employees in their daily lives.

To determine the success of the BI&C program, Newmont has created performance targets and metrics to quantitatively measure the need and success of the program. The following image below is how Newmont quantitatively measures governance ESG data for integrity.

ETHICS INVESTIGATIONS

Ethics matters opened, addressed and substantiated in 2020

New issues captured in Integrity Helpline	383
Total matters addressed (substantiated and unsubstantiated)	383
Total substantiated cases	71

Nature of ethics matters opened in 2020

Nature of cases	Number	Percentage
Allegations of misconduct or inappropriate behavior	163	42%
Concerns about corruption[1]	57	15%
Inquiries	126	33%
Environmental health and safety regulations	10	3%
Other	27	7%
Total	**383**	**100%**

Figure 13 Newmont's Integrity Data (Newmont 2020a, pg. 60).

The publishing of this data provides insight for stakeholders on the typical integrity related concerns that Newmont can have. For example, stakeholders can see that inappropriate behavior is the largest concern but also tells Newmont what areas of their corporate policy need changing.

The governance pillar of ESG is fundamental to how Newmont manages risks facing their business. Newmont has created their global Risk Management Standard that acts as a risk assessment framework, based on the International Standard for Risk Management (ISO 31000:2019), that evaluates and manages important risks (Newmont 2020a, pg. 62). Identified risks go through the Enterprise Risk Management process that tracks, identifies, and documents risks so that they can be reported to senior leaders and board members of Newmont (Newmont

2020b, pg. 62). The risk management process exemplifies how ESG is changing how companies manage risk and demonstrates how the highest levels of the company must consider sustainability risks as part of their jobs.

4.2. Rio Tinto

4.2.1. Environmental Pillar Analysis-Rio Tinto

This section will cover Rio Tinto's environmental policies and data. The primary source for environmental policies and data available for Rio Tinto is on their website. Their website has a sustainability tab which entails an environmental section, a Climate Change Report, and a Sustainability-Fact Book.

The role of the environmental pillar of ESG is a fundamental part of Rio Tinto's business strategy. In Rio Tinto's "About" section on their website they detail how they are prioritizing low carbon transition as the heart of their business strategy (Rio Tinto 2022a). Rio Tinto declares that the three most important parts in developing as a company are (Rio Tinto 2022a):

1. Accelerating our own decarbonization, switching to renewable power, electrifying processing and running electric mobile fleets.
2. Prioritizing growth capital in commodities that are essential to the drive to net zero, and look to grow further in copper, battery materials and high-quality iron ore.
3. Increasing our investment in R&D to speed up the development of products that will enable our customers to decarbonize quicker.

Rio Tinto presents their business strategy as entirely focused on reducing scope 1 and 2 emissions, which is a prime example of how ESG influences public company policy. This is an indicator of how sustainability is used as a public relations tool to help Rio Tinto in obtaining a social license to operate. This is seen by their commitment to switch their power sources on job sites and switching mobile fleets to renewable power, thus lowering their carbon footprint which will have direct impacts on their capital costs on projects. Decarbonization will influence future investments of the company as they prioritize commodities that will contribute to a greener future, demonstrating how environmental and social pressures cause mining companies to re-evaluate their business strategies.

Under “Our Strategy” in the sustainability tab, Rio Tinto outlines that they have developed a new sustainability strategy in 2018 to increase their focus on sustainability issues material to their business. This strategy calls for Rio Tinto to increase transparency of social and environmental performances across all operations to increase stakeholder knowledge and engagement (Rio Tinto 2022a). To enforce their commitment to sustainability, Rio Tinto states that they support the UN’s Sustainable Development Goals and the 2030 development agenda. Their sustainability strategy is broken up into three pillars which are

1. Running a safe, responsible, and profitable business
2. Collaborating to enable long-term economic benefits
3. Pioneering materials essential for human progress.

Of the three pillars that are important to Rio Tinto’s sustainability strategy, two of them have environmental subcategories. Rio Tinto establishes the environment and tailings management as key parts of pillar 1 and climate change as a key part of pillar 3. These pillars integrate the three ESG segments together to create a sustainable business model.

4.2.1.1. Environmental Pillar Overview

This section covers a portion of Rio Tinto’s website that gives an overview of Rio Tinto’s integration of environmental policies based on the first pillar of their sustainability strategy. Rio

Tinto wants to see themselves as "long-term stewards of natural resources" by supporting the ecosystems and freshwater systems they work on from the start of the project to the end of the project (Rio Tinto 2022a). In their summarized "Environment" section of pillar 1, Rio Tinto states that they want to mitigate the risks and impacts their operations may hold on to the environment (Rio Tinto 2022a). To provide context to this initiative, they use their Diavik Diamond Mine project and Weipa operations as examples of projects in which they integrate local Aboriginal people into their environmental efforts through measures such as water testing and plant seeding. This is a combination of both social and environmental portions of ESG being directly integrated into their operations. Rio Tinto publishes these case studies to inform stakeholders of their commitment to sustainable mining. Supporting ecosystems and freshwater systems, related as part of their environmental strategy, are related to the clean water and sanitation and life on land UN SDGs. Rio Tinto utilizes the UN SDGs as a risk management tool and the foundation of their environmental policies. This shows how mining companies are using ESG within their corporate policies to mitigate risk.

The second topic Rio Tinto discusses in their environment section is Partnerships. To strengthen their environmental policies, Rio Tinto partners with industry associations and relevant non-governmental organizations (NGOs) to influence and guide their own sustainable policies. Rio Tinto utilizes the ICMM's ecosystems management, air and water emissions control, and waste management policies as a primary source for influencing their environmental standards. This demonstrates Rio Tinto's commitment to sustainability as a core part of their business as they are working alongside leaders of ESG like ICMM to create company policy. For their commodities, Rio Tinto is a part of the Aluminums Stewardship Initiative (ASI) and has also been awarded the Copper Mark for their responsible operations. Mentioning the Copper

Mark and their commitment to ASI and ICMM presents Rio Tinto in a more positive light as it is an example of their commitment to achieving a higher standard of environmental sustainability.

In continuation of this trend, Rio Tinto provides examples of NGO and UN commitments they use to strengthen their environmental policy. Within this section of the website, Rio Tinto provides examples of projects in which they have had mutually beneficial relationships with the environment. For example, the Richard Bay Minerals operation in South Africa has been a study point for many researchers on dune rehabilitation. Rio Tinto states that this project alone has contributed to published findings that can be found in 60 international scientific journals (Rio Tinto 2022a). Rio Tinto mentioning this provides context that they can continue to produce their resources while having positive impacts on the environment. This is important for mining companies to have it publicly available as it helps alleviate public criticisms of Rio Tinto's operations and allows them to maintain their social license to operate.

4.2.1.2. Rio Tinto's Primary Environmental Concerns

Within their website, Rio Tinto separates the environment into the five most important environmental categories which are biodiversity, water, land, industrial environment, and tailings. Each category has a small section in which they provide context as to why it is important to their business and what they do to mitigate risk in each area.

Addressing biodiversity is important for Rio Tinto as they acknowledge that their operations inherently pose a risk to biodiversity and the communities that rely on the environment (Rio Tinto 2022a). Rio Tinto is committed to minimizing the impacts on biodiversity through the development of what they call the mitigation hierarchy. The mitigation hierarchy uses four methods of creating positive change to biodiversity at their operations. They include avoidance, minimization, restoration, and offset. Having this framework in place establishes to stakeholders that Rio Tinto is ready and capable of having a positive impact on the areas they work in. The creation of the mitigation hierarchy is a method of ESG used to control and manage Rio Tinto's business by having stronger policies to reduce environmental disasters that would damage Rio Tinto's finances and their public image. Rio Tinto's public commitment to their mitigation hierarchy is an example of how mining companies are evaluating sustainability as critical risks that face their company.

Rio Tinto's biodiversity policies stem from the developed policies created by the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). Rio Tinto uses data from the UNEP-WCMC to manage their operations and prioritize each operation in terms of biodiversity importance (Rio Tinto 2022a). The methodology of collecting sustainability data allows Rio Tinto to address and examine biodiversity risks more accurately. This allows them to identify the potential for biodiversity related risks to occur and mitigates the potential of causing biodiversity related disasters. This is an example of a multinational company using existing ESG data and frameworks to influence their corporate policy.

A large part of having the social license to operate is having an effective plan on how the land will be used and how the land will be restored post-operation. Rio Tinto views land management as essential for profitable business (Rio Tinto 2022a). Rio Tinto will get more involved with the traditional landowners to restore the land to meet their standards. This includes having local members of Indigenous tribes having input on environmental and cultural heritage sites around their projects (Rio Tinto 2022a). This is a strategy that uses ESG as a base structure to mitigate the potential for a large-scale environmental or reclamation related disaster and a multinational mining company stating the key importance of ESG in the profitability of their business.

The water section under the “Environment” header on Rio Tinto’s website is one of the more detailed sections on their website regarding working with the environment. Rio Tinto aims to use water as efficiently as possible in the design and operation of their sites, and their risk assessment process is fundamental to this (Rio Tinto 2022a). As a member of the ICMM, Rio Tinto has strong policies regarding the protection of waters. Rio Tinto claims to be the most transparent in the industry regarding water stewardship (Rio Tinto 2022a). To further convey their commitment to their operations’ water allocation, Rio Tinto has created a goal to have 100% disclosure on all allocations of surface water usage at their projects (Rio Tinto 2022a). This goal holds themselves more accountable to water usage, especially in areas of high-water scarcity. This goal was created to have better accountability and compliance with the natural resources Rio Tinto works with and is rooted through the integration of ESG policy.

The fourth major environmental concern for Rio Tinto is industrial environment. Rio Tinto defines industrial environment to be the product of any pollutant from their operations including emissions, discharge, and any other waste product (Rio Tinto 2022a). Rio Tinto, for all their operations, is looking to find ways to reduce the amount of waste material they produce or to find ways to recycle the waste material. They include examples of their Oyu Tolgoi operation in Mongolia in which they take waste oil lubricant products and use it as an ingredient for soap. Another example is Rio Tinto using the waste rock at their borate project in California as an extra source of revenue stream by extracting high grade lithium from the waste. The inclusion of these examples is Rio Tinto showing investors that they can minimize waste to both save the environment and to profit off it.

The final major environmental concern for Rio Tinto is the management of Tailings. Rio Tinto commits to being transparent about their tailings facilities and how they are managed (Rio

Tinto 2022a). In collaboration with the ICMM, Rio Tinto is part of the Global Industry Standard on Tailings Management which continually reviews tailings dam standards across the industry and ensures more consistency and rigor in how tailings are managed (Rio Tinto 2022a). In an additional document, Rio Tinto's Tailings Policy, they state their engagement into continuously improving on their tailings designs, monitoring their tailings dams, and overall transparency with stakeholders about tailings dams (Rio Tinto 2022a). A separate document is created to strengthen stakeholder confidence in Rio Tinto's tailings policies to alleviate the potential for a tailings dam collapse. This document is part of the utilization of ESG by Rio Tinto to convey the mitigation of large-scale risk to stakeholders.

4.2.1.3. Rio Tinto's 2020 Climate Change Report

This section will cover Rio Tinto's 2020 Climate Change Report and discusses the implications of ESG and environmental policy at Rio Tinto. The report is a short 35-page document filled with environmental goals, responsibilities, and examples of Rio Tinto's sustainable efforts at their projects. The report contains graphics and other visual aids to convey data and goals. The report is broken down into four different sections which reflect the "four pillars" of Rio Tinto's climate change strategy. The four pillars of Rio Tinto's climate change strategy are producing materials essential to a low-carbon future, reducing the carbon footprint of our operations, partnering to reduce the carbon footprint across our value chains, and enhancing our resilience to physical climate risks (Rio Tinto 2020b, pg. 4).

After the executive letters, the first page of the report is a mixture of gross revenues per commodity accompanied by their position on climate change. Figure 14 shown below is a graphic that shows their earnings alongside emissions per commodity.

	Iron Ore	Aluminium	Copper & Diamonds	Energy & Minerals
Mines	16	4	5	6
Smelters	–	14	1	–
Processing plants & refineries	–	4	–	7
Mt CO_2 emissions	3.0	21.8	2.7	3.6
Rio Tinto share of production	Iron ore 275.5Mt (2019: 270.7Mt)	Bauxite 56.1Mt (2019: 55.1Mt) Aluminium 3,180kt (2019: 3,171kt)	Mined copper 528kt (2019: 577kt)	Titanium dioxide slag 1,120kt (2019: 1,206kt)
Underlying EBITDA	$18.8bn (2019: $16.1bn)	$2.2bn (2019: $2.3bn)	$2.2bn (2019: $2.1bn)	$1.6bn (2019: $1.8bn)

Figure 14 Gross Revenue (Rio Tinto 2020b, pg. 6)

Rio Tinto combines financial data with environmental principles showing how important environmental considerations, especially climate change, play a role on how they think about finances. This can be further shown on this page as they state that they will produce "materials such as aluminum used in electric vehicles, copper used to build wind turbines, and iron ore used to create critical infrastructure" (Rio Tinto 2020b, pg. 6). The mentioning of this gives the implication that Rio Tinto's portfolio is green and works directly with fighting climate change. This statement also implies that they have a bright future in continuing to mine commodities as it contributes to high potential industries. This point ties into their first pillar of producing materials essential for a low-carbon future as seen in the figure shown below. Reports published by mining companies within the industry focus on commodities produced, production of commodities, reserves, and before tax cashflow as key pieces of data to convey to investors. Figure 14 above contains underlying EBITDA, production, and mines by commodity while also integrating greenhouse emissions into the table showing how Rio Tinto views sustainability data as equals to traditional data shared to investors. ESG is being integrated within key production data to exhibit the company's financial and sustainable standing.

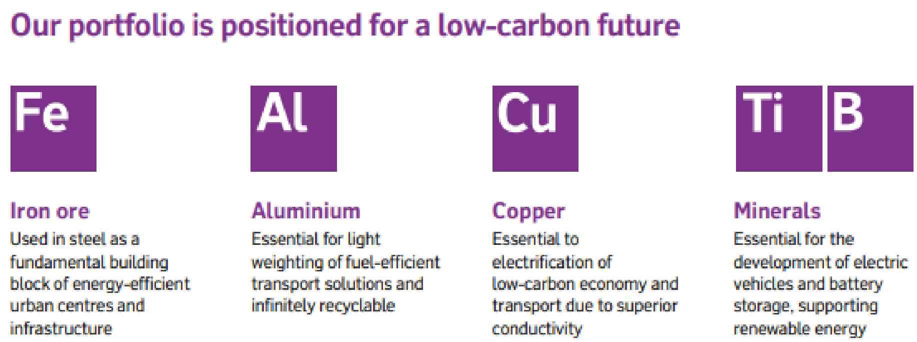

Figure 15 Rio Tinto Low-Carbon Future by Commodity (Rio Tinto 2020b, pg. 11)

Rio Tinto uses climate change as a consideration in determining how to shape their portfolio (Rio Tinto 2020b, pg. 11). This can be seen with their strong commitment to continue working with commodities like iron or aluminum while eliminating their stake in the coal extraction business in 2018 (Rio Tinto 2020b, pg.3). Figure 15 above, is a graphic used by Rio Tinto to affirm stakeholders and shareholders that Rio Tinto will continue to have relevancy within the industry by investing in commodities that have sustainable futures. This graphic is one of the core principles in Rio Tinto's business strategy. This combines financial marketing with sustainability, showing that ESG has a strong influence in a mining company's business strategy and marketability.

The second pillar discussed in this report is "reducing the carbon footprint of our operations." This influences operations as Rio Tinto has become committed to implementing renewable energy as a key priority to their business (Rio Tinto 2020b, pg. 24). The reduction of carbon emissions is discussed through Rio Tinto's Planning Review Committee which consists of their CEO, CFO, CCO, and other executives. The committee discussed how to mitigate emissions on an asset-to-asset basis and determined that it is necessary to spend $1 billion on climate change over the next five years (Rio Tinto 2020b, pg. 26). The company expenditure is influenced by how Rio Tinto evaluates the environmental impact of their operations. Additional resources and jobs are created and used to investigate how to mitigate climate change related risks to their operations as seen from their $1 billion commitment. This demonstrates a growing industry trend of investing more into ESG related topics and its integration into corporate decision making.

The third pillar for mitigating and controlling climate change related risks is "partnering to reduce the carbon footprint across our value chain." This pillar is focused on addressing the need to reduce scope 3 emissions in their supply chain versus the second pillar which focuses in on scope 1 and 2 emissions, which are directly caused by Rio Tinto's operations. This section addresses which part of Rio Tinto's portfolio produces the most scope 3 emissions and discusses how Rio Tinto continues to improve on the tracking of scope 3 emissions. The primary message in this section is that Rio Tinto is working on ways to minimize scope 3 emissions, specifically by decarbonizing as much of the metal production chain as possible (Rio Tinto 2020b, pg. 38). This includes working on projects like Rio Tinto's partnership with Apple and Alcoa to develop the first carbon free aluminum smelting process. This appeals to stakeholders as it emphasizes a willingness to collaborate with other industries on reducing emissions. This also influences Rio Tinto's logistical side of their business as reducing scope 3 emissions alters how they get their commodities to market and will influence what companies they do business within their supply chain. Such considerations are relevant to investors as altering how Rio Tinto brings commodities to market can alter profits for Rio Tinto.

The final pillar of Rio Tinto's climate change strategy is "enhancing our resilience to physical climate risk." Rio Tinto deems this as an important pillar as stated in the first sentence of the section with "taking and managing risk responsibly is essential to running our business efficiently and in a way that creates value for our customers…" (Rio Tinto 2020b, pg. 45). Evaluating climate related risks has become fundamental to how a company like Rio Tinto evaluates projects and uses ESG framework to mitigate such risks. Performance on high-risk issues and projects could negatively or positively affect Rio Tinto's performance, prospects, or reputation (Rio Tinto 2020b, pg. 47). This is Rio Tinto combining governance and environmental policy to prevent any catastrophic damage to their company's projects or reputation.

4.2.1.4. Rio Tinto's 2020 Sustainability-Fact-Book

Rio Tinto uses a different format for presenting their sustainability data and reporting than other companies. Companies within the industry and the other companies reviewed in this Thesis use a Sustainability Report with a combined format of written content and data. Rio Tinto's most up-to-date sustainability report comes in the form of their Sustainability-Fact-Book which is an excel file that breaks down environmental, social, and governance data related to the company. Some important pieces of data found in this report are implemented in different documents like annual reports or climate reports. This section will show how this fact book presents environmental data.

Rio Tinto establishes eight sustainability goals, two of which are environmentally related (Rio Tinto 2020a, "Group Level Targets").

1. To reduce our absolute Scope 1 and 2 emissions by 15% and our emissions intensity by 30% by 2030.
2. To disclose for all managed operations by 2023, their permitted surface water allocation volumes, annual allocation usage, and estimated surface water allocation catchment runoff from average annual rainfall.

The environmental goals set out by Rio Tinto are directly influenced by The UN sustainability development goals and the ICMM principles, specifically ICMM Principle 6 and UN Development goal 6 which both deal with proper water management. This shows that key members of the development of ESG are critical in the development of company policy within the mining industry.

The environmental section of this fact sheet is composed of data regarding the economics of their climate change strategy, scope emissions data, mineral waste data, water management, and tailings. The data is broken down by geographic region and by commodity. This provides extensive insight on which commodities have positive or negative environmental trends. Environmental data is the last set of data and encompasses the largest number of sections in the report. Table 2 is an example of how data is presented in the report. This table shows greenhouse gas emissions by commodity in 2020.

Table 2 Greenhouse Gas Emissions by Resource Group (Rio Tinto 2020a, "Greenhouse Gas Emissions)

Greenhouse Gas Emissions

2020 equity greenhouse gas emissions by product group (Mt CO2e)	Scope 1 emissions (Mt CO2e)	Scope 2 emissions (Mt CO2e)	2020 Total emissions (Mt CO2e)
Aluminium			
Aluminium (Pacific)	4.6	5.4	10.1
Aluminium (Atlantic)	5.2	0.1	5.3
Bauxite & Alumina	6	0.5	6.4
Energy & Minerals	2.4	1.2	3.6
Iron Ore	3	0	3
Copper & Diamonds	1.2	1.5	2.7
Other (includes Shipping and corporate functions)	0.5	0	0.5
Rio Tinto Total	**22.8**	**8.7**	**31.5**

4.2.1.5. Environmental Pillar in Rio Tinto's 2020 Annual Report

Within Rio Tinto's 2020 Annual report, there is a section that covers sustainability. Topics of importance within the report related to the environment include emissions, water management, biodiversity, and proper mine closure. The sustainability section has become a more detailed part of Rio Tinto's annual report over time. In comparison, Rio Tinto's 2014 report contains 7 pages related to sustainability while the 2020 report is over 30 pages. The increasing amount of detail included about sustainability reporting within the annual report is a testament to ESG and sustainability reporting and how it is becoming an increasingly important trend within the mining industry.

The first issue Rio Tinto addresses in the environmental segment of the report is emissions. Multiple tables are presented that identify and quantify total greenhouse gas emissions. Emissions data is reported by scope 1 and 2 emissions, emissions by commodity, emissions by geographical region, and emissions by scope 3 emissions. Rio Tinto uses this section to demonstrate how their transition to renewable sources of electricity plays a critical role in reducing total emissions. Figure 16, shown below, shows two pie charts that break down what sources their electricity on job sites comes from and where the highest source of emissions comes from. Including these charts in the annual report is an example of Rio Tinto using ESG data to appeal to stakeholders to show that they are a green company.

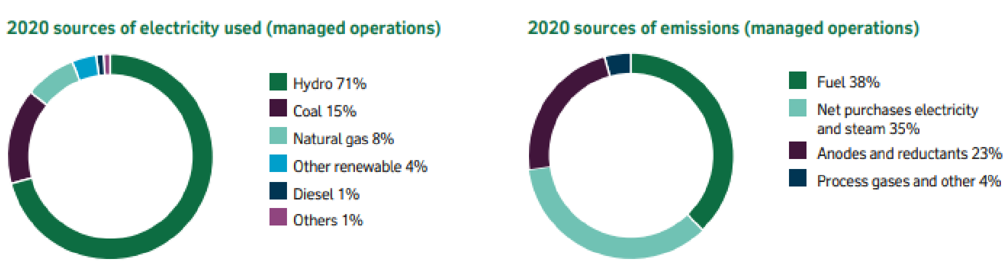

Figure 16 Emissions Pie Charts (Rio Tinto 2020C, pg. 80)

The next section, and the largest, is the water management section. The water management section is structured around the ICMM water stewardship principle and contains extensive data regarding Rio Tinto's water management. Rio Tinto states that they are the most transparent in the industry regarding water stewardship by publicly reporting progress on their water goals (Rio Tinto 2020c). The presentation of this information includes 3 pages of extensive water management data. This is in the report to prove their transparency on their water management and provides stakeholders with evidence that Rio Tinto is putting effort to track and manage water at their operations. This section is an example of Rio Tinto using ESG data to create a better image of being a more sustainable company.

4.2.2. Social Pillar Analysis-Rio Tinto

This section will cover how Rio Tinto integrates the social pillar of ESG into their company policy. The social pillar is important to Rio Tinto, which can be seen in their company values as followed (Rio Tinto 2022a).

1. Care: for people, for the communities in which we operate and for our environment.
2. Courage: to try new things, speak up and do what's right.

The core values exemplify how Rio Tinto utilizes the environmental and social pillars of ESG as important parts of their company's philosophy. These values convey how the company places a high importance on the host communities they work in as seen in the first value. Prioritizing a strong relationship with host communities is a key part of the social pillar of ESG. The social pillar is also a major part of Rio Tinto's three pillars of sustainability. Most of the subcategories of their sustainability pillars pertain to the social pillar and can be seen below (Rio Tinto 2022a).

1. Health, Safety and Wellbeing

2. People
3. Human Rights
4. Communities
5. Social and Economic Development
6. Materials of the Future
7. Partnerships

Rio Tinto labels health, safety, and wellbeing as their first value. Rio Tinto explains that the safety of their colleagues and communities is one of their top priorities (Rio Tinto 2022a). This is backed up with having zero fatalities in 2019 and 2020 and a decreased injury frequency rate across all their projects by 12% (Rio Tinto 2022a). This promotes the idea that Rio Tinto is a good place to work due to their competent safety culture and is a form of advertising to stakeholders that there is a minimal risk of catastrophic injuries at Rio Tinto's projects.

Another way Rio Tinto utilizes the social pillar to develop their company is to engage with the local communities on their projects. The first aspect of their community engagement strategy is through the form of negotiated doctrines with local communities called community agreements. These agreements are used by Rio Tinto as a mechanism for accountability and provides local communities with transparency on the development of their project and closure plans (Rio Tinto 2022a). These agreements benefit local communities through social and economic outcomes through engaging with Indigenous groups, providing employment, promoting business development, and creating trust funds for traditional landowners (Rio Tinto 2022a). The implementation of the community agreements increases Rio Tinto's ability to be granted a social license to operate. The community agreements are implemented at every project which proves that stakeholder management is a critical part of their operations.

4.2.2.1. Communities and Social Performance Commitments Disclosure Interim Report- Rio Tinto

The Communities and Social Performance Commitment Report (CSP Report) was a document released by Rio Tinto in response to the destruction of the Juukan rock shelter. Rio Tinto uses this document to outline the changes in their social policies and incorporates the measures that they will take to mitigate future social disasters. The CSP Report illustrates how not managing ESG risks can damage a company's reputation, causing rapid changes in their company's policies. One of the bigger changes in Rio Tinto's policies after the Juukan incident was the establishment of the Communities and Social Performance Model (CSP).

The CSP consists of 300 professionals whose role is to strengthen the company's approach to cultural heritage management on job sites (Rio Tinto 2021a, pg.5). This position acts as a tool to prevent future incidents by developing relationships with local communities to create or maintain a social license to operate. The core principle of a CSP professional is rooted as a method to have a better way of implementing ESG policy using the social pillar. This is an example of how ESG is important to companies as companies are beginning to create new positions to fulfill ESG policies and goals. Rio Tinto states that "the CSP function has focused on revising standards, improving risk management systems and processes and strengthening our assurance processes" (Rio Tinto 2021a, pg. 6). This statement supports Rio Tinto's intention to use ESG framework through their CSP model to mitigate risk at their operations.

This report covers how Rio Tinto plans to cultivate stronger relationships with Indigenous people, with an emphasis on indigenous employment. The first section is "Reducing" which follows the plan of reducing the barriers for indigenous employment (Rio Tinto 2021a, pg. 7). Rio Tinto plans on investing $50 million to attract and grow indigenous professionals within the mining industry (Rio Tinto 2021a, pg.7). This will lead to more

Indigenous leaders within Rio Tinto and the mining industry. Rio Tinto promoted Indigenous leaders from within the company, supported scholarships for university students of Indigenous descent, and created an indigenous recruitment campaign. The commitment to increase diversity within the company is a key part of social and governance and the measures listed above show how essential ESG is becoming to Rio Tinto.

Rio Tinto's policy changes affect the company at all levels, including the upper-level executives. Rio Tinto has invested in creating a new cultural awareness training course for their employees. The training courses are led by traditional landowners and are catered to the region where the operation is located. The Cultural Connection Programme was established to build better culture competency at the corporate level (Rio Tinto 2021a, pg. 8). Leaders of Rio Tinto are required to take this training to help them make better and more informed decisions and to improve relationships with traditional landowners and Indigenous communities (Rio Tinto 2021a, pg. 8). The changing and implementation of training to have a better reflection for diversity in the areas Rio Tinto operates in is evidence that Rio Tinto is adopting ESG frameworks to improve their company.

4.2.2.2. Social Pillar in the 2020 Annual Report

Rio Tinto defines four key social performance targets within their annual report that are important to their sustainability policy (Rio Tinto 2020c, pg. 67).

1. Zero Fatalities
2. Identifying Hazardous Material
3. Reducing the Rate of Occupational Illness
4. Demonstrate Local Economic Benefits from Employment and Procurement

These goals cover a range of social aspects within the company. Three of the goals are oriented in protecting their employees through improving safety. Zero Fatalities addresses the goal for all operations to increase their safety program to mitigate the potential for a fatality. Identifying Hazardous Material is a goal that focuses on examining projects to find new ways in which employees could get hurt which allows Rio Tinto to create new tools or trainings to prevent these accidents. Reducing the Rate of Occupational Illness was identified as a goal for Rio Tinto to prevent fatal illnesses in their employees. All the safety goals listed above are business tactics as the goals identify areas to mitigate the potential for harm at projects, increase relationships between the company and their employees, and to reduce the prospect of lost production time. The final goal broadens Rio Tinto's social policy by incorporating being good hosts to local communities of their projects by providing economic benefits to the communities. Rio Tinto using this as one of the primary sustainability goals shows that Rio Tinto is devoted to collaborating closely with local communities to gain the right to operate responsibly. The social goals set forth by Rio Tinto proves that ESG policy is integral to their business model and demonstrates ESG as a growing trend within the industry.

Rio Tinto prioritizes social related policies highly in their 2020 Annual Report. Social policies are the first sustainability section implemented in the report. The longest section for social sustainability data is the community engagement section. This section begins with a discussion on the Juukan Gorge demolition incident which saw Rio Tinto demolish a sacred Aboriginal site in 2020 (Rio Tinto 2021c, pg. 10). The communities section outlines new policies and precautions that Rio Tinto will take in the future to ensure a better relationship with traditional landowners and mitigate the risk of another Juukan Gorge disaster from happening again. This includes the establishment of the Communities and Social Performance "which will deliver a more rigorous assurance framework across our operations and elevate communities risk process" (Rio Tinto 2021c, pg. 93). Alongside economic analysis of their projects, Rio Tinto uses the annual report to convey that they conduct social assessments to ensure that their projects meet the criteria for sustainable mining. To show how social policy and risk influences Rio Tinto's operations, they state in their annual report that they "…conduct social risk analyses at our sites-informed by day-to-day engagement with, and feedback from, communities as well as social and economic impact assessments" (Rio Tinto 2021c, pg. 72). These commitments made by Rio Tinto show how mining companies are using the social pillar of ESG as it has a direct influence on their business strategy.

Rio Tinto uses economic contributions and social investing to help develop relationships with local communities and strengthen the bond between the company and traditional landowners. Rio Tinto donates to local communities to help cover areas like "…health, education, environmental protection, housing, agricultural and business sectors" (Rio Tinto 2021c, pg. 74). To create economic prosperity in host regions, Rio Tinto prioritizes employing local people, buying local products when possible, and engaging in local services (Rio Tinto 2021c, pg. 74). Economic investment is a social strategy used by Rio Tinto to maintain good relations with host communities and traditional landowners. Investing considerable amounts of money in local development is a growing trend within the industry and demonstrates how ESG plays a critical role in a company's financial plan. Figure 17, shown below, is Rio Tinto's financial statement that includes economic contributions.

Economic contributions (US$ million) (2020)

	2020	2019	2018	2017	2016
Gross product sales	**47,018**	45,367	42,835	41,867	35,336
Net cash generated from operating activities[a]	**15,875**	14,912	11,821	13,884	8,465
Underlying earnings	**12,448**	10,373	8,808	8,627	5,100
Underlying earnings per share (US cents)	**769.6**	636.3	512.3	482.84	283.8
Profit/(loss) after tax for the year	**10,400**	6,972	13,925	8,851	4,776
Net cash/(debt)	**(664)**	(3,651)	255	(3,845)	(9,587)
Capital expenditure[b]	**(6,189)**	(5,488)	(5,430)	(4,482)	(3,012)
Employment costs	**(4,770)**	(4,522)	(4,728)	(4,765)	(4,881)
Payables to governments[c]	**(8,224)**	(7,175)	(7,217)	(6,637)	(4,025)
Value add[d] [e]	**31,472**	27,841	30,504	27,734	20,065
Payments to suppliers[e]	**(15,547)**	(17,245)	(17,231)**	(16,471)**	(15,812)**
Amounts paid by Rio Tinto	**n/a[f]**	(7,635)	(6,575)	(5,138)	(3,984)
Amounts paid by Rio Tinto on behalf of its employees	**n/a[f]**	(1,284)	(1,342)	(1,402)	(1,416)
Community contributions (2016-2018 data includes payments to landowners)	*	*	(192)	(176)	(168)

Figure 17 Rio Tinto Economic Statement (Rio Tinto 2021c, pg. 74)

Figure 17 transparently shows Rio Tinto's earnings and includes a row detailing their community contributions. Rio Tinto including this table in the sustainability section is proof that Rio Tinto is integrating ESG into conventional business practices.

4.2.2.3. Social Policy in Corporate Presentations

In March 2021, Rio Tinto presented the *Cultural Heritage* presentation to stakeholders. The objective of this presentation was to reaffirm and outline Rio Tinto's cultural heritage policies to the public and how they relate to their social license to operate in Australia. The presentation responds to criticisms about the Juukan Gorge incident and details what parts of Rio Tinto's policy need to be mended. This presentation directly uses ESG and sustainability framework to support their business to the eyes of stakeholders. Figure 18 shown below demonstrates how Rio Tinto uses ESG as a marketing tool to gain a social license to operate and to engage stakeholders.

Figure 18 Rio Tinto Presentation Using ESG and SLO to Engage Investors (Rio Tinto 2021b, slide 6)

The inclusion of this graphic by Rio Tinto is used to help deter the notion that they are a sustainably irresponsible company and how they plan to build meaningful relationships with future partners. This presentation details what Rio Tinto needs to improve on regarding sustainability policy which can be seen in Figure 19, shown below.

Rio Tinto Iron Ore (RTIO)	1	Remedy, re-building relationship with PKKP
	2	Partnership with Pilbara Traditional Owners: modernising and improving agreements
	3	Building local capability and capacity to support Asset General Manager
	4	Improve governance, planning and systems
	5	Reducing barriers to and increasing Indigenous employment
RTIO / Australia	6	Increasing Indigenous leadership and developing cultural competency
	7	Process to re-define and improve cultural heritage management standards
	8	Establish Indigenous Advisory Group
	9	Delivering recommendations from the Parliamentary Inquiry
Rio Tinto Group	10	Elevate external consultation
	11	Elevate employee engagement
	12	Establish the new Communities and Social Performance model

Figure 19 Identified Areas of Improvement (Rio Tinto 2021b, slide 11)

All the working areas of improvement identified by Rio Tinto are related to the social pillar of ESG. On their website, Rio Tinto has few presentations from 2021. Having a presentation that highlights ESG and changing of their social policies indicates the importance of ESG within the industry.

One of the actions that Rio Tinto has taken to have a more positive engagement with local communities is the establishment of an Indigenous Advisory Group. The intention of this group is to hire more Indigenous employees, start partnerships to help conserve land and heritage, help develop economic prosperity in areas they work in, and become leaders in advocacy on their behalf (Rio Tinto 2021b, slide 14). The advisory group will work with Rio Tinto's senior leaders and Indigenous leaders to build a mutually beneficial relationship. This relationship will aid in business performance and mitigate the potential of future issues. This partnership and communication between the two parties indicates that ESG is critical for business in the modern mining industry for both finances and risk mitigation. This partnership requires Rio Tinto's executives to play a key part in building social relationships. This presentation is also another spot in which Rio Tinto communicates their investment of $50 million to Indigenous communities (Rio Tinto 2021b, slide 20). Common points made on mining companies' websites are their commitments to stakeholders, being leaders in production, and generating returns for their investors. The consistent mentioning of the commitment of $50 million is an indication of how ESG is critical to business and is becoming equal to other large commitments made by Rio Tinto.

This presentation presents Rio Tinto's CSP model. This model is created to monitor and mitigate social related risks at their operations. Figure 20 shown below, outlines the CSP model's five steps to manage potential risks. This slide is important to Rio Tinto as it concisely specifies how they plan to reduce future disasters from happening using ESG framework.

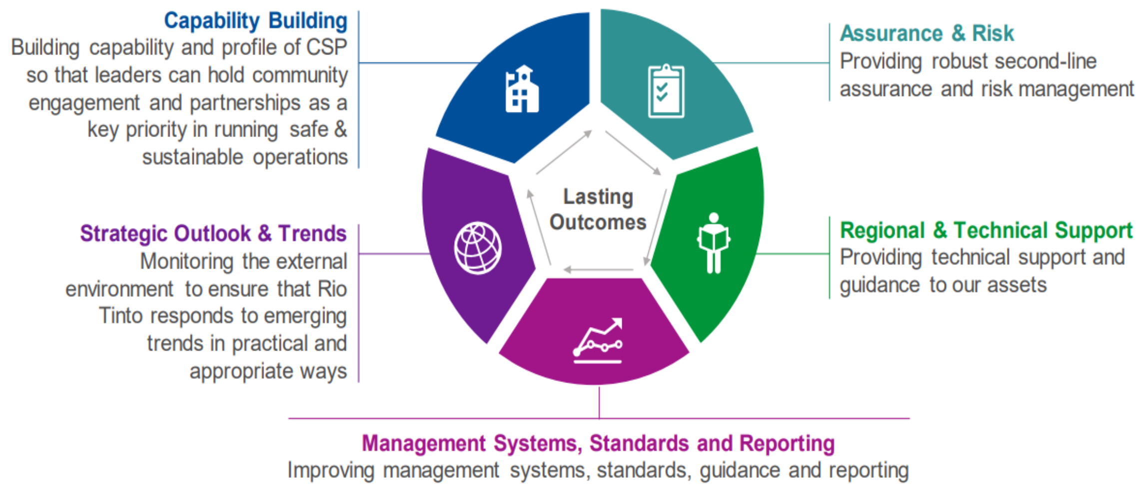

Figure 20 Rio Tinto CSP Risk Management (Rio Tinto 2021b, slide 24)

4.2.3. Governance Pillar Analysis-Rio Tinto

4.2.3.1. Executive Committee of Rio Tinto

This section will look at the executive committee of Rio Tinto and how their job titles and roles are influenced by ESG-related policies. The executive committee of Rio Tinto consists of 12 officers whose roles are based on leading different sectors of their business. 23% of the executive committee consists of women while 33% of Rio Tinto's board consists of women (Rio Tinto 2020c, pg. 67). These statistics are displayed in the 2020 Annual Report to demonstrate Rio Tinto's commitment to diversity within their highest levels of governance within the company. The following is a list of Rio Tinto's executives who have sustainability as a background or as a prominent part of their job criteria.

1. Alf Barrios is the Chief Commercial Officer for Rio Tinto. He was previously the Chief of Rio Tinto Aluminum where he helped generate a better safety record for the

commodities group while delivering industry leading financial performance. Alf Barrios helped the Aluminum group become an industry leader in sustainability with the launching of the first low-carbon aluminum and helping Rio Tinto become the first company certified by the Aluminum Stewardship Initiative (Rio Tinto 2022a).

2. Peter Cunningham is the Chief Financial Officer of Rio Tinto. Peter Cunningham's previous experience with the company includes being the company's Global Head of Safety, Environment and Communities, and Head of Energy and Climate Strategy (Rio Tinto 2022a).

3. Mark Davies is the Chief Technical Officer of Rio Tinto. He holds current responsibilities like working on renewable energy projects and planning mine closure projects. The technical centers he manages work on energy and climate change management and other asset management strategies. Mark Davies also works as a sponsor for Rio Tinto to raise awareness and improve support for employees affected by domestic violence (Rio Tinto 2022a).

4. Isabelle Deschamps is the Chief Legal Officer and External Affairs Officer. Isabelle Deschamps has previous experience working as a member of an executive committee for AkzoNobel where she was responsible for integrity and compliance and was a driving force behind AkzoNobel's diversity and inclusion program. Her background consists of heavy experience in working to understand legal compliance and accountability for many European businesses (Rio Tinto 2022a).

5. Sinead Kaufman is the Chief Officer Minerals. Her achievements as the head of minerals for Rio Tinto include having the Kennecott Copper operation be awarded the Copper Mark. She oversaw the reduction of Kennecott's carbon footprint by 60% (Rio Tinto 2022a).

6. Kellie Parker is a Chief Executive, Australia. Her role within Rio Tinto is to engage with Australian stakeholders through here experience of working with community values. Kellie Parker has a strong commercial background and is an advocate for Indigenous Australians (Rio Tinto 2022a).

7. Arnaud Soirat is a Chief Operating Officer. His previous work includes embedding sustainability in the copper and diamond product groups. This led to the diamonds group being the most coveted and responsible in the industry (Rio Tinto 2022a).

8. Simon Trott is the Chief Executive of Iron Ore. One of his goals is to rebuild trust with local communities and traditional landowners (Rio Tinto 2022a).

Of the 12 members of the executive committee, 8 of them have ESG related titles, background, or responsibilities. Rio Tinto made it important to include sustainability related facts and responsibilities about each executive member to demonstrate how sustainability is important, even at the executive level. Notable responsibilities for Rio Tinto's executive committee include their CFO being the head of numerous environmental and safety groups, thus combining a key financial position with sustainability. Kellie Parker's position is to help build trusting and valuable relationships with traditional landowners in Australia. The responsibility of Rio Tinto's executives to oversee and help continually develop sustainability policy within the company is critical to their public image and how they conduct business. Figure 24 is a flowchart that shows how Rio Tinto governs sustainability in their company.

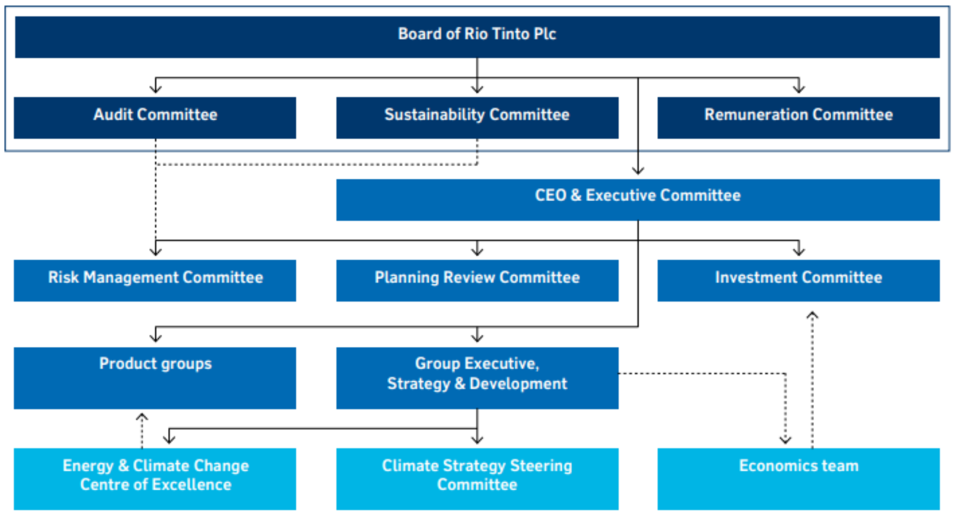

Figure 21 Rio Tinto Corporate Governance Flowchart (Rio Tinto 2021a, pg. 51)

The board of Rio Tinto directly oversees sustainability, which is above the executive committee. This shows that sustainability is critical to Rio Tinto's business strategy as the board manages the sustainability committee. The integration of ESG is changing the responsibilities for upper-level management in the mining industry.

4.2.3.2. Rio Tinto's Ethics and Compliance Policies

Under Rio Tinto's Sustainability section on their company website, there is a section that details their policies for ethics and compliance. The objective of this section is to communicate how Rio Tinto is improving transparency within their business. Rio Tinto believes that increasing transparency for their business is beneficial as it can "…identify opportunities for improvement so our stakeholders can have confidence in the way we work" (Rio Tinto 2022a).

This is an example of Rio Tinto using a sustainable approach to governance to influence how they interact with stakeholders and how they want to be perceived by the public. To ensure full credibility to Rio Tinto's ethics policies, they developed the integrity compliance program which acts independently from their business operations. Rio Tinto uses the program as a risk management strategy as the program identifies the risk profile of key assets. This allows Rio Tinto to prevent future integrity issues from occurring (Rio Tinto 2022a).

Business integrity policy is a critical method in which Rio Tinto manages risks on their projects. The importance for continually reviewing and updating these policies is important for Rio Tinto's business strategy and public image. For example, Rio Tinto updated their "new country" procedure to have a better structure to investigate governance related risks like corruption (Rio Tinto 2022a). Another sustainable structure created to mitigate governance related risks by Rio Tinto is the creation of the Group Ethics and Compliance Committee in 2021. The committee was established to provide strategic oversight and input on compliance matters from members of the executive committee (Rio Tinto 2022a). The committee acts as a check and balance measure for both the board and the executive committee to determine if the ethics and compliance policies are working.

4.2.3.3. Transparency-Rio Tinto

Open accounting practices and mineral development contracts are a sustainability tool used by Rio Tinto to have better communication with stakeholders. Rio Tinto is a founding member of the Extractive Industries Transparency Initiative (EITI). The EITI is a document created in 2003 that encapsulates cornerstone principles regarding economic, social, and governance responsibilities for natural resource extraction companies (metals, coal, and oil) (Rio Tinto 2022a). Principles focus on such topics like having a transparent and strong relationship between the natural resource company and the host nation, transparent accounting practices, and companies being more transparent about how they operate within the laws of the countries where they work. Being a founding member of EITI demonstrates Rio Tinto's commitment to be an industry leader in governance which allows Rio Tinto to develop a better relationship with host communities.

Another key initiative Rio Tinto is involved with is "The B-Team." The B-Team is an organization that focuses on creating a more sustainable economy through redefining the culture of accountability for business (Rio Tinto 2022a). They believe that this can be done through the integration of new corporate leadership models. Their business model is centered around the 2030 UN sustainable development goals. This is seen through their objectives to create a more inclusive economy and their belief is that this will become a staple in different industries. The B-Team is an advocate for the integration of ESG criteria into a company's risk management strategy and performance metrics. Joining such initiatives as the B-Team is key to building trust and encourages sustainable business practices (Rio Tinto 2022a). Rio Tinto will partner with governments and stakeholders to encourage the harmonization of reporting obligations to align with the Global Best Practices (Rio Tinto 2022a). Rio Tinto's statements on transparency and compliancy are closely tied with their business strategy, which demonstrates the integration of ESG policy within corporate business strategy in the mining industry.

4.3. Glencore

4.3.1. Environmental Pillar Analysis-Glencore

Glencore is a publicly traded company that is based out of Switzerland. Glencore is a diversified metals, minerals, and energy company with over 150 assets in over 35 countries (Glencore 2022a). Glencore specializes in products like zinc, copper, lead, aluminum, iron ore, and coal. Glencore was selected in this thesis as they are based in Switzerland which provides insight on how ESG is utilized in a European based company, they have multiple commodities including coal which places a unique role to ESG challenges, and they operate in multiple nations. Data collected for Glencore was found on resources from their company website including their climate report, sustainability report, annual report, and other documents and webpages that pertain to ESG.

4.3.1.1. Environmental Overview

Environmental standards are integrated as critical parts in Glencore's corporate policies. A primary document that outlines Glencore's corporate policies is the "Our Purpose and Values Document." This document gives an overview of what Glencore does and their company standards. Within the document there are plenty of examples of sustainability being used to influence their policy. The first example that can be seen is in the "What We Do" page. "What We Do" is a section that defines the role that Glencore plays in the global market and how they grow their business. There are four pillars that define what Glencore does and they are as followed (Glencore 2022a):

1. Metals and Minerals
2. Energy
3. Marketing
4. Recycling

Glencore defines what resources they extract to generate revenue but also includes that they are a world leader in recycling metals (Glencore 2022b). The inclusion of recycling is to show that a large and important function of Glencore as a company is environmentally friendly. This is Glencore using ESG framework to present themselves in a brighter light within the public eye by having environmental concerns as one of the bases for their business model. This notion can further be seen in Glencore's corporate values. Glencore has six values that reflect the purpose of their company and defines their values as the heart of their company (Glencore 2022b). The environment is a core value at Glencore through the "Responsibility" value. This value involves taking responsibility for the environment and improving environmentally related policies. Responsibility and its relation to the environment is a key contributor to ESG being used to define corporate values within the mining industry.

Glencore's website contains a sustainability section which details the measures and policies Glencore deems important. There are six primary focus areas that are core to Glencore's sustainability policies. All six of the policies are based off the ESG pillars. Two of the six core policies are based on the environmental pillar, and they are Climate Change and Tailings. All the primary focus areas have a webpage that provides a quick overview on why they are part of the foundation of Glencore's sustainability policy.

Glencore, through science backed by the UN, acknowledges the significance of climate change and the role they have as a mining company to reduce the effects of climate change. Glencore supports the transition to a low carbon economy through the proper sourcing and production of raw materials that contributes to essential technologies like the materials used for electric cars (Glencore 2022a). Glencore's climate change policies are formed from the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement. The UNFCCC and the Paris Agreement are fundamental documents and guidelines that define the environmental portion of ESG. Glencore using these resources to shape their policies is an example of a mining company using ESG as an influential resource in the shaping of their company.

Tailings is the other environmentally related focus area that is critical to Glencore's sustainability policy. Glencore uses stakeholder engagement and transparency to keep host communities informed on the development and use of tailings storage facilities. This is a way for Glencore to maintain their social license to operate by using the environmental and social pillars of ESG. Glencore ensures the quality of their tailings dams to their host communities through engaging with the Global Industry Standard for Tailings Management (GISTM) (Glencore 2022a). Their tailings dam information is published on the GISTM database and is publicly available to stakeholders. Glencore adheres to industry leaders in tailings dam policy using such resources as the Global Tailings Review, ICMM, UN Environmental Program and the Principles for Responsible Investment. These resources help dictate sufficient design parameters, closing plans, and engagement with local communities (Glencore 2022b). All the organizations that Glencore uses to help create their tailings policies are leaders in ESG framework. Glencore using those policies to exceed regulator standards proves that ESG is critical in a company's policy and is a tool used by mining companies to engage with stakeholders.

4.3.1.2. Environmental Data in the Sustainability Report

Glencore's published sustainability report is a 153-page report comprised of sustainability data, reports, case studies, and general information on how Glencore handles sustainability risks and issues. The report is broken down into three sections, the first pertaining to an intro on the purpose of this report and an outline of their sustainability strategy. The second section is where the primary source of data and information is located. This section focuses on specific sustainable topics that are deemed most important to Glencore's sustainability policy. The concluding section contains sets of tables that detail specific ESG related policies and data to support their sustainable efforts. Key values for Glencore's sustainability policy are based on the UN SDGs. Relevant SDGs related to the environment that Glencore uses to shape their policy are (Glencore 2020a, pg.3):

1. Goal 6: Clean Water and sanitation
2. Goal 7: Affordable and Clean Energy
3. Goal 13: Climate Action
4. Goal 14: Life Below Water
5. Goal 15: Life on Land

These goals are discussed on the fourth page of the report, outlining how Glencore's sustainability tracking and policies are influenced by the UN SDGs.

Within the first section of the sustainability report, there is a letter from the CEO of Glencore, Tony Hayward. He discusses how each pillar of ESG is critical to the development of their business. He addresses the impact of the Paris Agreement and how it influences Glencore's operations and corporate strategy. When addressing how the Paris Agreement influences Glencore, Hayward states that "The majority of our earnings comes from the metals and minerals that enable the transition to a low-carbon economy" (Glencore 2020a, pg. 4). This statement from the CEO depicts Glencore's business model to be both sustainable and set up for a long-term future. This is important for a mining company as this model shows that Glencore will continue to profit despite growing public criticisms of mineral extraction processes. This point discusses how Glencore's portfolio is directly correlated to the green energy movement and follows the UN SDGs and the Paris Agreement. Hayward discusses their goals of reducing scope 1, 2, and 3 emissions by 40% by 2030 and to be net zero by 2050 to follow the Paris Agreement (Glencore 2020a, pg. 5). This goal is important to Glencore as it is a policy that will significantly alter their business model as they begin to move toward decarbonization and is especially important considering they have coal assets. Within the letter, Hayward explicitly mentions ESG and its relationship on how stakeholders view Glencore by saying "Our stakeholders are looking more closely at various ESG disclosure frameworks and requesting companies to indicate how these frameworks apply to their disclosures" (Glencore 2020a, pg. 5). As noted by Hayward, the implementation and disclosure of ESG is becoming a valuable tool to communicate how Glencore is committed to being sustainable. This provides context as how executive level members of mining companies are using ESG as a business strategy to promote their business and mitigate risk.

To outline their sustainability strategy, Glencore has a three-step strategy they use at the beginning of the sustainability report. Each of the three strategies conveys how ESG and sustainability policy is implemented at the distinct levels of their company. Figure 22 is a graphic found in the report showing Glencore's three-step strategy plan.

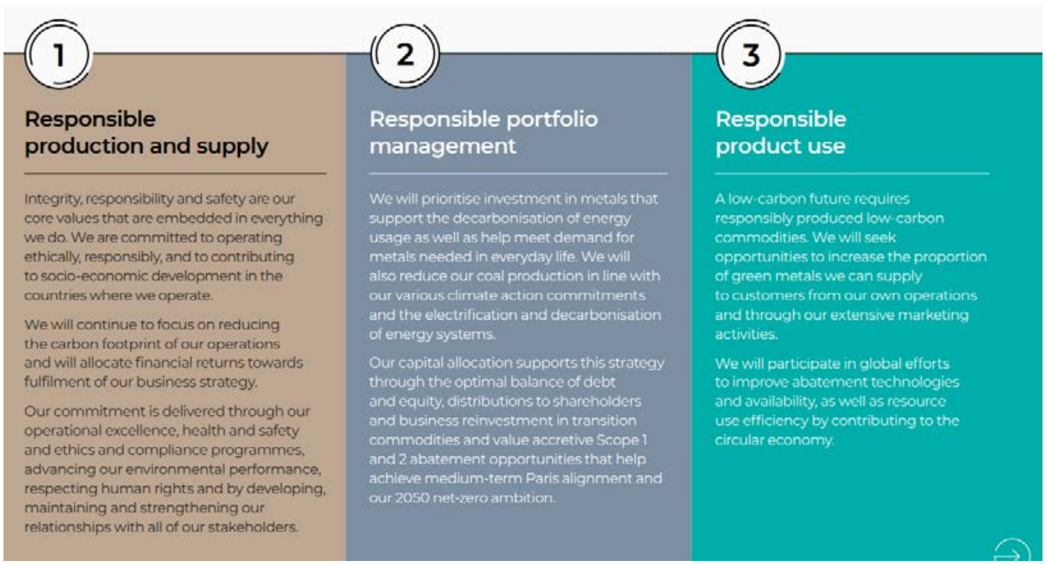

Figure 22 Glencore Sustainable Purpose and Strategy (Glencore 2020a, pg. 8)

Each of the steps listed above uses ESG framework to help shape the structure of the strategy. The first step explains how the reduction of carbon emissions is a fundamental part of their business strategy and how it will provide financial returns in the future. Production is a large part of Glencore's business and stating that the commitment to reducing carbon emissions as part of that strategy indicates that ESG integration is critical for mining companies in financial gains and stakeholder relations. The second step in Glencore's business strategy demonstrates how environmental concerns and ESG framework influence a mining company's business strategy and their portfolio. Glencore has pledged to evaluate the relevancy of their metals to the decarbonization movement and prioritize investments in metals that can help achieve carbon neutrality. Social pressures of being a responsible mining company has caused Glencore to plan to phase out revenue building assets like the Prodeco coal project, the mine responsible for being Colombia's third largest exporter of thermal coal (Glencore 2022a, pg. 75). ESG commitments has led a company who has mined coal for over 25 years to focus on different commodities. The last step in Glencore's sustainability strategy is responsible product use. Responsible product use is a continuation of their commitment to use efficient extraction methods and contributes to technological developments that are relevant to decarbonization. Out of the three ESG pillars, this strategy concentrates heavily on the environmental pillar. The precedent of environmental policy being a heavy influence on Glencore's business model indicates the significant role that ESG has in the creation of corporate policy for mining companies.

The second section of the sustainability report details Glencore's sustainability practices and data. Glencore's sustainability performance is outlined through their "material topics" which are sustainability related topics that they believe is important to measure their sustainability performance. These topics are important tools used to guide their Health, Safety, Environment, and Community Committee (HSEC). Each of these topics are directly sourced from the framework of ESG policy. All these material topics use a pillar of ESG in some detail and are influenced by the UN SDGs. The Material Topics relevant to the environment are as followed:

1. Catastrophic Hazard Management
2. Water
3. Land Stewardship
4. Climate Change

Glencore also highlights how they perform on each of the topics with short paragraphs and graphics. In Catastrophic Hazard management, for example, they have an example project in which they highlight how they have changed their tailings dam procedure to match the Canadian Dam Association Guidelines. This is another example of Glencore using external standards to go beyond the minimum requirements to mitigate the risk of an environmental disaster. Glencore has brief sections that explain exactly how they monitor tailings dams, how their HSEC Committee analyzes the risks of dams, the training to ensure proper tailings dam designing and monitoring, and the next steps they plan to take for the upcoming year. The material topics take up the bulk of the report. Figure 23 below is an example of data presented in the climate change material topic.

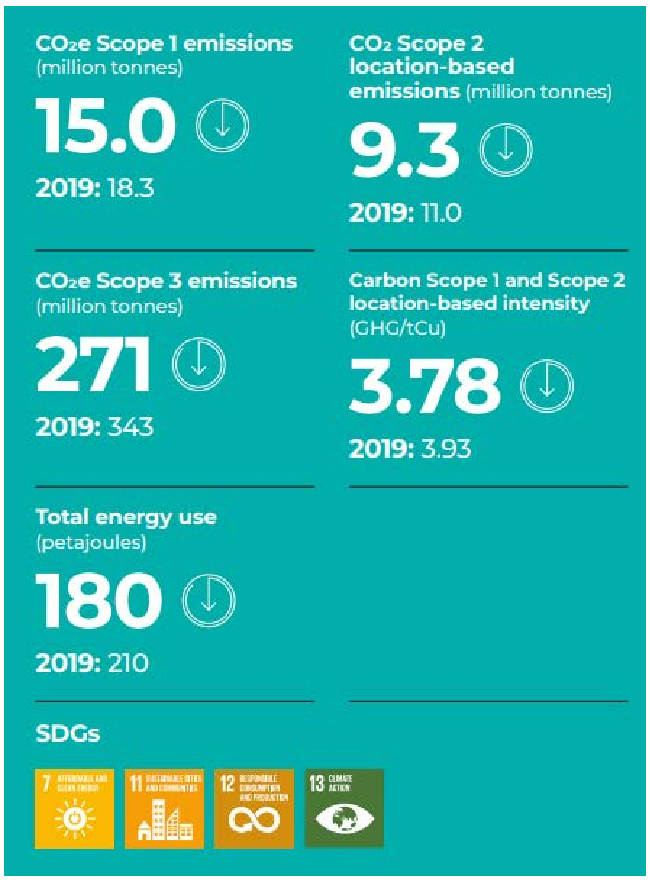

Figure 23 Climate Change Material Topic Data (Glencore 2020a, pg. 30).

In the Climate Change section, the company displays data on their emissions for 2019. They detail a formulated plan on different technologies and methods they plan on testing and implementing to reduce scope 1 and 2 emissions. Examples of some operational changes to their projects are displayed in the report. For example, at their Onaping Depth Project they are using battery electric mobile mining equipment as opposed to diesel powered equipment (Glencore 2020a, pg. 34). This reduces diesel emissions at the project and shows that Glencore has methods to minimize scope 1 and scope 2 emissions. (Glencore 2020a, pg. 31). Each material topic contains a section in which they discuss how they use the material topic as a form of risk management. In the climate change material topic for example, Glencore states that their diversified portfolio directly contributes to decarbonization efforts which means their production will continue with increasing demand.

"Water" is another important environmentally related material topic that Glencore discusses in their sustainability report. Water management is relevant to Glencore as the extraction and use of water is a necessary function within the mining industry. Glencore includes this section as they discuss how water management needs to be a transparent matter to maintain good relationships with host communities. In 2020, Glencore recorded two moderate water-related environmental incidents (Glencore 2020a). These incidents warranted the establishment of the water working group. The water working group is comprised of subject matter experts whose role in the company is to strengthen water management and review internal and external water targets (Glencore 2020a, pg. 37). This group works to mitigate water related risks and improves water management performance across all projects. The water working group is an example of ESG framework being created to reduce risk against the company. The "Water" material topic uses tables of data to convey to stakeholders their overall performance on water management. These tables act as benchmarks for areas of improvement or areas in which they excel. Figure 24 is an example of how Glencore uses data to convey transparency on material topics and how they specifically use data to show their water management.

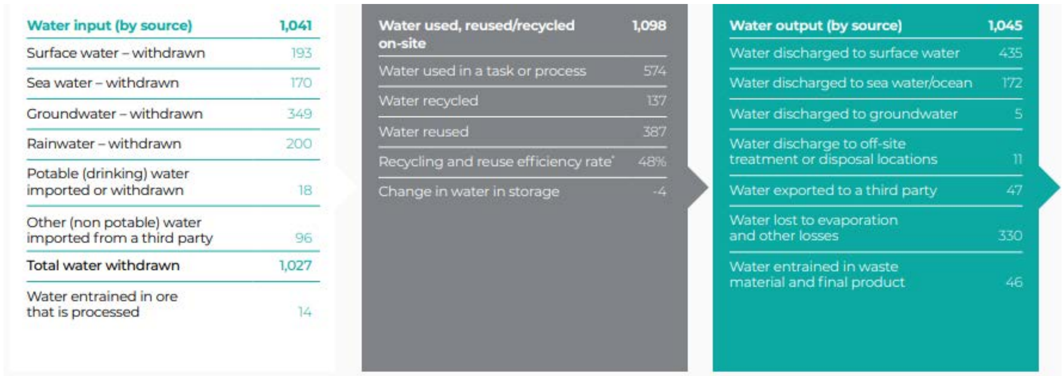

Figure 24 Glencore Water Management Data (Glencore 2020a, pg. 38).

The concluding section of the report contains additional data and information that Glencore deems relevant to support transparency of their sustainability policy. The first part of this section contains goals and data related to each individual commodity and shows how they perform against their key performance indicators (KPI's). The KPI's cover each pillar of ESG including such indicators as safety, scope emissions, energy use, and proportion of female employees. Figure 25 shows how KPI's relate to a specific commodity, zinc, and how its presented in Glencore's sustainability report.

Zinc

We are one of the world's largest zinc miners and producers. Our assets include underground and surface mines, smelters, refineries, concentrators, hydroelectric facilities and warehousing. We trade in zinc and lead concentrates and valuable by-products such as sulphuric acid. We also deal in gold and silver as by-products of zinc mining and copper.

KPI's	2020	2019	2019
Fatalities at managed operations	4	5	7
Lost time injury frequency rate (LTIFR) (per million hours worked)	1.21	1.46	1.44
Total recordable injury frequency rate (TRIFR) (per million hours worked)	2.79	3.31	3.58
New cases of occupational diseases	15	14	9
CO_2e Scope 1 (million tonnes)	2.0	2.0	2.0
CO_2 Scope 2 – location based (million tonnes)	2.4	2.5	2.5
Total energy use (petajoules)	50	52	51
Water withdrawn (million m^3)	425	428	415
Community investment spend (US$ million)	49.9	36.9	37.9
Number of employees and contractors	52,119	52,718	54,298
Proportion of female employees (%)	16%	16%	17%

Operating highlights
Own sourced zinc production of 1,170,400 tonnes was 92,900 tonnes (9%) higher than 2019, mainly reflecting: higher zinc content from Antamina (40,000 tonnes); improved output from the Mount Isa operations (27,800 tonnes); and the net positive effect of 18,700 tonnes from other South American assets, owing to restarting the short-life Iscaycruz mine in Peru, offset by Covid-related suspensions and shutdowns.

Own sourced zinc production (kt)
1,170
2019: 1,078

Zinc metal and concentrates marketing volumes sold (mt)
2.8
2019: 3.1

Figure 25 Zinc Sustainable Data (Glencore 2020a, pg. 83).

The table on the right indicates the KPI's for the product group across 3 years. The bottom graphic details where the commodity is extracted from and production performance data. These pages provide insight on the performance of each commodity in comparison to Glencore's sustainability goals and provide stakeholders with data to interpret Glencore's progress in sustainable mining.

The closing section of the report is called Environmental, Social, and Governance data. This section contains over 60 pages of tables detailing specific ESG data that Glencore tracks. This section is included in the report to provide accessible sustainability related information for stakeholders to read and is a way for Glencore to be transparent. Glencore including this section is a method of stakeholder relationship management and is a display of how mining companies use ESG.

4.3.1.3. Glencore's 2021 Climate Change Report

This section will discuss the relevancy of Glencore's 2021 Climate Change Report and the usage of ESG related framework to convey the connection between their business plans and their relationship with environmental practices and standards. The 2021 climate change report is a document that promotes Glencore's plan to reach net zero emissions by 2050 to comply with the Paris Climate Agreement. This document talks about how Glencore deems climate change concerns as a critical challenge to their business and how they plan to mitigate these risks. This is an example of using ESG as a tool to combat physical risks of operations and financial risks. Figure 26 demonstrates how Glencore combines the environmental and governance pillars of ESG to create a corporate framework to guide the creation and enforcement of their climate change strategy.

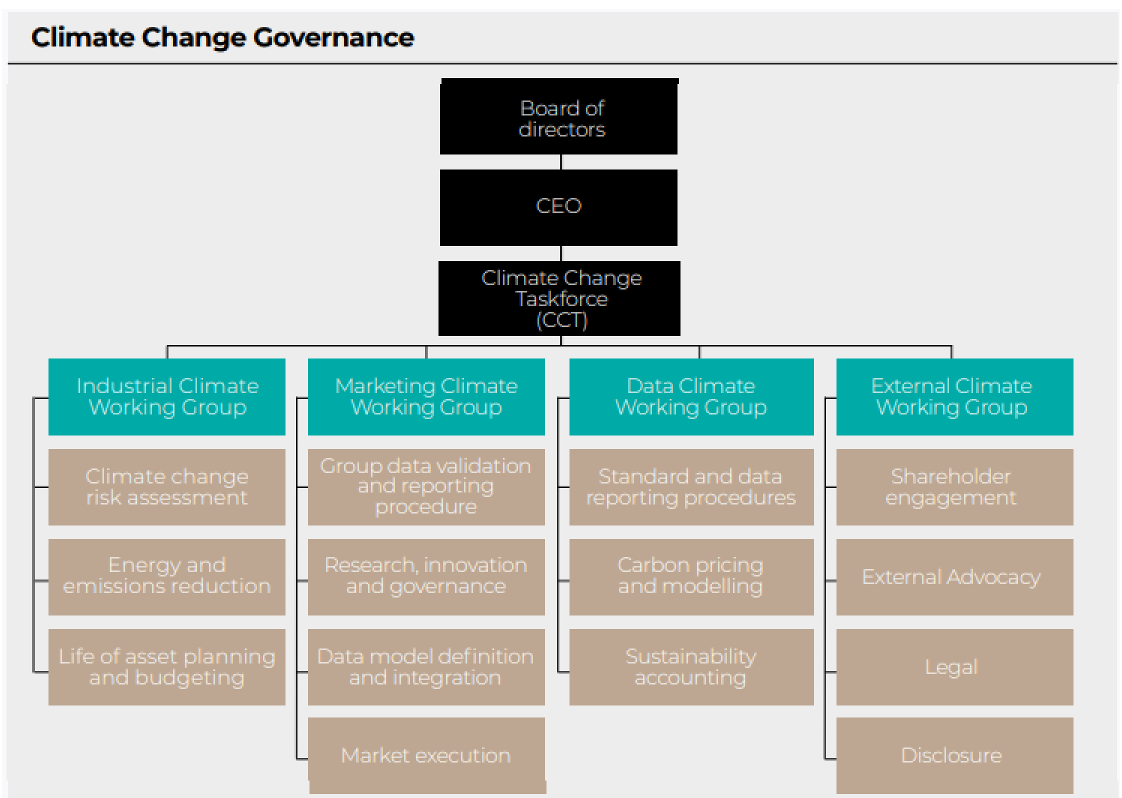

Figure 26 Glencore Governance Structure for Climate Change (Glencore 2021a, pg. 7).

The key strategies for Glencore's climate change policies fall under the Climate Change Taskforce (CCT). The CCT consists of upper management like the CEO, CFO, Head of Industrial Assets and General Council, and a variety of other individuals who represent key corporate functions like finance, sustainable development, and investor relations. This shows that the environmental pillar of ESG is so critical to mining companies, that their top leaders are in charge with implementing policies and risk management strategies.

One of the primary objectives of the climate change report is to address how Glencore views climate change as a risk and the steps and frameworks they take to mitigate such risks. Glencore has two pages within their report that are dedicated to explaining how climate change poses financial and physical risks to their company. Glencore acknowledges these risks by stating that "Climate change-related impacts present both risks and opportunities to our operations, which we must identify and manage to ensure the long-term sustainability and resilience of our business" (Glencore 2021a, pg. 9). This is an indication that Glencore's sustainability and financial planning identifies climate change as a key risk that must be managed and is a big part of their financial future. Glencore has extensive risk management measures that are updated yearly through each commodity group. These measures are used to assess how climate change risks and factors will impact their portfolio and profits. They go through a "bottom-up approach" in which they take regulatory risks as a factor in their investing. Such risks considered are carbon taxes, physical risks like flooding or dry season, or obtaining permits for new projects (Glencore 2021a, pg. 9).

Glencore takes climate change as a serious risk for the net present value (NPV) of their operations. Specifically, new expenditures are being detailed in finance reports like carbon taxation. Glencore has mitigation plans to navigate the risk of higher carbon taxes. They utilize a Marginal Abatement Cost Curve (MACC) as a method to mitigate high carbon prices. Glencore's plan to lower carbon emissions through decarbonization plans will mitigate a significant increase in costs at their operations as it will reduce the amount of carbon taxes they will have to pay (Glencore 2021a, pg. 10). On top of the financial risks of carbon taxing or permitting new projects, Glencore also states the physical risks they evaluate and consider on their projects. Extreme weather events like flooding or hurricanes can be detrimental to mining operations. Glencore states that they regularly review the potential damages their tailings dam facilities would take during an extreme weather event. Measures like these are taken to gain the confidence of host communities to increase Glencore's public image and their ability to maintain their social license to operate. Glencore uses their MACC to assess and predict the rise of carbon taxes and when large renewable technological advances will be made. Figure 27 shown below, is Glencore's NPV curve that models how their operations will change from diesel fuel to renewable sources based on the changing costs.

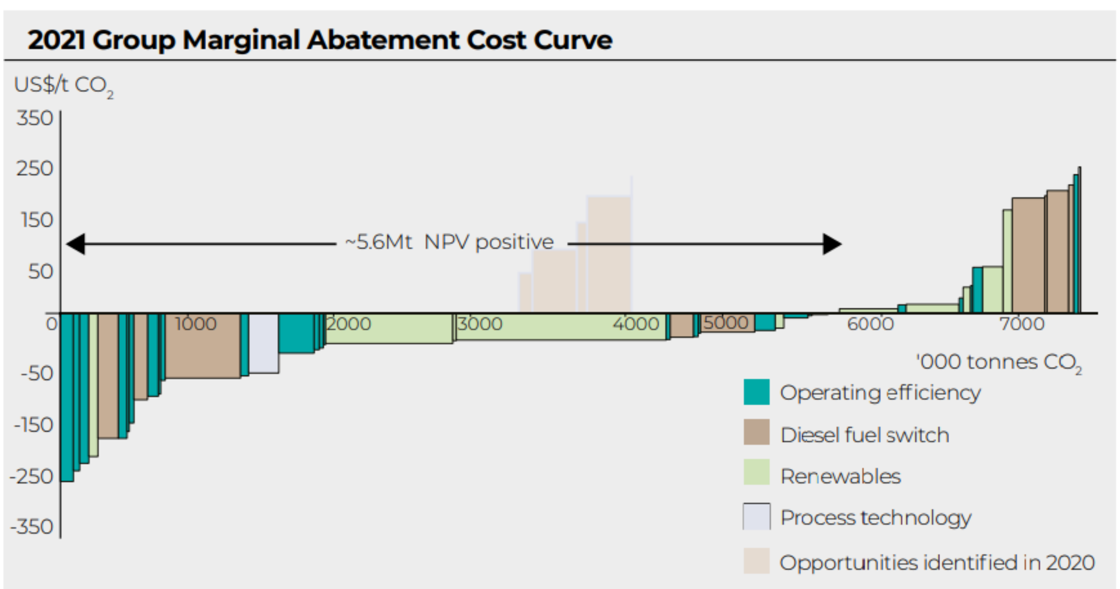

Figure 27 Glencore NPV Graph for Group MACC (Glencore 2021a, pg. 15).

This abatement strategy demonstrates the integration of more environmental factors into their cost models showing that mining companies are taking sustainability into account for their accounting practices. In the past, mining companies would only consider more direct environmental costs like reclamation and mine closure.

Glencore identifies the two largest scope 1 emitters in their portfolio to be downstream operations of processing metals and the use of diesel fuel at their operations. They express the difficulties it would take to reduce the use of reductants during the mineral processing step. Glencore states that they need a longer timeframe to address this issue. For diesel emissions at job sites, Glencore has three clear principles in which they plan to use to phase out diesel. The overall goal is to phase out the existing fleet of equipment by replacing them with electric powered equipment and to comply with ICMM standards. To reach this goal, Glencore continues to research and develop innovative technologies with the intent to reduce global emissions. They use an example in their Onaping Depth mine in the climate change report to show that they are changing the way they operate to reduce emissions (Glencore 2021a, pg. 17). ESG, through emissions commitments and regulations, has proven to have impacts on how companies operate as they must invest and implement innovative technology.

The final area of interest in Glencore's climate change report is their statement on their future in coal. Glencore, as a large producer of coal, acknowledges the effect of coal operations on their environmental impact. Glencore's emissions goal for coal operations is to reduce 15% of total emissions from coal by 2026 (Glencore 2021a, pg. 19). Glencore plans to execute this goal through the closure of some of their assets. ESG directly impacts how Glencore manages their portfolio as seen with their commitment to phasing out their coal operations. They continue this trend as they plan to allocate more capital expenditure into transition metals.

4.3.1.4. Environmental Data in Glencore's 2020 Annual Report

Sustainability is featured as a core concept in Glencore's annual report. On the fifth page of the report, Glencore details how their portfolio of commodities will play a pivotal role in a green future and how it will contribute to them being net zero by 2050 (Glencore 2020b, pg. 5). Figure 28 is a graphic used by Glencore to outline their emissions commitments.

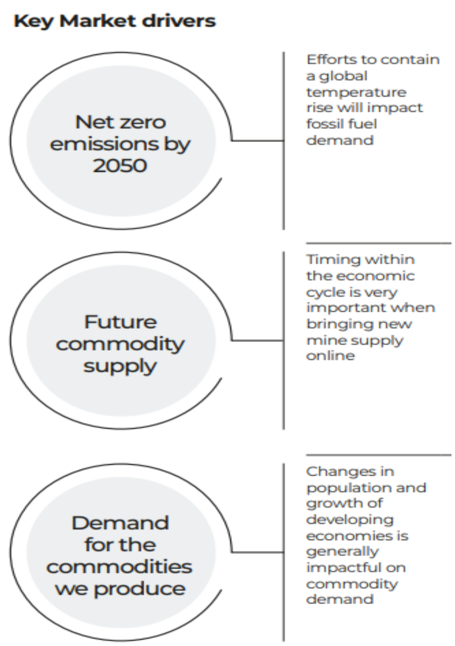

Figure 28 Key Market Drivers (Glencore 2020b, pg. 6).

Glencore identifies how their connection to transition metals leads to a green future and provides potential for economic growth. This leads to how their corporate strategy is based on their vision of a sustainable future. Glencore's sustainability section within the report is called "Our Strategy for a Sustainable Future." This section comes before any financial performance metrics or any notes about their specific operations. In comparison to their 2010 annual report, the sustainability section, including all topics related to ESG, is 33 pages which is larger than the sustainability section as seen in the 2010 report. The 2020 report combines sustainability topics with how they manage financial risk. There is a much shorter focus on how Glencore integrates their stances on sustainability and there is less data on environmental issues in comparison to the 2020 annual report. This is evidence of the shift of publishing ESG related metrics and policies and how it is becoming a larger part of what companies are reporting. Within the 2010 annual report, at no point is there a mention of ESG. In comparison to the 2020 annual report, ESG is mentioned in the chairman's statement as being a critical part of their business strategy.

4.3.2. Social Pillar Analysis-Glencore

4.3.2.1. Social Pillar Overview

The social pillar of ESG is deeply rooted in their sustainability and corporate policies. Social policy is central in how Glencore defines their four pillars of sustainability which are (Glencore 2022a):

1. Health
2. Safety
3. Environment
4. Community

Three of the four pillars of Glencore's sustainability policy use the social pillar of ESG. Health and safety as their first two pillars signify to stakeholders that Glencore places a high value on the employees that work for them. Glencore states that safety is critical to their operations as they created the SafeWork initiative to mitigate the risk of fatalities, occupational diseases, and injuries at work (Glencore 2022a). Safety at projects is overseen by the Board of Health, Safety, Environment, Community and Human Rights (HSEC). HSEC uses risk identification and assessment processes to develop programs to improve safety performance at their projects (Glencore 2022a). The HSEC committee consists of executive level and industry specific professionals whose goal is to integrate the social and governance pillars to create competent framework to increase safety across all projects. Glencore's safety strategies and frameworks follow the UN SDGs and the ICMM principles. ICMM Principle 5, Health and Safety, influences Glencore's sustainability framework as seen with the goal of zero harm to their employees (Glencore 2022a). The integration of ICMM principles directly influences their sustainability pillars and corporate policy. This is an example of ESG being essential for a modern mining company.

Human rights are also a critical component of the social pillar used by Glencore to build their corporate policies. Human rights are listed as one of the six key focus areas for ESG. Prior to the development of a new project, the HSEC Committee must carry out risk management procedures to identify the potential of human rights risks. This is done by consulting with affected groups to enable their participation in policy making and creating effective grievance and complaint mechanisms that host communities can use (Glencore 2022a). Human rights play a significant role in Glencore's risk management frameworks. The executive officers determine and review the policies and potential human rights risks that may occur at new projects.

Glencore's social policies are further explained and backed up in their Social Performance Policy document. This document details Glencore's commitments and standard practices regarding their social policies. Their commitments to being socially sustainable are seen through their policies such as employment and business opportunities through social development in host communities (Glencore 2022b). Glencore uses social policy to support local communities through the chartering of social transition strategies to mitigate the impacts of local communities on the closure of Glencore's projects (Glencore 2022b). Glencore "…manages social risks at all levels of the organization and integrates social performance management into business decision making" (Glencore 2022b). This statement by Glencore demonstrates the significant culture change within the mining industry by integrating ESG into their business decision making processes.

4.3.2.2. Social Data in Glencore's 2020 Sustainability Report

Glencore's sustainability report defines a set of material topics that convey the company's sustainability goals. Within the report, there are four material topics that are identified as related to social policy consisting of topics like safety, human rights, responsible citizenship, and our people (Glencore 2020a). Responsible citizenship is an ESG tool used by Glencore to cultivate and sustain long term relationships with local communities through the contributions made to the local economies. Glencore uses socio-economic contributions to communities and exhibits the contributions via a scorecard in the sustainability report to exemplify their efforts as seen Figure 29.

Socio-economic contribution scorecard

Stakeholder group	Value flows	2020 results
Employees	• Wages and benefits	• 96% of our workforce is local to the country where we operate
Suppliers, contractors and small businesses	• Procuring goods and services • Skills and enterprise development	• 80% of our global procurement spend is with suppliers and contractors local to the countries where we operate • Nearly 80,000 people benefited from our enterprise development and economic diversification investments
Local communities	• Community development • Use of shared public-use infrastructure • Education and skills development	• US$95 million spent on programmes supporting local community development, including about US$9.6 million on enterprise development and economic diversification of local entrepreneurs • Around 2.6 million people living near to our assets have benefited from our community investment activities, including environmental initiatives, healthcare facilities, education programmes and enterprise development • US$1.3 million spent on infrastructure for water processing and distribution, including more than 15 kilometres of pipework and infrastructure • US$2.1 million spent building or maintaining over 72 kilometres of roads • US$0.55 million invested in power distribution infrastructure generating 232 Megawatts per year
Local and national governments	• Taxes and royalties	• US$5.8 billion paid to host governments in taxes and royalties

Figure 29 Glencore's Economic Contributions by Stakeholder Group (Glencore 2020a, pg. 60).

This scorecard specifies how Glencore positively financially impacts all stakeholders with the presence of their operations. Charitable work is a key detail highlighted in this graphic as seen with the US$95 million spent in 2020 that was used to support local community development (Glencore 2020a, pg. 60). Proving that Glencore can bring economic prosperity to the host communities they operate in, creates the potential for new projects in new communities while also maintaining effective relationships with current host communities.

The "Human Rights" material topic outlines Glencore's social policy and how they create both a better work environment and how they positively impact local communities. Glencore follows human rights principles and frameworks to assess the potential of human rights violations occurring on their job sites (Glencore 2020a, pg. 52). This includes tailoring their Group Human Rights policy to better fit local cultures and regional challenges to provide equal opportunity and proper labor rights. On top of working on human rights within the company, Glencore works with local communities to reduce artisanal mining. Glencore works with local communities to reduce artisanal mining by providing education to locals of the community to learn the hazards of this mining method and to deter people from risking their lives (Glencore 2020a, pg. 55). Glencore transparently details how their value chain is integral to maintaining integrity of their corporate values. This can be seen in Figure 30 which details artisanal and small-scale mining site operations that pose human life risks near their operations. Reporting data on artisanal mining incidents shows transparency on the risks Glencore faces and allows them to create new policies to reduce these risks.

Description	Response/Cross reference/ Unit of measurement	2018	2019	2020	UNGC principles
Number (and percentage) of company operating sites where artisanal and small scale mining takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate these risks	Number of sites	7	7	**7**	1,2
	Sites (%)	6%	6%	**6%**	1,2

Figure 30 ESG Data of Artisanal Mining that Pose Risk at Glencore Operations (Glencore 2020a, pg. 136).

4.3.2.3. Social Data in Glencore's 2020 Annual Report

Within the 2020 Annual Report, Glencore utilizes social sustainability policy to shape their public image to stakeholders. Glencore discusses how their company culture plays a pivotal role in being a successful business. This can be seen in the results of a published company survey that details how their employees feel about the corporate culture and values. The graphic sheds a positive light on the work culture at Glencore, demonstrating that Glencore is an exceptional employer. The survey is data that expresses a strong relationship between the employees and upper management showing strong social values within the company. The survey results can be seen in Figure 31.

Our Values and Culture survey

82%

Our Values and Culture score of 82% tells us that the vast majority of our employees feel their experience matches our values

87%

of surveyed employees told us that they intend to stay at least 12 months with the company

92%

of surveyed employees stating that they work in a safe environment

86%

of surveyed employees stating that they are proud to work at Glencore

94%

of surveyed employees feeling comfortable reporting a safety concern, a key enabler of improvement in our performance

88%

of surveyed employees stating that their direct manager acts ethically and in compliance with policies

Figure 31 Glencore Values and Culture Survey Results (Glencore 2020b, pg. 26).

A key part of the annual report is Glencore's social performance section. This section summarizes the goals and results of Glencore's social policies. Glencore defines the integration of social performance as being critical to the engagement of stakeholders and is a core principle of their business (Glencore 2020b, pg. 37). Glencore engages with their local communities through social investment. Within the report, Glencore uses the example of donating and investing in medical equipment to combat Covid-19 in communities in which they operate as an example helping with the short term need of communities.

In the risk discussion section of the annual report, Glencore identifies community and human rights as a major sustainability risk. As a globalized company, Glencore is subject to work in diverse social and political climates that can have significant impact on their business. Glencore acknowledges that if they deviate from competent and respectable business practices in high-risk regions, they are susceptible to having higher costs at their operations, being exposed to loss of profitability, and loss of new business in higher risk regions of the globe (Glencore 2020b, pg. 37). Identifying and creating strong frameworks to prevent social disasters from happening is critical to Glencore's business strategy. This ensures a formidable reputation of local community engagement is maintained and the ability to access added resources is not inhibited. This strategy is developed through an ESG framework as Glencore utilizes the UN Guiding Principles on Business and Human rights to mitigate social impacts on their local communities (Glencore 2020b, pg. 84).

4.3.3. Governance Pillar Analysis-Glencore

4.3.3.1. Glencore's Executive Leadership

Glencore's board of directors are made up of eight directors whose roles are to be responsible for financial performance, strategic direction, major acquisitions, and risk management. The board consists of three female members (~38%) and five independent directors. Independent directors are members of the board that are selected from outside of Glencore. This diversifies the perspective of the board and is a governance tool used by Glencore to mitigate potential biases. Many of the independent directors work in sustainability-based committees at Glencore. This section will detail the relevant sustainable responsibilities carried out by each board member.

Kalidas Madhavpeddi is a non-executive Chairman for Glencore. His role within the company is to be the Chair of the Nomination Committee and the Investigation Committee and is a member of Glencore's HSEC committee. His role within the company is to be a leader and pivotal decision maker on sustainability matters on all fronts of ESG, most importantly being the chair of major governance policy committees.

Peter Coates is a non-executive director for Glencore with his primary role being the chair of Glencore's HSEC Committee. He is a member of other ESG related committees like the

Ethics, Compliance, and Culture Committee and the Nomination Committee. Coates' plays a role in all three ESG pillars through his involvement with such committees, demonstrating the significant role executives have in implementing sustainability within Glencore.

Gill Marcus is a non-executive director who is a member of the Audit Committee: and the Ethics, Compliance, and culture committee, and the Nominations Committee. Marcus's role at Glencore has a heavy influence on structuring and creating policies regarding the social and governance strategies of the company.

Patrice Merrin is a non-executive director with membership in the Ethics, Compliance, and Culture Committee; member of HSEC; and the Investigations Committee. Merrin is the only member of the board of directors to be a member of the investigations committee. Merrin also has previous experience working under the Canadian Advisory Panel on Sustainable Energy, Science, and Technology. Merrin is the only director to have experience in sustainability prior to entering the board with her environmental and governance related role for the Canadian government.

Half of Glencore's board works directly with an ESG related committee. The HSEC is the most influential committee regarding sustainability. Within Glencore's board, there are three members who work on the HSEC board. This demonstrates the role that the highest leaders of Glencore play in the integration of ESG strategy in corporate policy.

4.3.3.2. Governance Bodies and Committees

In 2020, Glencore executives made major changes to the governing policies of the company. The board updated its policy and group framework to make Glencore's commitments and requirements more accessible and transparent to employees and stakeholders (Glencore 2022a). These policies were influenced by ESG by being based on the UN Global Compact, International Labor Organization Declaration on Fundamental Principles and Rights and Work, and the ICMM. It is specifically expressed in the "our policies" section on Glencore's website, that Glencore's ESG Committee was the key committee that reviewed and approved of new governing policies. The ESG committee is comprised of Glencore's CEO, CFO, Head of Industrial Assets, General Counsel, Head of Compliance, Head of Human Resources, Head of HSEC and Human Rights, and Head of Sustainability. They are the key governing body for sustainability at Glencore and their role is to advise Glencore's ESG programs, develop policies and standards, and identify ESG issues relevant to their business. This committee is the direct use of ESG framework to governing significant aspects of their company and is comprised of some of the highest levels of leaders in the company. This demonstrates the growing importance of ESG within the mining industry.

The second most important governing body for ESG at Glencore is the Health and Safety, Environmental, and Communities (HSEC) Committee. This committee oversees and reviews ESG policies that are being implemented and practiced at all levels of the company. The committee is a tool to reduce sustainability hazards and provides recommendations to Glencore's policies. HSEC deals directly with risk assessment on potential catastrophic and major sustainability related incidents and finds mitigation and remediation methods to prevent these risks from occurring (Glencore 2022a).

A leading governance committee at Glencore is the Ethics, Compliance, and Culture (ECC) Committee. ECC is the key governance committee as they directly work on creating and maintaining ethical practices and standards for the company. The ECC Committee acts as a check and balance framework for the company as it is their role to create and respond to employee concerns and wrongdoings (Glencore 2022a).

The Nomination Committee is critical to Glencore as it is responsible for determining suitable candidates to nominate into important leadership roles within the company. The Nomination Committee has a significant impact on the structure of the company as they are the framework that determines who and how many people are needed to govern the company. The committee's additional role within Glencore is to aid the board in increasing diversity within leadership roles within the company (Glencore 2022a).

The Audit Committee oversees the quality and integrity of financial statements, financial plans, and taxation. They review how effective the financial risk management control framework is and review the effectiveness of external auditors (Glencore 2022a). This committee is designed to be transparent with governments and stakeholders to build a trusting relationship with them.

4.3.3.3. Risk Management Strategies

Glencore uses an ethics and compliance program to assess risk, create policies, instill proper employee training, and conduct investigations (Glencore 2022a). Glencore has full-time and specially trained compliance officers that work on the company's corporate compliance team. They specialize in creating compliance programs for each of the unique geographic regions that Glencore operates in. The ethics and compliance program are Glencore's primary resources in governance risk assessment. The risks they target include creating proper framework to avoid corruption in high-risk countries and transparency of payments. For example, Glencore has a policy where they cannot use money to donate to political campaigns or figures. Another governance related policy implemented by the ethics and compliance program is that Glencore must provide accurate annual accounting statements to maintain the trust of stakeholders (Glencore 2022a). Applying these governance policies helps Glencore maintain a trusting image of the company which makes them a more trusting business partner to local communities and prevents any damage to their reputation.

Glencore's sustainability committees and their ethics and compliance program are what Glencore deems as their vital risk management framework. Developing these sustainable frameworks is a modern trend within the mining industry as they assess new kinds of risks. Traditional risks that mining companies would face would be commodity prices, permitting, and operating costs. Companies like Glencore are now utilizing governance frameworks like HSEC and the ESG committee to mitigate new sustainability risks. This demonstrates the shift in the mining industry on what companies deem as important risks facing their business. The integration of ESG policy can be seen in Glencore's risk management framework as presented in their 2020 annual report.

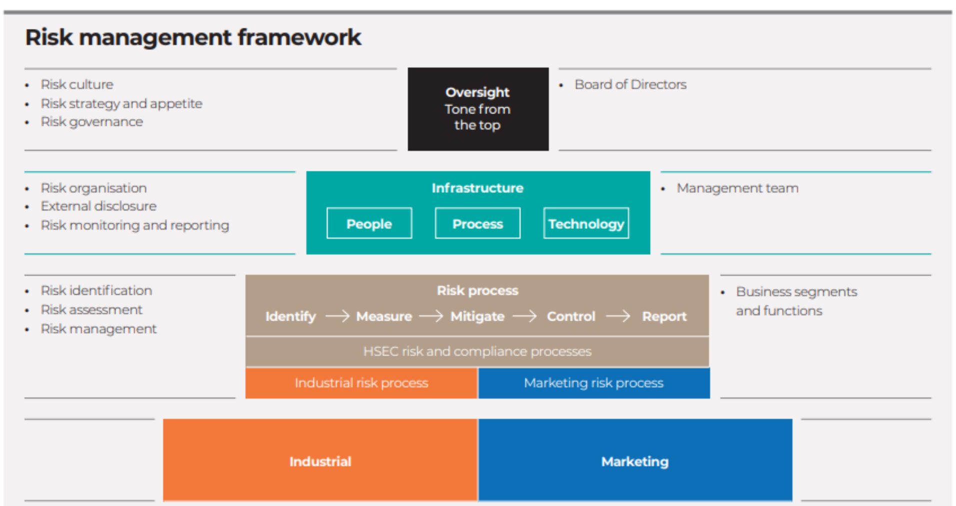

Figure 32 Glencore's Risk Management Framework (Glencore 2020b, pg. 70).

Glencore identifies Industrial and Marketing as the two largest categories of risk that can affect their business. Glencore's risk management framework uses their HSEC committee as the primary governing body to control the most important risks to the company. This indicates the transition of how key risks within the mining industry are now using sustainability policies to mitigate critical risks.

In Glencore's 2020 annual report, the company identifies 11 strategic priorities used to manage the most important risks facing their company (Glencore 2020b, pg. 72). One of the risks that Glencore identifies as important is the management of Geopolitics, permits, and social license to operate. The integration of obtaining a social license to operate and its imperative relation to geopolitical risk shows the significance of how ESG is used to maintain control over high-risk scenarios. Glencore believes that leaving a positive legacy in host communities through executing high legal standards, proper ethics, and abiding by the highest human rights standards is the best way they can control geopolitical risk (Glencore 2020b, pg. 75). Glencore believes that proper governance policy is fundamental in achieving their social license to operate. This is a combination of the social and governance pillars of ESG and how they are used to build proper relationships with host communities. This mitigates the potential for sustainability related disasters that could damage Glencore's reputation or profitability.

Another risk identified by Glencore in their strategic priorities is laws and enforcement. Glencore identifies laws and enforcement as one of the highest risks facing their business. The risks that Glencore is most exposed to are laws that relate to bribery, corruption, sanctions, taxation, environmental protection, and a variety of other laws that can inhibit how they manage and operate their projects (Glencore 2020b, pg. 76). Glencore uses governance framework through the form of their Group Ethics and Compliance program. The program's role at Glencore is to mitigate legal risk through creating policies, procedures, and training to keep Glencore at a high compliance standard. Glencore invests time and money to ensure that the Group Ethics and Compliance program has sufficient resources by increasing the number of dedicated compliance professionals (Glencore 2020b, pg. 77). Glencore employs people whose role within the company is to not help produce the commodities needed for profit, but to build and enforce sustainability policy to protect Glencore from damaging legal liability. Their position is created through the need for the mining industry to care more about sustainability and is an application of using ESG to create and strengthen their sustainability policies.

4.3.3.4. Transparency Policy

To engage in trusting relationships and dialogues with their stakeholders, Glencore commits themselves to high standards of corporate governance and transparency (Glencore 2022a). Glencore uses multiple public documents to convey their position on vital transparency matters to guide stakeholders through the corporate transparency process. Fiscal transparency is the first category of financial transparency that Glencore discusses on their website. Fiscal transparency refers to the payments Glencore makes via taxation to governments in countries they operate in. Fiscal transparency policy is supported by their Group Tax Policy document. The objective of this document is to discuss Glencore's approach to taxation (Glencore 2022b). Glencore states the fiscal transparency is important to their business strategy as it encourages the responsible management of revenues from extractive activities (Glencore 2022b, pg. 2). Transparency in the Group Tax policy also includes the commitment to being transparent in social investing. Social investing is Glencore's method of supporting local community programs and community development through charitable donations made by the company (Glencore 2022b, pg. 2). This statement within Glencore's tax policy shows how mining companies integrate ESG in all aspects of their business policies, including a document that details how they manage their finances in taxation. This document commits to stakeholders that Glencore is a company that can be trusted as they use strong governance policies such as making the accounting practices available to the public. This is an example of using the governance pillar to alter corporate business practices as well as use ESG as a method to appease stakeholders.

Payments made directly to governments are the next relevant financial transparency category that is important to Glencore. To promote their positive policies on transparent government payments, Glencore created the Payments to Governments report which has been published annually since 2015 (Glencore 2022a). A key topic within this report is Glencore's stance on tax haven jurisdictions. Glencore states that they do not use tax havens as an accounting method to lessen payments. Glencore states that any business in tax haven countries is still susceptible to taxation from host countries (Glencore 2020c, pg. 5). This is an example of using transparency to provide stakeholders with a better understanding of Glencore's accounting practices. To support their transparency on taxation policies, the report states the different organizations Glencore is a part of. This serves as an accountability measure and as a resource to guide their policies.

Glencore is part of the Extractive Industries Transparency Initiative (EITI) which promotes open and the accountable management of extractive resources (Glencore 2020c, pg. 6). Glencore has been part of EITI since 2011 and is a key member of EITI's Working Group on Transparency in Commodity Trading. Notable work done by this branch of EITI includes the ratification of increased transparency expectations of natural resource extraction companies, which was published in 2020 (Glencore 2020c, pg. 6). Glencore also uses ICMM's Mineral Resource and Tax Working Groups as a transparency tool as they are a member of this group. Glencore will work with ICMM to create standard guidelines for transparency and will abide by the new policies when they are published (Glencore 2020c, pg. 6). Glencore's engagement with these organizations displays their company positively as they work with peers of the industry and external third parties to create a higher standard for transparency within the mining industry. Membership with these organizations and committing to higher transparency standards demonstrates how mining companies use the governance pillar as essential framework for how they conduct business.

5. Data Analysis

5.1. Data Analysis Overview

The primary objective of this section is to compare how each of the studied companies utilizes ESG at all levels of their company. This will help draw conclusions of what pillar is most relevant to each company, what documentation is available for stakeholders to review regarding ESG, where ESG is integrated, and how ESG framework is used. Data that will be analyzed to guide the comparisons are:

- Comparing sustainability goals/ESG topics of importance
- Comparing when ESG was first mentioned by the company
- Comparing how ESG is utilized in their core values and pillars of business strategy
- Comparing sustainability roles and positions of members of the executive team
- Comparing sustainability related committees
- Comparing membership to ESG related NGOs, membership groups, or councils
- Finding quantitative metrics that each of the companies track

These guiding comparisons helped determine the objectives of this section. Comparing sustainability goals demonstrates how mining companies heavily utilize guiding frameworks like UN SDGs and ICMM principles to establish their sustainability policies. Difference in goals is evidence as to what ESG pillar is most important to the company. Determining when ESG was first mentioned by the company, particularly in their annual reports, will help determine when ESG became a relevant aspect of their business. A comparison of how each company utilizes ESG in their core values and core business strategies will exemplify how they use ESG as a marketability tool for their company. This comparison demonstrates how important ESG is to their business. The two governance comparisons of sustainability responsibilities of the executive teams and relevant sustainability committees demonstrates the level of importance ESG serves to each company as it pertains to their highest levels of leadership. Membership to NGOs, membership groups, and councils was used to provide insight as to where each company draws their sustainability framework from. Quantitative metrics tracked was studied to determine what relevant areas of sustainability are the selected companies tracking and how similar or different they are between the companies.

The next section of the data analysis section is understanding ESG scoring and how it pertains to both the industry as a whole and to the selected companies. Two different ESG scoring agencies where selected for this study, S&P Global and Refinitiv. Background on how both companies create their ESG scores is detailed. This section will show a comparison on how both S&P and Refinitiv score differently. ESG scores for the selected companies were compared and reviewed to understand how ESG scoring works and how their policies reflect their score.

5.2. Qualitative Data Comparisons

5.2.1. Sustainability Goals

Sustainability goals are key targets implemented by companies to track sustainability performance and they reflect what sustainability policies matter most to their business. All three companies will have sustainability targets compared and each company was analyzed to see how many of the goals apply to each pillar of ESG. Table 8, located in the appendix, shows each of the companies' sustainability goals. Many of the sustainability goals presented in Table 8 overlap with one another between the companies.

A common goal of zero fatalities is to be expected to be shared across the industry due to the safety movement that is occurring within the industry. The "Zero fatalities" goal combines ESG framework with worker safety and is a prioritized goal by mining companies to have a safe working environment which makes the company a desirable place to work. All companies studied have a sustainability target regarding the reduction of scope emissions. A common goal of reducing scope emissions demonstrates the significance of the Paris Agreement and the UN SDGs for climate change and how it is critical to their business strategy. The final sustainability goal that all three companies have in common is being stewards of the environment through proper water management planning, water tracking, and transparency in reporting water management. Water is a critical resource that both a mining company and host communities share, and water stewardship is listed as key principles in both the ICMM's mining principles and the UN SDGs. Reducing scope emissions, striving for zero fatalities, and water management as a common goal amongst the three industry leaders studied. This shows that these are defined as the largest issues identified by mining companies regarding sustainability, regardless of where the company is based out of or commodity they produce.

There are multiple goals that are shared between two companies but not the third. Both Newmont and Rio Tinto have a sustainability goal that states that they want to address and track grievances made by their host communities. This goal promotes more transparent communication with stakeholders and addresses issues that host communities may have. This provides a voice for host communities which they have not historically had when engaging with mining companies. This goal is a method for mining companies to be granted their social license to operate, showing how community relations and the social pillar of ESG has become increasingly relevant to mining companies' business strategies. Newmont and Rio Tinto also share clearly defined goals on what they want their roles to be within local communities. Both companies are committed to working with their local communities through site commitments that they believe will increase community relationships. Regarding this sustainability goal, Glencore uses a broader goal of creating risk-based management systems to support their health, safety, environment, community, and human rights committee. This goal suggests that Glencore is laggard in their approach to having defined sustainability goals and are still working on frameworks and policies.

The goals defined by the companies also demonstrate what pillars are most important to each company. Table 3 shown below shows the correlation of their sustainability goals to each ESG pillar. The discovery is that Newmont's and Rio Tinto's goals are heavily influenced by the social pillar of ESG, whereas Glencore's goals are heavily influenced by the environmental pillar.

Table 3 Sustainability Goals by Pillar

Pillar	Newmont	Rio Tinto	Glencore
Environmental	4	2	5
Social	6	6	3
Governance	0	1*	1

*Note: Rio Tinto's goal of improving diversity was counted in both social and governance as it pertained to leadership and their workforce.

5.2.2. When Was ESG Integrated?

An important concept in understanding the role of ESG within the mining industry is to determine when it was first utilized by companies. Analyzing the first use of ESG brings context as to when the cultural shift within the mining industry to adopt ESG started. The key areas to investigate to determine when ESG started to become relevant is to look at when ESG was first mentioned in their sustainability reports and their annual reports. The first mention of ESG in their sustainability reports signifies the transition of ESG as their methodology for sustainability reporting. The mentioning of ESG in their annual reports conveys how ESG is beginning to be integrated into their corporate policies and business strategies, not just their sustainability policies. Table 4, shown below, discloses when each company's sustainability report and annual report first mentioned ESG.

Table 4 ESG First Reported per Major Company Document

Report	Newmont	Rio Tinto	Glencore
Sustainability Report	2016	2016	2019
Annual Report	2019	2018	2019

Newmont (2016) *Annual Sustainability* Newmont
Newmont (2019) *Annual Report* Newmont
Rio Tinto (2016) *Sustainability Report* Rio Tinto
Rio Tinto (2018) *Annual Report* Rio Tinto
Glencore (2016) *Sustainability Report* Glencore
Glencore (2019) *Annual Report* Glencore

A common trend that can be seen from this table is when ESG became a relevant part of the mining industry. 2016 is the common period in which ESG was first mentioned in each of the company's sustainability reports. In ESG's first iteration in each sustainability report, ESG was minimally mentioned. In Newmont's 2016 sustainability report, ESG is only mentioned through their accomplishments as being recognized by Bloomberg for having strong ESG policies in place, as stated in the Chief Executive's message (Newmont 2016, pg. 3). In contrast, Newmont's 2020 sustainability report is written to be structured around the three pillars of ESG. In Rio Tinto's 2016 sustainability report, the only mention of ESG is in their sustainability section where Rio Tinto lists their voluntary commitments and external benchmarking initiatives (Rio Tinto 2016, pg. 75). Currently at Rio Tinto, ESG heavily influences their 2020 annual report and their investor presentations as means to support their business and engage with stakeholders. Glencore did not introduce ESG into their sustainability report until 2019 but accompanied the document with an ESG data book detailing ESG related data. Glencore is also the only company to have ESG first mentioned in both their annual report and sustainability report in the same year.

As ESG was integrated into annual reports between 2018-2019 for the observed companies, it implies that ESG has become critical to how companies want to be perceived. This demonstrates the momentous change in corporate culture within the mining industry as this table shows the adoption of ESG as the suitable CSR. This is also evident through the growing amount of usage of ESG as seen on company websites, such as Newmont and Glencore having ESG pages, and through the increasing integration of ESG in their sustainability reports.

5.2.3. Comparison of Business Strategy and Core Values

This section will compare how ESG framework is integrated within each studied company’s key business principles and corporate strategy. This will demonstrate how important ESG is to each company and signifies which pillar is most relevant to their business model.
The first area to be compared is each company’s business strategy. Newmont’s business strategy directly uses ESG as a core strategy through their desire to be the leader in the gold sector in profitability and responsibility (Newmont 2022a). This goal encompasses being leaders in environmental, social, and governance performance (Newmont 2022a). This is a broader goal that focuses in on being leaders in all pillars of ESG. This differs from the approach that Glencore and Rio Tinto take into creating their core business strategies. Rio Tinto’s business strategy focuses on the decarbonization of their business through prioritizing commodities that are essential to the drive to net zero, switching to renewable energy for their fleet and power sources, and investing money in research and development of products that contribute to decarbonization (Rio Tinto 2022a). Glencore has similar strategies as they want to be a leader in enabling decarbonization of the global energy demand and to responsibly meet the energy needs

of today (Glencore 2022a). Glencore's and Rio Tinto's business strategies follow more closely to meeting the requirements of the Paris Agreement, demonstrating that the environmental pillar is critical to both companies' business strategies.

Rio Tinto's corporate values shift focus towards the social pillar of ESG. Rio Tinto's values include caring for people, communities, the environment, courage to try new things, and curiosity to collaborate and innovate. Most of the values focus on developing good social structure within the company. The "Care" value focuses on having strong relationships with communities and the environment (Rio Tinto 2022a). Newmont's values focus on having strong social and governance policies. This includes the values of Safety, Integrity, Sustainability, Inclusion, and Responsibility. Glencore's values also focus on social and governance with values including Safety, Integrity, Responsibility, Openness, Simplicity, and Entrepreneurialism. It can be concluded that the social and governance pillars play the largest role in the creation of a company's core values. Safety, openness, integrity, inclusion, and developing relations with local communities are all fundamental parts of each companies' values. The consistency of themes across each company's values implies the use of ESG as the common policy creating framework.

Examining the roles of the executive committee for each company showed how new roles related to sustainability are being implemented and how traditional executive leadership positions are taking on new sustainability related obligations to further the integration of ESG into their company. Comparing the governance structure between each company through examining their executive leaders for number of ESG related roles or positions provides context as to how the governance pillar of ESG is used by each company. The comparison will also show which pillar is important to their business strategy through the relationships of the executive teams' roles and responsibilities to each ESG pillar. The comparison between the companies studied is shown in Table 4. Direct responsibility refers to the position having direct focus of a sustainability topic. This would include positions that work directly on sustainability topics like stakeholder relations, safety, environment, etc. Indirect responsibility refers to positions where sustainability is not their focus, but they do have sustainability roles such as being part of a sustainable committee. The total direct and indirect responsibilities are summed up then divided by the total executive members to yield a percent composition. This will show what percentage of their leadership team has ESG related roles. Note that Glencore's Board of Directors was used in this comparison.

Table 5 Relationship Between Executive Leaders and ESG

	Total Members	Indirect Responsibility	Direct Responsibility	% Composition
Newmont	7	1	3	57%
Rio Tinto	12	3	3	50%
Glencore	8	4	0	50%

The data from Table 5, shown above, is an indicator of the growing importance of ESG in the mining industry as it can be interpreted that each company has over half of their leaders holding some sort of ESG related role. Newmont and Rio Tinto each have three executive leaders with roles with a direct relationship with ESG. Both companies have an officer that oversees legal affairs that works directly on compliance and transparency for the company. This shows that the governance pillar through transparency and legal compliance is important enough for companies to delegate an executive officer in this regard. Newmont has a position on their leadership team called Chief Sustainability and External Affairs Officer (Newmont 2022a). This position is created directly out of the need for a leadership role to directly oversee Newmont's sustainability policies and social relationships. This supports their business model of working on being leaders of ESG in the gold sector. Rio Tinto has a Chief Executive role that works directly with stakeholders in Australia to develop stronger relationships. This represents the shift in corporate culture to have stronger frameworks to support the integration of the social pillar of ESG. This position will also be used to mitigate risks of future social disasters. Glencore's board is actively integrated into Glencore's ESG framework. Half of Glencore's board members work as chair or members of their sustainability related committees. The engagement of Glencore's directors as core leaders of ESG frameworks shows how Glencore currently holds high regard for sustainability as a critical part of their corporate framework.

The second area in governance data for each company is to observe the diversity composition of each companies' leadership teams. Diversity is a critical part of the governance pillar of ESG and comparing each company's diversity among their leadership is important to understand how they address diversity. Diversity refers to members of the leadership teams that are gender and ethnically diverse.

Table 6 Leadership Diversity Comparison

	Number of Executive Team	(%) Executive Team Diversity	Number of Board Members	(%) Board of Directors Diversity
Newmont[1]	7	43%	11	63%
Rio Tino[2]	12	42%	11	36%
Glencore[3]	N/A	N/A	8	38%

1- (Newmont 2022a)
2- (Rio Tinto 2022a)
3- (Glencore 2022a)

Newmont and Rio Tinto when comparing the composition of their executive team are equals regarding diversity composition. Both companies have almost half of their executive team composed of gender or ethnically diverse members showing that the governance pillar strategy of strong diversity of leadership is important to their governing bodies. When comparing each company's board of directors, there is a larger parity in the diversity composition. Newmont is the leader in board composition at 63%, followed by Glencore and Rio Tinto who are at 38% and 36% respectively. To fully understand how diversity has become more prominent in leadership roles, it is important to look at historically how the board is composed. Table 7, shown below, compares the diversity board composition for each company from 2011 to 2022.

Table 7 Board Diversity Change

	Number of Board Members 2011	Board Diversity 2011 (%)	Number of Board Members 2022	Board Diversity 2022 (%)
Newmont	12	25%	11	63%
Rio Tinto	14	14%	11	36%
Glencore	9	11%	8	38%

(Newmont 2011a)
(Rio Tinto 2011a)
(Glencore 2011a)

From the data shown above, it can be interpreted that board diversity has gone up over the last 11 years, exemplifying how ESG frameworks like diversity in governance has influenced corporate structure. It can also be noted that over the 11-year period, all three companies studied have reduced the number of positions on their board. This may indicate that mining companies believe that smaller boards can outperform larger boards due to efficiency.

5.2.4. Analysis of Sustainability Committees at Each Company

Another metric that can be used to further understand the integration of the governance pillar within the mining industry is to understand sustainability related committees that each company has implemented. It is important to understand how many sustainability committees each company has, what topics (pillars) these committees cover, and where each committee is found on the corporate structure. Where the committee is found on the corporate structure dictates how important the committee is to the overall corporate framework and determines what leadership level is responsible for that committee. Types of committees is another important metric as it determines what pillars are important to their business.

All three companies have board members overseeing a sustainability related committee. The board at Rio Tinto directly oversees the sustainability committee. This committee is above the executive committee. This committee covers all sustainability related goals and policies for Rio Tinto and shows the board's involvement in Rio Tinto's sustainability framework. Newmont's board oversees their Safety and Sustainability Committee and is the highest ESG related committee. Glencore's board is involved with multiple ESG related committees as board members act as chair and members in committees such as the Nomination committee, the HSEC committee, and the Ethics and compliance committee. ESG can be seen as a priority for each of the studied company's corporate frameworks as their board members are directly involved in the oversight of a sustainability governing body that is higher than their executive committee in the corporate structure.

Glencore's board of directors are directly involved in all their sustainability committees exemplifying how critical sustainability policy is to Glencore. Rio Tinto's and Newmont's sustainability frameworks are further down the leadership hierarchy. Rio Tinto's Climate Strategy Steering Committee is overseen by their Executive Committee. Newmont has

Sustainability and External Relations frameworks in place as means to implement sustainability policy at the corporate level and for each region. This framework is overseen by their Senior Leadership Team, a leadership level that is below the Executive Leadership team. This shows a contrast to the priorities of companies' sustainability policies. Rio Tinto deems climate change as a large enough risk factor to their business to have a committee be formed under the executive leadership team. Newmont has a broader framework in place to integrate sustainability. Sustainability has frameworks that are integrated at lower points in Newmont's corporate structure which gives more responsibility to a specific project or corporate teams to integrate ESG policy. Rio Tinto is the only company to have a committee specifically dedicated to the environmental pillar of ESG as being a key part of their governing framework. Glencore and Newmont combine pillars together to make up their committees.

5.2.5. Corporate Membership to Sustainability Related Organizations

Primary influences of ESG policy integration and inspiration stem from a company's memberships and commitments to sustainability related councils, NGOs, and industry groups. Being a part of these groups holds the company more accountable. Third party policies can help guide their own sustainability policy and can help shed positive light on the company as they are showing commitments to sustainability. Sustainability related NGOs help define industry related sustainability commitments and help standardize sustainability practices across the mining industry. This acts as means to guide companies with their sustainability goals and to hold the companies to a higher standard. Groups and councils can be related to the entire mining industry like the ICMM or can be commodity based, regionally based, and a variety of other defining positions that mining companies fall under or deem necessary to their business.

Newmont, Glencore, and Rio Tinto are all part of numerous commitments, councils, and NGOs that help define their sustainability policies. Comparing each companies’ commitments will show what NGOs or councils are standardized within the mining industry. The following is a list of examples of common commitments and memberships that Newmont, Rio Tinto, and Glencore share.

- Global Reporting Initiative (GRI)
- The Mining Association of Canada: Towards Sustainable Mining
- International Council of Mining and Metals (ICMM)
- Sustainability Accounting Standards Board (SASB)
- UN Global Compact
- Paris Agreement
- Extractive Industries Transparency Initiative
- Responsible Minerals Initiative (RMI)
- Global Industry Standard on Tailings Management (GISTM)
- Task Force on Climate-related Financial Disclosures

Memberships to these organizations as a widespread practice for each of the companies studied signifies common trends within the industry. All companies committing to the Paris Agreement and the UN Global Compact exemplify that ESG is the dominating method of policy creation and sustainability management for these mining companies. Both the Paris Agreement and the UN Global Compact are fundamental documents in the inception of the idea and application of ESG on a global scale. These documents and commitments are used by each of the companies to define their sustainability targets and performance metrics like greenhouse gas emissions, human rights, or biodiversity management. The adoption of GRI and ICMM shows the standardized approach that the mining industry has taken on defining sustainability goals and reporting metrics. Other overlapping organizations focus on reporting and commitments made to ESG standards. This includes the Responsible Minerals Initiative for managing each company's supply chain standards, using EITI to help define transparency goals for mining companies, and the Task Force on Climate-related Financial Disclosures is used to help mining companies define their climate change targets and data necessary for tracking. Newmont, Rio Tinto, and Glencore are all part of the Global Industry Standards on Tailings Management. This demonstrates that companies deem tailings storage facility failures as high risks and a common commitment strengthens the overall industry standard, thus holding companies more accountable for tailings dam failures and policies.

Each company studied is also part of unique organizations that the other companies are not a part of. Commodity related organizations are essential to standardize goals and practices for each sector of the mining industry. All companies studied hold membership to different commodity-based organizations to help strengthen their policies and improve public relations. Newmont holds membership to the World Gold Council, Rio Tinto is a part of the Aluminum Stewardship Initiative, and Glencore is a member of the Nickel Institute for example. Each company studied also holds membership to regional minerals councils. Holding membership in these areas helps develop transparent relationships with host countries and governments which is beneficial as these memberships help grant a social license to operate which both parties can economically benefit from. These include the Minerals Council of Australia, Mining Association of Canada, and Minerals Council of South Africa. All memberships are critical for the success of a mining company as they hold the company to a higher standard and help define and fulfill sustainability targets.

5.3. Quantitative Measures

To understand the sustainability performance of each company, there are several quantitative metrics that are tracked by each company. The first set of metrics is data that is related to the company's performance in each of the three ESG pillars. This type of data helps the company monitor their current impacts and, through yearly tracking, can determine the company's performance in each relevant category. Through companies' commitments and through regulation, most metrics tracked for environmental practices are standardized and are common from company to company. Social data follows under a similar category as many metrics are committed to be tracked by companies through their commitments to organizations like the ICMM and the UN Global Compact. Governance, on the other hand, has a smaller amount of data that can be quantified, making it more difficult to compare metrics and performance between companies. ESG scoring is the second quantitative metric that will be compared in this section. ESG scoring is a third-party method to rank a company's ESG policy to others in their industry and the score is based on numerous factors that differ between reporting companies.

5.3.1. Tracked Quantitative Metrics

5.3.1.1. Environmental Quantitative Metrics Tracked

Environmental goals and reporting can quantitatively be measured in three primary categories for mining companies: climate change, environmental management, and tailings. Climate change focuses on scope 1, 2, and 3 emissions produced by each company and is tracked by emissions output by project or region. Environmental metrics focus on water stewardship, biodiversity management, and environmental performance such as mining waste management and environmental fines paid. Tailings performance is a vaguer area to track but includes metrics like tailings produced and number of inspections per period of time.

Emissions is one of the important metrics tracked by companies. Tracking emissions is critical to a mining company's current business strategies as it can tell their performance on their goal of reaching carbon neutrality in 2050. Emissions data by each company is broken down by scope, by tonnes of CO_2 emissions produced, and emission weights of other gases. Each company reports emissions that are produced for each region or site where they operate. In the case of Glencore and Rio Tinto, emissions are also reported by emissions produced by commodity. This can help the company focus on regions or commodities which produce the most emissions so they can focus on reducing them in that site or region. For scope 2 emissions, emissions generated by power source is a useful metric tracked by each company. Power sources are essential for the mining and smelting aspects of their business. Identifying projects with high scope 2 emissions are important metrics to track as it will show which projects need to invest in new energy sources. This is pivotal in a company's portfolio as these metrics will predict which new projects are economically feasible and which current projects will need to have additional capital investment to address scope 2 emissions.

Scope 3 emissions tracking will help companies determine what parts of their supply chain hurt their goal of carbon neutrality. This will force companies to make decisions on how they bring products to market and will determine which suppliers they will work with. Appendix tables 9, 10, and 11 show how Newmont, Rio Tinto, and Glencore respectively report greenhouse gas emissions. Newmont's is an example of how scope 2 emissions are tracked through power sources, Rio Tinto's is an example on how total greenhouse gas emissions are reported by region, and Glencore's table shows tracked emissions output by commodity.

Environmental tracking is a broader form of ESG quantitative data that is publicly available. Per ICMM principles and UN SDGs, water management is tracked by all three companies. Water management entails how companies use water on-site and how it is managed during the mining process. Specific metrics tracked include water withdrawn for mining use, water recycled on site, water output such as water discharged, or water lost to evaporation. Water is broken up into surface water, sea water, groundwater, potable water, and imported water. Water usage is a critical metric to track as water is often a shared resource between the mining company and the local community. Transparency of water tracking is important to hold mining companies accountable for water usage and gives host communities public data on how mining companies are using and disposing of water. Table 12 in the appendix shows how Glencore reports water usage in their 2020 sustainability report.

Biodiversity management is another important metric tracked by mining companies. Mining companies work in areas that can harm plant and animal populations and through reclamation legislation it is critical that mining companies have plans and data to help deter the risk of damaging these populations. Biodiversity reporting metrics include total number of wildlife mortalities, acres of land disturbed, and number of endangered species of potential harm that can be located near a project site. All these metrics are tracked at a site-by-site basis or by geographic region. Table 13 in the appendix shows how Rio Tinto tracks biodiversity data.

Tailings has smaller sets of quantitatively trackable metrics in comparison to such metrics as water management or GHG emissions. Tailings focuses more on metrics like tailings produced by each company and where tailings come from. Reporting tailings management is a standard practice for members of the Global Industry Standard on Tailings Management per Principle 15: Publicly Disclose and Provide Access to Information About the Tailings Facility to

Support Public Accountability (GISTM 2020). Table 14 in the appendix shows how Newmont Reports tailings volumes.

5.3.1.2. Quantitative Social Metrics

Quantitative social data is another source of data available to the public for both the company and the public to measure the improvement of the company's social targets. The most prominent data available for quantitative social data is the reporting of safety data like incidents or fatalities at job sites. Tracking this metric helps measure a company's safety culture and their sustainability goal of zero fatalities. To track relationships with local communities, there are different sets of data that companies compile. The first set of data is tracking local/indigenous employment. These metrics help measure the companies' economic and social impacts on their host communities by understanding the percentage of their total employment that lives in the host communities. This metric is used as a public relations tool as it shows an increase in employment in the local area and demonstrates the economic value of the project to the area. Data collected on their employees also includes diversity. Diversity is a key part of ESG and integrating diversity in all levels of their business shows the growth of sustainability within the company.

The second community related metric tracked by all three companies is complaints and grievances. Complaints are tracked by companies to understand what areas of their social relationships need the most improvement. These would include grievances like land access, soil contamination, or complaints on air quality. Another metric tracked by mining companies to help create a positive public image with potential and current host communities is community investing. This includes tracking expenditures spent by companies on local communities, donations given, and money spent on local sourcing. This metric is tracked by companies for both the purpose of taxation and to demonstrate the company's value to local communities. This is essential for companies to gain or maintain their social license to operate. An example of community investments tracking can be seen in Table 15 in the appendix. This table shows community development expenditures and donations by region made by Newmont in 2021.

5.3.1.3. Quantitative Governance Metrics

Governance data tracked by each company is more qualitative as governance mostly focuses on the governing bodies of the company and transparency. Quantitative data tracked by each of the studied companies is categorized into two focus areas which are data pertaining to leadership roles within the company and transparency of taxation policies. Leadership data includes number of members of the board of directors or executive leadership, diversity of each leadership category, and compensation for each leadership category. For taxation, the data available comes in the form of tax and accounting practices that are published in the financial sections of such documents as annual reports. Each company tracking the same metrics demonstrates the influence of ESG as there are a set of standardized policies and metrics that are tracked.

5.3.2. ESG Scoring

ESG scores provide the public with quantitative data that shows how each company performs on each ESG metric and how they compare to peers in the industry. ESG scores are published by multiple third-party sources and are used by companies as ways to measure how strong their ESG policies and actions are. Many companies will publish their ESG scores on their corporate website, sustainability reports, annual reports, company presentations, or other public sources as means to convey to stakeholders their strong presence in sustainability or to show what areas they are working to improve. This section will focus on how ESG scoring is used within the mining industry and will focus on how ESG scores are created. The three companies studied will have their scores compared to peers within the industry to demonstrate their standing within the industry and to provide context as to how mining companies fair in ESG scoring. Scoring from two different ESG agencies will be analyzed and compared to detail the criteria that scoring agencies are looking at in examining a company's sustainability strategy and compare how agencies score differently.

The two ESG reporting agencies that were selected for this section were S&P and Refinitiv. Both companies have extensive databases on ESG scoring for mining companies and both score each company on a scale out of 100 total points. Both companies assign a specific score for each pillar and average the score to give the company's final score. The similarity in the final product of scoring made these two companies ideal for the study. This will allow for easier judgment in determining how consistent scores are between rating companies.

5.3.2.1. S&P Scoring

S&P is a leader in ESG scoring as seen by their multitude of awards including ESG Index Provider of the Year in 2021 from Environmental Finance Awards, Best Research Provider from Inside Market Data (IMD), and Best ESG Index Provider from the ESG Investing Awards (S&P 2022a). S&P uses company data from publicly available sources, verified company disclosures, media, and stakeholder analysis, and engages with the studied company through their Corporate Sustainability Assessment (S&P 2022a). S&P also factors in financial aspects of the company as they affect the company's value drivers, earnings capacity, competitive position, or long-term value for their shareholders if those aspects have significant impacts to the environment (S&P 2022a).

S&P scores companies on a scale of 0-100, where 100 is the highest prestige. S&P determines scoring on a point-based system that uses up to 1,000 data points per company that uses pre-defined scoring frameworks that assess availability, quality, relevance, and importance on ESG topics (S&P 2022b, pg. 3). This is done through the CSA process in which S&P uses a questionnaire mixing 80-100 cross-industry and industry-specific questions related to sustainability (S&P 2022a). This process includes the receiving internal documentation that is not part of public disclosures when possible (S&P 2022b, pg. 4). The core portion of the assessment, 40-50%, includes sustainability risks, opportunities, stakeholder impacts over short- and long-term periods, climate strategy, human rights risk, and crisis management (S&P 2022b, pg. 5). The remaining areas of evaluation are industry based (S&P 2022b, pg. 5). The structure of S&P's questions follows the criteria of (S&P 2022b, pg. 5):

- Awareness of the relevance and impact on value drivers and stakeholders.
- Quantification of risk exposure and potential opportunities.
- Implementation of strategies to manage sustainability risks, or capitalize on related opportunities, in a manner consistent with current business models.
- Measurement of results in relation to stated key performance indicators (KPIs) and metrics to evaluate the effectiveness of sustainability strategy.
- Validation or external audit of reported data.
- Transparent communication of corporate sustainability strategies and the degree to which targets have been stated and met.

This criterion ultimately makes up the final ESG score which can be viewed on S&P's website. This process also includes weighted ESG scores in relevance to how each pillar relates to the industry the company of study is a part of (S&P 2022b, pg. 5). S&P's score weighting and aggregation are as followed (S&P 2022b, pg. 8)

Equation 1 S&P ESG Score Formula

$$SPESG = \sum(((SPAP * SPQW) * SPCW) * SPDW)$$

Where:

SPESG = S&P Global ESG Score

SPQP = Question Points

SPQW = Question Weight

SPCW = Criteria Weight

SPDW = Dimension Weight

Figures 34, 35, and 36 in the appendix detail specific criteria S&P has for each ESG pillar.

5.3.2.2. Refinitiv ESG Scoring Methodology

Refinitiv scores companies on a scale of 0-100 with 100 being considered the highest score range. Scores represent a company's standings within their respective industry with scores ranging from 0-25 being the first quartile (lowest), >25 to 50 as the second quartile, >50 to 75 as the third quartile, and >75 to 100 as the fourth quartile (best) (Refinitiv 2022a). Refinitiv objectively observes ESG performance, commitment, and effectiveness across 10 categories (Refinitiv 2022a). These categories reflect the three pillars of ESG and divide each pillar into subcategories as shown below (Refinitiv 2022b, pg. 6):

- Environmental
    - Resource Use
    - Emissions

  - Innovation
- Social
  - Workforce
  - Human Rights
  - Community
  - Product Responsibility
- Governance
  - Management
  - Shareholders
  - CSR Strategy

Data collected by Refinitiv comes from data available in the public domain and calculates a company's score through 630 company-level ESG measures, which has 186 measures being relevant to the company's industry. Data collected by Refinitiv includes annual reports, NGO websites, CSR reports, news sources, stock exchange findings, and data from the company website (Refinitiv 2022b, pg. 4). After data is collected, scores are calculated through Refinitiv's calculation methodology. A computer calculates the base score and then compares the score to other companies in the same industry (Refinitiv 2022b, pg. 9). The final score formula is as followed (Refinitiv 2022b, pg. 9):

Equation 2 Refinitiv ESG Scoring Formula

$$Score = \frac{no.of\ companies\ with\ a\ worse\ value + \frac{no.of\ copmanies\ with\ the\ same\ value\ included\ in\ current\ one}{2}}{no.of\ companies\ with\ a\ value}$$

5.3.2.3. Contrasting ESG Scoring Methodologies

There are two primary distinctions that differ between the S&P and Refinitiv methods of calculating ESG scores. Refinitiv only uses data that is available in the public domain whereas S&P uses both data from the public domain and from disclosed information given by a company when possible. This creates a discrepancy in comparing the two reporting formats as S&P will have more information on the company in some cases. The second major difference is how the scores themselves are calculated. Scores for Refinitiv reflect how well the company performs in comparison to industry peers whereas S&P's formula independently looks at the company's ESG policies.

5.3.2.4. ESG Scores

The three studied companies have been scored by both S&P and Refinitiv. Their scores are as followed:

Table 8 ESG Score Comparisons Between the Three Studied Companies

	S&P Score[1]				**Refinitiv[2]**				
Company	E	S	G	ESG Score	E	S	G	ESG Score	Difference
Rio Tinto	77	74	77	**76**	76	92	67	**80**	4
Newmont	86	80	84	**83**	88	78	100	**87**	4
Glencore	47	46	35	**43**	87	94	88	**90**	47

1- (S&P 2022c)
2- (Refinitiv 2022c)

Each company has a score related to their performance in each of the three ESG pillars and a total score shown in bold. In Refinitiv's scoring methodology, all three studied companies are among the top quartile of their industry. In S&P's scoring methodology, Rio Tinto and Newmont are leaders within their industry but Glencore is above average. The average within the industry for S&P scoring is a total score of 31. Glencore's variance in ESG scores shows discrepancies in ESG scoring. To compare how relative Refinitiv and S&P's scoring methodology are to each other, the three studied companies along with other members in the industry were put on a scatter plot to compare the scoring methodologies. Data points in orange represent gold companies and data points in blue represent companies that have diversified assets or are copper based. The red line is a 45° line that is used to determine if there is a strong correlation between ESG scores. The resulting graph is shown in Figure 33 below.

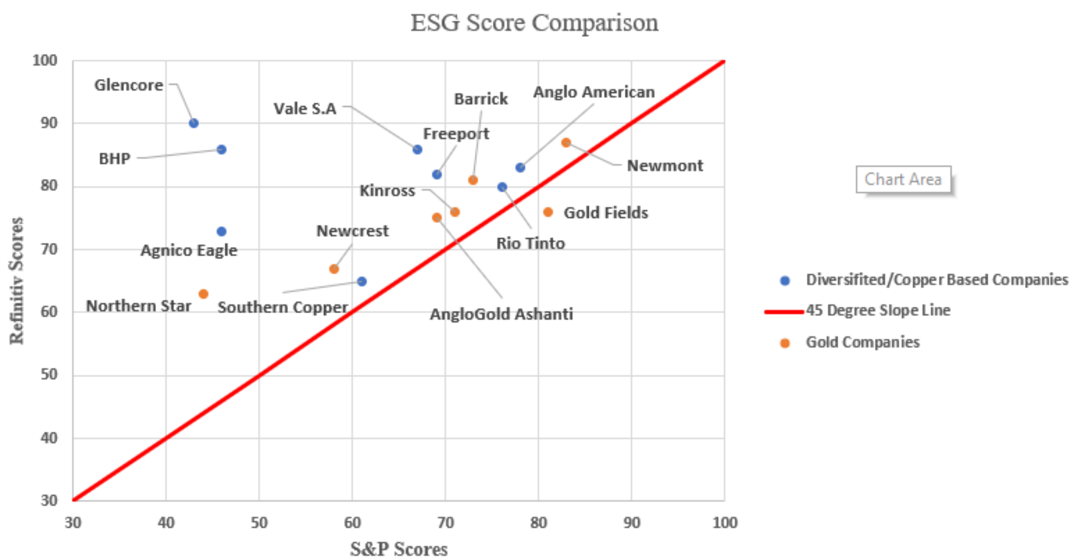

Figure 33 Comparison of S&P's and Refinitiv's ESG Scores

Most companies shown above show a moderate correlation in their ESG scores from the two scoring methodologies. Notable outliers include Glencore, BHP, Agnico Eagle, and Northern Star. Each of the outliers has a significantly higher score on Refinitiv's scale versus S&P's scale. This may be attributed to Refinitiv's methodology of comparing how a company performs against its peers versus being studied independent, as per S&P's method. This could lead to companies who perform average on S&P's scale to see a boost on Refinitiv's scale as they are performing better than over half the industry.

6. Conclusion

In conclusion, the analysis of three industry major mining companies demonstrated that ESG has become an integral framework used in corporate policy, public relations, business strategy, and as a risk mitigating tool. This report demonstrated that mining companies are thoroughly evaluating how sustainability has a significant impact on their business now and for the future. ESG has emerged as a leading and standardized method in which they implement sustainability as part of their business.

ESG has been proven to be a key tool in how companies identify and mitigate risk at all levels of their business. This can be seen with the establishment of new positions and committees whose role within the company is to directly work on improving sustainability. Reports published annually by the companies studied identifies sustainability as key risks that they face for the future of their business as well as the data tracking and corporate framework implemented demonstrates the serious nature in which these companies are taking sustainability. Changes in core values, business strategy, and money committed to carbon neutral alternatives and local community engagement demonstrate how ESG is intertwined with mining companies' finances.

7. Future Work

There is much more to be studied regarding the integration of ESG into a mining company's corporate framework. This study focused on what policies and frameworks a mining company has implemented regarding ESG. A future area of study would entail analyzing the effectiveness and actual utilization of all policies laid out by a company. This is especially important for the social pillar as much data collected in this area in this study analyzed policies. Changing of policies over time will show new areas in which companies are attempting to gain their social license to operate. A secondary aspect to this recommendation would be analyzing companies closer towards 2030. This gap in time would show if ESG has stayed as the main reporting framework or has ESG been replaced by a newer trend within the industry. After a specified period, it would be interesting to study how close mining companies are to achieving sustainability goals such as the reduction of scope emissions. This will show the effectiveness of the environmental pillar of ESG.

ESG scoring is a huge category that needs to be studied further. There are many different companies who provide the services of ESG scoring, but in certain cases, the scores do not line up with each other. An investigation of the causes of contrasting scores and determining a standardization method is an area of relevance that needs to be studied.

A future study detailing its effectiveness would shed light on whether ESG is the right framework for mining companies. This study also looked at major companies within the mining industry with varying commodities. A comparison between larger companies, who have access to higher cashflows, to smaller companies would provide context to how ESG is used at all levels of mining companies.

8. References Cited

Alonso-Almeida, M., Llach, J., & Marimon, F. (2013). A closer look at the 'Global Reporting Initiative' Sustainability Reporting as a tool to implement environmental and Social Policies: A worldwide sector analysis. *Corporate Social Responsibility and Environmental Management*, *21*(6), 318–335. https://doi.org/10.1002/csr.1318

Barrick (2020) *Sustainability Report 2020* Barrick

Böhling, K., Murguía, D. I., & Godfrid, J. (2017). Sustainability reporting in the mining sector: Exploring its symbolic nature. *Business & Society*, *58*(1), 191–225. https://doi.org/10.1177/0007650317703658

Chapman and Cutler. (2021, May 25). *The role of ESG ratings providers in assessing ESG performance and risks*. Chapman and Cutler LLP. Retrieved from https://www.chapman.com/insights-publications-ESG_ratings_providers_important_data_point.html

Fonseca, A., McAllister, M. L., & Fitzpatrick, P. (2014). Sustainability reporting among mining corporations: A constructive critique of the GRI approach. *Journal of Cleaner Production*, *84*, 70–83. https://doi.org/10.1016/j.jclepro.2012.11.050

Garside, T. R. (2021, May 18). *Largest mining companies by market cap 2021*. Statista. Retrieved from https://www.statista.com/statistics/272706/top-10-mining-companies-worldwide-based-on-market-value/

Glencore. (2022a) *Glencore Corporate Website* Glencore https://www.glencore.com/

Glencore (2022b) *Group Tax Policy* Glencore

Glencore (2022b) *Social Performance Policy* Glencore

Glencore (2022b) *Our Purpose and Values* Glencore

Glencore (2021a) *Pathway to net zero 2021 progress report* Glencore

Glencore (2020a) *Sustainability Report – 2020* Glencore

Glencore (2020b) *Annual Report 2020* Glencore

Glencore (2020c) *Payments to Governments* Glencore

Glencore (2019) *Annual Report 2019* Glencore

Glencore (2016) *Sustainability Report 2016* Glencore

GRI. (2022). *GRI Sector Standards Project for mining - globalreporting.org*. Sector Standard Project for Mining. Retrieved from https://globalreporting.org/media/dirncusz/gri-mining-sector-standard-wg-terms-of-reference.pdf

GTISM (2020) *Global Industry Standard on Tailings Management*

Hahn, R., & Kühnen, M. (2013). Determinants of sustainability reporting: A review of results, trends, theory, and opportunities in an expanding field of research. *Journal of Cleaner Production*, *59*, 5–21. https://doi.org/10.1016/j.jclepro.2013.07.005

ICMM (2022) Corporate Website https://www.icmm.com/

IFC. (2004). *Who cares wins, 2004–08 - IFC: Issue Brief*. Retrieved from https://www.ifc.org/wps/wcm/connect/9eeb7982-3705-407a-a631-586b31dab000/IFC_Breif_whocares_online.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-9eeb7982-3705-407a-a631-586b31dab000-jkD12B5

Kinross (2022) Corporate Website Kinross http://kinross.com/

Komnitsas, K. (2020). Social License to Operate in Mining: Present Views and Future Trends. *Resources*, *9*(6), 79. https://doi.org/10.3390/resources9060079

Kuykendall, T., Bouckley, K., Warwick, F., & Dholakia, S. T. and G. (2020, July 27). *Mining faces pressure for net-zero targets as demand rises for clean energy raw materials*.| S&P Global Commodity Insights. Retrieved October 8, 2021, from https://www.spglobal.com/platts/en/market-insights/latest-news/coal/072720-mining-faces-pressure-for-net-zero-targets-as-demand-rises-for-clean-energy-raw-materials

MSCI. (2021). *ESG investing: ESG Ratings*. MSCI. Retrieved April 10, 2022, from https://www.msci.com/our-solutions/esg-investing/esg-ratings

Newmont (2022a) *Newmont Corporate Website* Newmont https://www.newmont.com/home/default.aspx

Newmont (2021a) *Climate Change Strategy Report* Newmont Corporation

Newmont (2021b) *ESG Data Tables* Newmont Corporation

Newmont (2020a) *Sustainability Report* Newmont Corporation

Newmont (2020b) *Modern Slavery Statement* Newmont Corporation

Newmont (2020c) *Social Baseline and Impact Assessment standard* Newmont Corporation

Newmont (2020d) *People Policy* Newmont Corporation

Newmont (2020e) *Our Code of Conduct* Newmont Corporation

Newmont (2020f) *Corporate Governance Guidelines* Newmont Corporation

Newmont (2019) *Annual Report* Newmont Corporation

Newmont (2016) *Annual Sustainability* Newmont Corporation

Newmont (2011) *2011 Annual Report and Form 10-K* Newmont

Perez, F., & Sanchez, L. E. (2009). Assessing the evolution of sustainability reporting in the mining sector. *Environmental Management*, *43*(6), 949–961. https://doi.org/10.1007/s00267-008-9269-1

Rio Tinto. (2022a) *Rio Tinto Corporate Website* Rio Tinto https://www.riotinto.com/en

Rio Tinto (2022b) *Tailings Policy* Rio Tinto file RT-Tailings-policy.pdf

Rio Tinto (2021a) *Communities and Social Performance Commitment Disclosure* Rio Tinto

Rio Tinto (2021b) *Communities and Social Performance: Cultural Heritage* (Presentation)

Rio Tinto (2020a) *Sustainability Fact Book 2020* Rio Tinto

Rio Tinto (2020b) *Climate Change Report 2020* Rio Tinto

Rio Tinto (2020C) *Annual Report 2020* Rio Tinto

Rio Tinto (2018) *Annual Report 2018* Rio Tinto

Rio Tinto (2016) *Sustainability Report 2016* Rio Tinto

Rio Tinto (2011) *2011 Annual Report* Rio Tinto

S&P (2022b) *S&P Global ESG Scores Methodology* S&P Global

S&P Global. (2020, February 24). *What is the "G" in ESG?* S&P Global. Retrieved October 15, 2021, from https://www.spglobal.com/en/research-insights/articles/what-is-the-g-in-esg

UN. (1993). REPORT OF THE UNITED NATIONS CONFERENCE ON ENVIRONMENT AND DEVELOPMENT. In *Report of the United Nations Conference on Environment and Development: Rio de Janeiro, 3 - 14 June 1992*. New York; United Nations.

UN. (2022). *The Paris Agreement*. Unfccc.int. from https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement

UN. (2015). *The 17 goals | sustainable development*. United Nations. Retrieved from https://sdgs.un.org/goals

9. Appendix

Table 9 Sustainability Goals by Company

Newmont	Rio Tinto	Glencore
Zero Fatalities	Reach zero fatalities and eliminate workplace injuries	No Fatalities
Local/Indigenous Employment	Identify at least one critical hazard material to business per project	Year-on-year reduction in number of new occupational disease cases
Local/Indigenous Procurement	Reduce the rate of occupational illness each year	Do not cause or contribute to incidents resulting in severe human rights impacts
Stakeholder Complaints and Grievances	Reduce absolute scope 1 and 2 emissions by 15% and emissions intensity by 30%	Implement a proactive risk-based approach to prevent HSEC-HR incidents.
Community Commitments	Disclose permitted surface water allocation volumes and annual usage for all sites	Compliance with Global industry standard for tailings management
Human Rights and the Supply Chain	Improve diversity in business	40% absolute reduction in Scope 1,2, and 3 emissions by the end of 2035.
Water Stewardship	Improve employee satisfaction	Net zero by 2050
Water Efficiency	Work with local communities through employment, procurement of goods, and track community complaints.	By 2023, establish water-related risks targets and policies to reduce impacts on water stressed environments.
Energy and Climate Change (Reduce scope emissions)		No Serious environmental issues
Closure and Reclamation		

Table 10 Scope 2 Emissions Reporting by Newmont Example(Newmont 2021b, Climate Change)

Estimated greenhouse gas (GHG) emissions: Trailing five year data (million tonnes CO_2e)[1, 2, 3]	**2016**	**2017**	**2018**	**2019**	**2020**
Direct GHG emissions sources					
From coal	0.000	0.000	0.000	0.000	0.000
From diesel	1.321	1.441	1.562	1.337	1.237
From waste oil	0.000	0.000	0.000	TR	0.000
From gasoline	0.006	0.007	0.007	TR	0.007
From natural gas	0.030	0.047	0.041	0.105	0.162
From propane	0.026	0.029	0.028	TR	0.024
From heavy fuel oil	0.017	0.119	0.113	0.148	0.145
From aviation fuel	0.000	0.000	0.000	TR	0.007
From biodiesel	0.012	0.000	0.000	TR	0.009
From quick lime production	0.038	0.019	0.005	TR	0.013
From acid rock drainage (ARD) neutralization	0.000	0.000	0.000	0.000	0.000
From sulfur hexafluoride (SF_6)	0.000	0.000	0.000	TR	0.000
Other fugitive emissions	0.002	0.001	0.000	0.000	0.000
Methane[4]	0.000	0.000	0.000	0.000	0.000
Total direct (Scope 1) GHG emissions	**1.451**	**1.663**	**1.757**	**1.591**	**1.604**
Total indirect (Scope 2) emissions - LOCATION BASED	**1.469**	**1.550**	**1.591**	**1.506**	**1.627**
Total indirect (Scope 2) emissions - MARKET BASED	**1.681**	**1.769**	**1.813**	**1.727**	**1.852**
Total direct and indirect (Scopes 1 and MARKET BASED 2) GHG emissions	**3.132**	**3.432**	**3.570**	**3.318**	**3.455**

Table 11 Rio Tinto Greenhouse Gas Emissions by Region (Rio Tinto 2020b, GHG Emissions)

2021 equity greenhouse gas emissions by location ($Mt CO_2e$)	Scope 1 emissions ($Mt CO_2e$)	Scope 2 emissions ($Mt CO_2e$)	Total emissions ($Mt CO_2e$)
Australia	12.8	6	18.8
Canada	6	0	6
South Africa	0.3	1.1	1.4
USA	1	0	1
Other: Rest of Africa	0.2	0	0.2
Other: Europe	0.4	0	0.4
Other: Asia, New Zealand, Central America, South America	2	1.3	3.3
Total	**22.7**	**8.4**	**31.1**

Table 12 GHG Emissions by Commodity (Glencore 2020a, pg. 109)

GRI 305	305-1	Direct greenhouse gas (GHG) emissions (Scope 1)	Direct emissions (thousand tonnes CO_2e)	18,788	18,266	**15,029***
			Direct emissions by commodity (thousand tonnes CO_2e)	18,788	18,266	**15,029**
			– Aluminium	0.02	0.03	**0.01**
			– Coal	6,879	6,702	**5,856**
			– Copper	1,725	1,578	**1,328**
			– Ferroalloys	4,380	4,112	**3,047**
			– Iron ore	–	–	**–**

Table 13 Glencore Water Management Data (Glencore 2020a, pg. 38)

Glencore's overall water balance 2020 (GL)

Share water used in task/process vs water input 55%

Water input (by source)	1,041
Surface water – withdrawn	193
Sea water – withdrawn	170
Groundwater – withdrawn	349
Rainwater – withdrawn	200
Potable (drinking) water imported or withdrawn	18
Other (non potable) water imported from a third party	96
Total water withdrawn	1,027
Water entrained in ore that is processed	14

Water used, reused/recycled on-site	1,098
Water used in a task or process	574
Water recycled	137
Water reused	387
Recycling and reuse efficiency rate'	48%
Change in water in storage	-4

Water output (by source)	1,045
Water discharged to surface water	435
Water discharged to sea water/ocean	172
Water discharged to groundwater	5
Water discharge to off-site treatment or disposal locations	11
Water exported to a third party	47
Water lost to evaporation and other losses	330
Water entrained in waste material and final product	46

Diversions and water transferred to others	81
Surface water diversions	22
Aquifer interception diverted	35
Water supplied to others	23

Table 14 At Risk Species at Risk Per Asset (Rio Tinto 2020a, Biodiversity Species by Asset).

Total number of IUCN Red List species ranges that overlap with Rio Tinto operating assets

Country	Product group	Asset name	IUCN Red Listed species: Critically endangered	Endangered	Vulnerable	Near threatened	Least concern
Australia	Aluminium	Gove Plant-Alumina Refinery	12	5	101	126	1,460
Australia	Aluminium	Weipa	9	24	137	161	2,306
Australia	Aluminium	Yarwun	9	25	131	167	2,133
Australia	Aluminium	Andoom	9	21	95	124	1,476
Australia	Aluminium	Weipa East	9	21	95	124	1,483
Australia	Aluminiu	Gove Operations-Bauxite Mine	12	25	101	126	1,459
Australia	Copper & Diamonds	Argyle	2	1	3	10	608
Australia	Energy & Minerals	Energy Resources of Australia Ltd	4	9	19	16	686

Table 15 Tailings Generated by Region (Newmont 2021b, Tailings Management).

Tailings generated and managed (metric tons)[1]	Country	Management method			Total produced and managed
		Surface tailings	Open pit tailings	Sub-surface tailings	
AFRICA	**Ghana**	**17,984,815**	**0**	**0**	**17,984,815**
	Ahafo	9,569,103	0	0	9,569,103
	Akyem	8,415,712	0	0	8,415,712
AMERICAS: NORTH	**U.S.**	**1,658,790**	**0**	**0**	**1,658,790**
	CC&V	1,658,790	0	0	1,658,790
	Canada	**5,208,995**	**0**	**595,138**	**5,804,133**
	Éléonore	869,953	0	595,138	1,465,091
	Musselwhite	752,073	0	0	752,073
	Porcupine	3,586,969	0	0	3,586,969
	Mexico	**28,023,144**	**0**	**0**	**28,023,144**
	Peñasquito	28,023,144	0	0	28,023,144

Table 16 Newmont's 2021 Community Investments (Newmont 2021b, Community Investments)

Community investments: Site level (millions US$)[1,5]	Country/site[2]	Community development expenditures[3]	Donations[4]	Totals
AFRICA	**Ghana**	**$ 8.38**	**$ 0.11**	**$ 8.49**
	Ahafo	$ 3.92	$ 0.10	$ 4.02
	Akyem	$ 4.46	$ 0.01	$ 4.47
AMERICAS: NORTH	**U.S.**	**$ 0.18**	**$ 0.29**	**$ 0.47**
	CC&V	$ 0.18	$ 0.29	$ 0.47
	Canada	**$ 0.00**	**$ 2.21**	**$ 2.21**
	Éléonore	$ 0.00	$ 0.38	$ 0.38
	Musselwhite	$ 0.00	$ 0.09	$ 0.09
	Porcupine	$ 0.00	$ 0.37	$ 0.37
	Vancouver	$ 0.00	$ 1.37	$ 1.37
	Mexico	**$ 0.00**	**$ 2.10**	**$ 2.10**
	Peñasquito	$ 0.00	$ 2.10	$ 2.10
AMERICAS: SOUTH	**Argentina**	**$ 0.26**	**$ 1.33**	**$ 1.59**
	Cerro Negro	$ 0.26	$ 1.33	$ 1.59
	Suriname	**$ 0.37**	**$ 0.16**	**$ 0.53**
	Merian	$ 0.37	$ 0.16	$ 0.53
	Peru	**$ 3.57**	**$ 0.29**	**$ 3.86**
	Yanacocha	$ 3.57	$ 0.29	$ 3.86
AUSTRALIA	**Australia**	**$ 0.48**	**$ 0.76**	**$ 1.24**
	Boddington	$ 0.20	$ 0.03	$ 0.23
	Perth	$ 0.10	$ 0.67	$ 0.77
	Tanami	$ 0.19	$ 0.06	$ 0.24

Social Dimension Criteria Topics

Addressing Cost Burden
Asset Closure Management
Corporate Citizenship and Philantropy
Financial Inclusion
Health Outcome Contribution
Human Capital Development
Human Rights
Labor Practice Indicators
Local Impact of Business Operations
Occupational Health and Safety
Partnerships Towards Sustainable Healthcare
Passenger Safety
Responsibility of Content
Social Impacts on Communities
Social Integration & Regeneration
Social Reporting
Stakeholder Engagement
Strategy to Improve Access to Drugs or Products
Talent Attraction & Retention

Figure 34 Social Pillar Topics Relevant to ESG Scoring (S&P 2022a)

Figure 35 Environmental Pillar Criteria Topics Relevant to ESG Scoring (S&P 2022a

Environmental Dimension Criteria Topics

Biodiversity
Building Materials
Climate Strategy
Co-Processing
Electricity Generation
Environmental Policy & Management Systems
Enviromental Reporting
Fuel Efficiency
Genetically Modified Organisms
Low Carbon Strategy
Mineral Waste Management
Operational Eco-Efficiency
Packaging
Product Stewardship
Raw Material Sourcing
Recycling Strategy
Resource Conservation and Resource Efficiency
Sustainable Forestry Practices
Transmission & Distribution
Water Operations
Water Related Risks

Figure 36 Governance Pillar Topics Relevant to ESG Scoring (S&P 2022

Governance & Economic Criteria Topics

Anti-crime Policy & Measures
Brand Management
Codes of Business Conduct
Compliance with Applicable Export Control Regimes
Corporate Governance
Customer Relationship Management
Efficiency
Energy Mix
Financial Stability and Systemic Risk
Fleet Management
Health & Nutrition
Information Security / Cybersecurity & System Availability
Innovation Management
Market Opportunities
Marketing Practices
Materiality
Network Reliability
Policy Influence
Principles for Sustainable Insurance
Privacy Protection
Product Quality and Recall Management
Reliability
Risk & Crisis Management
Strategy for Emmerging Markets
Supply Chain Management
Sustainable Construction
Sustainable Finance
Water Related Risks

Table 17 ESG Score Data

	S&P Score				Refinitiv				
Company	E	S	G	ESG Score	E	S	G	ESG Score	Difference
Best in Industry	88	82	84						
Industry AVG	28	28	36	31					
Rio Tinto	77	74	77	76	76	92	67	80	4
Barrick	79	73	67	73	83	81	79	81	8
Newmont	86	80	84	83	88	78	100	87	4
Freeport	68	71	70	69	79	77	94	82	13
Kinross	66	71	76	71	68	86	73	76	5
Newcrest	47	64	62	58	57	64	84	67	9
Southern Copper	75	59	49	61	69	72	49	65	4
Vale S.A	80	61	61	67	90	86	79	86	19
BHP	48	43	48	46	82	83	97	86	40
Anglo American	78	79	77	78	80	85	85	83	5
Gold Fields	85	80	77	81	81	84	54	76	5
AngloGold Ashanti	66	74	68	69	61	75	94	75	6
Northern Star	38	43	49	44	48	65	81	63	19
Agnico Eagle	43	43	53	46	63	79	77	73	27
Glencore	47	46	35	43	87	94	88	90	47