

C0. Introduction

C0.1

**(C0.1) Give a general description and introduction to your organization.**

Vale S.A. is one of the largest metals and mining companies in the world, based on market capitalization and one of the leading mining companies in the global market for iron ore, iron ore pellets and nickel, with operations in more than 20 countries and five continents. The company is headquartered in Rio de Janeiro, Brazil, and has 213,413 employees (72.2 thousand own and 141.1 thousand third parties). Vale also produces manganese ore, ferroalloys, metallurgical and thermal coal, copper, platinum group metals, gold, silver and cobalt. Vale is engaged in greenfield mineral exploration in five countries. In addition, it operates large logistics systems in Brazil and other regions of the world, including railroads, maritime terminals and ports, which are integrated with its mining operations. The company has distribution centers to support the delivery of iron ore worldwide and also has investments in energy and steel businesses directly and through associates and joint ventures. Vale is a publicly traded private organization. The body responsible for guiding and directing the organization's management is the Board of Directors. It's up to Vale's Board to be the link between shareholders and leaders, to define Vale's general policies and guidelines, to evaluate plans and projects proposed by the Executive Committee and to measure the results achieved. Vale's purpose is to transform natural resources into prosperity and sustainable development. Vale is committed to becoming a sustainability benchmark (leader in sustainable mining) through a comprehensive approach based on systematic planning and execution, prioritizing risk and impact management (seeking to achieve zero harm to its employees and surrounding communities) and establishing a positive social, economic and environmental legacy in the places where it operates. Vale recognizes that climate change represents one of the greatest challenges for society and is committed to contributing to solutions that limit the increase in temperature by up to 2°C, as defined in the Paris Agreement (PA). In this regard, Vale's Board of Directors updated the organization's net-zero strategy in 2019. Vale aims to act actively to support the decarbonization of the steel, metallurgical and shipping chains and the company's main commitment is to become net-zero in its operations (scopes 1 & 2) by 2050, considering the target to reduce 33% of scopes 1&2 and the target to consume 100% of electricity from renewable sources by 2025 in Brazil, and globally in 2030. In addition in 2020 Vale assumed the goal of reducing Scope 3 net emissions by 15% by 2035, compared to the base year of 2018, which is based on the development of new products, nature-based solutions, partnerships, and engagement with clients and suppliers. The reduction volume was defined based on the Science Based Target Initiative-SBTi calculation tool, Absolute Contraction Approach method, so it can be also a science-based target. Therefore, to support these goals, an internal carbon price of USD50/tCO2e is already in effect to guide Vale's capital allocation decisions aligned with the PA goals. This price is also aligned with the 2°C scenario, following the recommendations of the Carbon Pricing Leadership Coalition (CPLC). In this process, the Executive Vice President for Sustainability has the function of deploying and monitoring advances in the implementation of strategies and policies, in addition to being an agent of internal and external engagement, through actions and dialogue with stakeholders, as well as strengthening the relationship between Vale and society, being an important facilitator for the implementation of the New Pact with Society, one of Vale's strategic pillars. In addition, acting with transparency and considering the expectations of its stakeholders is one of the company's pillars. One of the transparency initiatives related to climate change in which Vale participates, is the Task Force for Climate-Related Financial Disclosures (TCFD), an initiative that aims at promoting transparency regarding climate-related risks and opportunities. Some other relevant forums focused on climate change that Vale is part of are: International Council on Mining and Metals (ICMM), CDP, and the World Business Council for Sustainable Development (WBCSD). In 2020, Vale joined the CDP Supply Chain to report all actions and indicators focused on CO2e emissions in the value chain. Finally, Vale supports efforts to mitigate GHG emissions, in collaboration with peers, by promoting innovation, developing and deploying low emissions technology, and implementing projects that improve energy efficiency. The answers in the CDP questionnaire refer to 100% of Vale's operating units and to the companies over which Vale has operational control, that is, its subsidiaries in Brazil and other countries. This group of entities is called "Grupo Vale". For additional details access <http://www.vale.com/esp/pt/Paginas/Home.aspx>

C0.2

**(C0.2) State the start and end date of the year for which you are reporting data.**

	Start date	End date	Indicate if you are providing emissions data for past reporting years	Select the number of past reporting years you will be providing emissions data for
Reporting year	January 1 2021	December 31 2021	No	<Not Applicable>

C0.3

**(C0.3) Select the countries/areas in which you operate.**

- Brazil
- Canada
- China
- India
- Indonesia
- Japan
- Malaysia
- Mozambique
- Oman
- Paraguay
- United Kingdom of Great Britain and Northern Ireland

C0.4

**(C0.4) Select the currency used for all financial information disclosed throughout your response.**

USD

## C0.5

**(C0.5) Select the option that describes the reporting boundary for which climate-related impacts on your business are being reported. Note that this option should align with your chosen approach for consolidating your GHG inventory.**

Operational control

## C-MM0.7

**(C-MM0.7) Which part of the metals and mining value chain does your organization operate in?**

### Row 1

#### Mining

Copper

Iron ore

Nickel

Other non-ferrous metal mining, please specify (Coal)

Other mining, please specify (Manganese ore)

#### Processing metals

Copper

Gold

Platinum group metals

Silver

Nickel

Other ferrous metals, please specify (Manganese Ferroalloys)

Other non-ferrous metals, please specify (Cobalt)

## C0.8

**(C0.8) Does your organization have an ISIN code or another unique identifier (e.g., Ticker, CUSIP, etc.)?**

Indicate whether you are able to provide a unique identifier for your organization	Provide your unique identifier
Yes, an ISIN code	ISIN Code: US91912E1055 (NYSE)
Yes, an ISIN code	ISIN Code: BRVALEACNOR0 (B3 and LATIBEX)
Yes, a CUSIP number	CUSIP number: 91912E 105 (NYSE)
Yes, a Ticker symbol	VALE (NYSE)
Yes, a Ticker symbol	VALE3 (B3)
Yes, a Ticker symbol	XVALO (LATIBEX)

## C1. Governance

### C1.1

**(C1.1) Is there board-level oversight of climate-related issues within your organization?**

Yes

### C1.1a

**(C1.1a) Identify the position(s) (do not include any names) of the individual(s) on the board with responsibility for climate-related issues.**

Position of individual(s)	Please explain
Chief Executive Officer (CEO)	<p>The Chief Executive Officer is a position appointed by Vale's Board of Directors. The Board of Directors elects the members of the Executive Board, and the CEO is responsible for submitting the candidates for the Executive Vice-President positions for the Board of Directors' approval. The CEO has several duties, among them: preparing and submitting to the Board of Directors, the Company's purpose, strategic guidelines, and strategic plan. The strategic guidelines and plan are submitted on annual basis and consider socioenvironmental issues. The CEO is also responsible for the execution of the approved strategic plan besides preparing and submitting the Company's annual and multi-annual budgets to the Board of Directors and executing it. Planning and steering the Company's operations and reporting to the Board of Directors the Company's economic and financial performance, as well as Vale's performance in its sustainability initiatives and producing reports with specific performance indicators are also CEO's responsibilities. In addition, the CEO exercises executive direction of the Company, coordinating and supervising the activities of the other Executive Officers and exerting his best efforts to ensure faithful compliance with the decisions and guidelines laid down by the Board of Directors and the General Meeting. That includes overseeing the 33% reduction target for greenhouse gas emissions from Vale's operations (Scopes 1 and 2) by 2030, the 15% reduction target by 2035 for scope 3 and finally, and Vale's climate change net-zero strategy. Furthermore, the CEO leads Vale's Low Carbon Forum – an initiative that reflects top leadership's engagement on the topic, helps to monitor performance in upholding our commitments, and drives constant advances in Vale's climate agenda through monthly meetings with the participation of the leadership and technical teams that deal with the topic on daily basis.</p>
Chief Sustainability Officer (CSO)	<p>The Executive Vice President of Sustainability (EVPS), a position equivalent to the CSO is a legal representative of the company responsible for day-to-day operations and the implementation of the general policies and guidelines set forth by the Board of Directors. The EVPS has the function of deploying and monitoring advances in the implementation of strategies and policies, in addition to being an agent of internal and external engagement, through actions and dialogue with stakeholders, one of Vale's strategic pillars. The aforementioned EVPS coordinated the execution and approval of the Vale net-zero strategy, the plan which defines climate change ambitions for Vale for the next year, including guidelines and targets. The EVPS is also responsible for conducting a strategic process of benchmarking and engagement that culminated with the announcement of new and more ambitious climate-related intentions. These innovations include a target for achieving net zero emissions in scope 1 and 2 emissions by 2050, promoting an emission reduction by 2030 compatible with the Paris Agreement, and to propel towards decarbonization, an internal carbon price of USD 50/tCO<sub>2e</sub> is already in effect to guide its capital allocation decisions aligned with the Paris Agreement goals. This price is also aligned with the 2°C scenario, following the recommendations of the Carbon Pricing Leadership Coalition. The Chief Executive Officer established and coordinate the Low Carbon Forum to manage the implementation of the Vale net-zero strategy. The Forum is coordinated by the CEO and the VP of Sustainability and has the participation of Vale's Executive Vice Presidents; members of the Executive Committee. The meetings involve top leadership and technical groups from the business and corporate areas with monthly meetings to deliver on the commitments assumed through the Vale Carbon Net-Zero strategy. In 2020, the EVPS coordinated the approval by the Board of Directors to reduce Scope 3 net emissions by 15% until 2035, compared to the base year of 2018. The reduction volume was defined based on the Science Based Target Initiative (SBTI) calculation tool, the Absolute Contraction Approach method, so it is also considered a science-based target.</p>
Board-level committee	<p>Technical Committees advise the Board of Directors (BD) in monitoring Vale's activities and oversee the performance and effectiveness of the enterprise risk management conducted by the Board of Executive Officers. On these Committees there are independent members not belonging to the Board, who have experience in the Committees' related areas. Sustainability Committee is one of these technical committees and evaluates Vale's sustainability and innovation strategies, making sure they are considered in the definition of the company's global strategy. This committee is responsible for monitoring the Sustainability Plan; defining, monitoring, and analyzing indicators; performance ratings, socio-environmental investments; strategies for climate change and carbon pricing; recovering and protecting degraded areas; proposing improvement actions, and evaluating the implementation of mine closure and future use precepts according to best practices. The committee was responsible for establishing the low carbon forum in the organization and for the approval of scope 3 target, thus establishing a commitment to integrate sustainability into our business, moreover being responsible for approving Vale's Integrated Report. It works continuously and follows an annual calendar. At least 2 members of the Committee must be also members of the Board. Among some of the attributions that belong to the Sustainability Committee, is possible to highlight the following: Assist in the definition, evaluation and monitoring of the Sustainability indicators and propose improvements (including internal climate change indicators); evaluate and propose Vale's adoption or adherence to initiatives or agreements at the national or international level related to issues of social and environmental responsibility (such as the Global Compact for climate change), as well as monitoring the preparation and dissemination of the Sustainability Report, CDP questionnaire, and GHG inventory; evaluate projects, initiatives as well as the Company's investment proposals from the perspective of sustainability (including issues of climate change) and innovation, in addition to making possible recommendations to the BD; and monitor the scope of action and effectiveness of the area of institutional relations in dealings with regulatory bodies and other institutional relations associated with sustainability issues.</p>

**C1.1b**

**(C1.1b) Provide further details on the board's oversight of climate-related issues.**

Frequency with which climate-related issues are a scheduled agenda item	Governance mechanisms into which climate-related issues are integrated	Scope of board-level oversight	Please explain
Scheduled – all meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding risk management policies Reviewing and guiding annual budgets Reviewing and guiding business plans Setting performance objectives Monitoring implementation and performance of objectives Overseeing major capital expenditures, acquisitions and divestitures Monitoring and overseeing progress against goals and targets for addressing climate-related issues Other, please specify (Approve adherence to climate initiatives)	<Not Applicable>	The Board' Sustainability Committee internal rules, which describes its composition, responsibilities and meetings rules are described in the document available at: <a href="http://www.vale.com/brasil/en/investors/corporate-governance/board-committees-councils/pages/default.aspx">http://www.vale.com/brasil/en/investors/corporate-governance/board-committees-councils/pages/default.aspx</a> The ordinary meetings occur as scheduled in the approved annual calendar. When necessary, extraordinary meetings are arranged. During the meetings, the Company's sustainability strategy, policies, conduct and performance regarding Sustainability aspects (including climate change) are evaluated and improvements based on a long-term vision are proposed. Furthermore, the company's Sustainability indicators are evaluated and monitored. If it is necessary, improvements are proposed. In addition, all the operational risks and controls (including those related to climate change) are monitored and improvements in mitigation plans are proposed.
Scheduled – some meetings	Reviewing and guiding strategy Reviewing and guiding major plans of action Reviewing and guiding annual budgets Setting performance objectives Monitoring and overseeing progress against goals and targets for addressing climate-related issues	<Not Applicable>	The Climate change budget is annually discussed with, and approved by, the Executive Vice President of Sustainability after the corporate process of budget and strategic planning. Climate change risks are periodically discussed with the Low Carbon Forum and with the Executive Committee of Executive Vice Presidents. Opportunities, such as changing the internal energetic matrix and energy efficiency are discussed periodically as well.

**C1.1d**

**(C1.1d) Does your organization have at least one board member with competence on climate-related issues?**

	Board member(s) have competence on climate-related issues	Criteria used to assess competence of board member(s) on climate-related issues	Primary reason for no board-level competence on climate-related issues	Explain why your organization does not have at least one board member with competence on climate-related issues and any plans to address board-level competence in the future
Row 1	Yes	The Board of Directors, together with the Nomination Committee and specialized international consultancies, have updated the important qualifications and experience that should be represented on the Board as whole, in light of Vale's business strategy and future needs. The starting point of the Committee's work was the preparation of the CM (Competency Matrix), designed to meet the present and future objectives of the Company, and to ensure that the consequences of recent critical events (Mariana and Brumadinho) are managed properly. A preliminary CM was developed, segregated into the following competencies: a) administrative; b) functional; and c) sector-specific. For functional competences, the CM contemplates significant experience and knowledge in different areas such as environmental, social and governance (ESG), including compliance, preferably in the natural resources industry, with experience in community relations. After approval of the CM, the evaluation of the current composition of the Board was carried out, both individually and collectively, with a view to identifying the degree of coverage of the competencies listed in the CM, through questionnaires and interviews with the members of the Board and the main shareholders of the Company. As a result, a Vale's nominated chairman has a long professional history in Sustainability and ESG, with a leading role in Brazil and internationally, in socioenvironmental management of territories, relationship with stakeholders (communities and NGOs), mitigation and adaptation to climate change, especially in relation to Forests and Agriculture.	<Not Applicable>	<Not Applicable>

**C1.2**

**(C1.2) Provide the highest management-level position(s) or committee(s) with responsibility for climate-related issues.**

Name of the position(s) and/or committee(s)	Reporting line	Responsibility	Coverage of responsibility	Frequency of reporting to the board on climate-related issues
Chief Executive Officer (CEO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly
Chief Sustainability Officer (CSO)	<Not Applicable>	Both assessing and managing climate-related risks and opportunities	<Not Applicable>	More frequently than quarterly

**C1.2a**

**(C1.2a) Describe where in the organizational structure this/these position(s) and/or committees lie, what their associated responsibilities are, and how climate-related issues are monitored (do not include the names of individuals).**

The Chief Executive Officer (CEO) is the highest level in a management position responsible for climate change and it is a position appointed by Vale's Board of Directors.

The Chief Sustainability Officer (CSO), part of the Executive Committee, is responsible for proposing climate change policies, plans, projects, and targets as well as for implementing the general policies and guidelines set forth by the Board of Directors and Executive Committee. At Vale, the CSO function is handled by the Executive Vice President of Sustainability and it is below the Executive Committee of Executive Vice Presidents, being intermediated by the CEO. The Chief Sustainability Officer is also responsible for evaluating, monitoring, and reporting Vale's performance, risks and opportunities regarding climate change to the Executive Committee and Board of Directors.

Vale believes mining is essential to the world's development. To this end, the company promotes management based on voluntary business actions and partnerships with different levels of government, public institutions, other companies and civil society. In this process, the Chief Sustainability Officer has the function of unfolding and monitoring progress in the execution of strategies and policies, in addition to being an agent of internal and external engagement, through actions and dialogue with stakeholders, as well as strengthening ties between Vale and society, being an important facilitator for the implementation of the new pact with society, one of Vale's strategic pillars.

Vale's sustainability team tracks and monitors the performance of KPIs related to climate change through data available in the Credit360 system – a tool in which it is possible to find information such as the action plan to reduce emissions of greenhouse gases, the area responsible, calculation form and performance per period – and The annual budget dedicated to climate change is discussed and approved by the CSO in accordance with the Annual Strategic Planning and Budget Cycle.

Moreover, the Sustainability Department and the Departments of Strategic Planning, Risk Management and the Operational Risk Management teams are responsible for implementing the methodologies and managing the results of these methodologies that are used to monitor climate-related risks. Risks are identified based on strategic business planning, existing risk management processes and regulatory environment monitoring. Besides the risks, the Department of Strategic Planning and Department of Energy work together with Sustainability Department to assess the opportunities related to climate change.

**C1.3**

**(C1.3) Do you provide incentives for the management of climate-related issues, including the attainment of targets?**

	Provide incentives for the management of climate-related issues	Comment
Row 1	Yes	In 2020, Vale adopted metrics even more focused on environmental, social and governance (ESG) issues when considering its officers' short- and long-term variable compensation, seeking to strengthen Vale's strategic pillars of Safety & Operational Excellence and the New Pact with Society. Compensation alignment with Vale's ambition to be a leader in low carbon mining, through the readjustment of the organizational structure. As of 2021, goals related to the climate agenda represent 5% of short-term (out of 10% related to Sustainability) and 6% of long-term compensation (out of 20% ESG-related) of all employees, including our CEO and executive vice presidents.

**C1.3a**

**(C1.3a) Provide further details on the incentives provided for the management of climate-related issues (do not include the names of individuals).**

Entitled to incentive	Type of incentive	Activity incentivized	Comment
Chief Executive Officer (CEO)	Monetary reward	Emissions reduction target	The CEO receives incentive payments insofar as Vale meets collective climate change goals and strategic results. In 2021, the targets related to sustainability represented 10% (which 5% are related to the climate agenda) of short-term variable remuneration; and 20% of long-term compensation ESG-related of which 6% were connected to climate change.
Board/Executive board	Monetary reward	Emissions reduction target Other (please specify) (A target composed of indicators for greenhouse gas emissions, recovery and protection of forest areas, and assurance of renewable energy was also tied to the long-term compensation of the leadership.)	The Sustainability KPI goals program encourages the continuous improvement of the company's performance on material socio-environmental issues. Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the variable remuneration of the members of the Executive Board varies according to metrics focused on environmental, social, and governance (ESG) goals, among others, especially in long-term compensation. In 2021, the targets related to sustainability represented 10% of the employees' short-term variable remuneration, including the CEO and Executive Committee. Out of those, 5% is related to Vale's climate agenda. For long-term compensation, with 20% of ESG-related goals, 6% of that is connected to its climate challenge. A goal composed of indicators of greenhouse gas emissions, forest recovery and protection, and renewable energy was also linked to leadership's long-term remuneration.
All employees	Monetary reward	Emissions reduction target	The Sustainability KPI goals program encourages the continuous improvement of the company's performance on material socio-environmental issues. Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the variable remuneration of the teams. All of these goals, once defined, are registered and monitored in the Career, Succession and Performance (CSP) system. The Sustainability KPIs program integrates the variable remuneration of all Vale employees and impacts all hierarchical levels, up to the CEO. In 2021, the targets related to the climate agenda represented 10% of the employees' short-term variable remuneration, including the CEO and Executive Committee. Out of those, 5% is related to Vale's climate agenda. For long-term compensation, with 20% of ESG-related goals, 6% of that is connected to its climate challenge.

**C2. Risks and opportunities**

**C2.1**

**(C2.1) Does your organization have a process for identifying, assessing, and responding to climate-related risks and opportunities?**

Yes

**C2.1a**

**(C2.1a) How does your organization define short-, medium- and long-term time horizons?**

	From (years)	To (years)	Comment
Short-term	0	3	The environment management area is responsible for the assessment of the climate change's R&O based on the business strategic planning, risk management processes, and regulation monitoring. Therefore, for strategy and climate change analysis, Vale consider 3 years as short-term.
Medium-term	4	10	For the climate change area, medium-term is equivalent to 10 years.
Long-term	11	30	Vale considers 11 years or more as long-term. For instance, Vale conducted a business resilience test in the various climate change scenarios for a twelve-year horizon (until 2030), with the aim of being prepared for the challenges of the transition to a low carbon world.

**C2.1b**

## (C2.1b) How does your organization define substantive financial or strategic impact on your business?

We have developed an integrated framework for managing the risks to which we are exposed, in order to support the achievement of our goals, financial strength and flexibility and business continuity. In 2021, we expanded the use of our global risk management platform to promote synergies among our lines of defense, ensuring greater sharing of knowledge and process simplification. Our risk management strategy considers the impact on our business of market risk factors (market risk), risks associated with inadequate or failed internal processes, people, systems or external events (operational risk), risks arising from third-party obligations (credit risk), risks from exposure to legal penalties, fines or reputational losses associated with failure to act in accordance with applicable laws and regulations, internal policies or best practices (compliance risk), and risks associated with our business model, ESG, and political and regulatory conditions in countries in which we operate (strategic risk), among others. Our Board of Executive Officers has established five advisory committees (**the Business Risk Executive Committees**) to advise our management with respect to each of these risks: (i) operational risks, (ii) geotechnical risks, (iii) strategy, finance and cyber risks, (iv) compliance risks and (v) sustainability and institutional relations and reputational risks. The main responsibilities of these committees are, among others: promoting and spreading the culture of risk management throughout the company; supporting the first line of defense; supporting our management on preventive monitoring of potential operational, geotechnical, strategy, finance, compliance and cyber risks; making preventive recommendations about potential risks; and recommending revisions about management instruments and risk prevention principles, in accordance with the Risk Management Policy. Vale's climate change risks identification and assessment are integrated into the company's corporate risk management process. Vale has adopted TCFD's guidelines to manage impacts of transition risks to a low carbon economy and physical impacts. The Executive Risk Committee – Sustainability, Institutional Relations and Reputation continuously monitors climate change risks and reports them at the Sustainability Committee. This Committee acts as the second line of defense, continuously evaluating the process of management of climate change risks and opportunities. **The main tools Vale uses to identify climate change risks and opportunities are:**

- **Climate change scenario analysis and Vale Climate Forecast** with robust methodologies to evaluate our exposure to climate risks and opportunities.
- **External environment monitoring**, including new regulations, emerging technologies, market developments and public policies – the company monthly has an internal Climate Intelligence Bulletin that maps the most relevant news for the climate agenda.
- **Stakeholder engagement** in the most relevant industry forums, in order to monitor new positioning, emerging trends and regulations.

To better understand, track and estimate the potential exposure to climate change risks, the TCFD established climate-related metrics for transition and physical risks. Vale's results of these metrics are indicated below:

- **4% of Vale's assets are currently highly exposed to transition risks.** The assets considered highly exposed are Vale's coal assets.
- **67% of Vale's assets have been assessed under climate change physical risks exposure.**
- **68% of Vale's assets are currently highly exposed to climate opportunities.** The assets considered highly exposed are the North Corridor assets, which represent around 54% of Vale's iron ore assets, and Vale's pellets, copper, and nickel assets. A "substantial impact" for Vale is an impact financial or non-financial that may impair Vale's ability to achieve its strategy. Although Vale's definition of a noun varies with time and situation, Vale considers a substantial financial impact to be between 5 and 10% of EBTIDA, around US\$1.5 - 3 billion.

## C2.2

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**(C2.2) Describe your process(es) for identifying, assessing and responding to climate-related risks and opportunities.**

**Value chain stage(s) covered**

Direct operations  
Upstream  
Downstream

**Risk management process**

Integrated into multi-disciplinary company-wide risk management process

**Frequency of assessment**

More than once a year

**Time horizon(s) covered**

Short-term  
Medium-term  
Long-term

**Description of process**

How risks are identified and assessed: Vale's climate change risks identification and assessment is integrated into the company's corporate risk management process. Vale has adopted TCFD's guidelines managing impacts of transition risks to a low carbon economy and physical impacts. The Executive Risk Committee – Sustainability, Institutional Relations, and Reputation continuously monitors climate change risks and reports them to the Sustainability Committee. This Committee acts as the 2nd line of defense, continuously evaluating the process of management of climate change risks and opportunities. Moreover, the Sustainability Department and the Departments of Strategic Planning, Risk Management, and the Operational Risk Management teams are responsible for implementing the methodologies and managing the results of these methodologies that are used to monitor climate-related risks. Risks are identified based on strategic business planning, existing risk management processes and regulatory environment monitoring. Besides the risks, the Department of Strategic Planning and Department of Energy work together with Sustainability Department to assess the opportunities related to climate change. 2)Process in place for assessing: Once climate change risks are identified, they are included in Vale's risk management process and are assessed based on their severity and probability of occurrence. Internal carbon pricing is one of the tools to manage transition risks. The use of the shadow price of USD50/tCO<sub>2e</sub>, established in accordance with the Carbon Pricing Leadership Coalition-CPLC, is integrated into the decision-making process to guide our capital allocation enabling a faster and more effective transition to a net- zero-carbon economy. Vale also assesses the impact via scenario analysis, which demonstrates the material and financial impact of transition risks on the different businesses, in the EBITDA. Vale decided to use the International Energy Agency-IEA scenarios which are recognized industry-wide and have ample international support. Vale's main risks related to climate change are Regulatory/Legal, Technological, Market, Reputation e Physical risks. 3)Illustration for a transition risk: As part of the strategy, and in line with the recommendations of the TCFD, regarding what refers to the transition risks, Vale analyzed the resilience of its strategy paired up against three climate change scenarios, considering as a baseline the scenarios put forth by the IEA. Building climate-related scenarios enable Vale to identify indicators to monitor the external environment and quickly adapt to the needs identified from each scenario to the extent that one or another comes to reflect the emerging reality of the given topic. In order to support Vale's transition risk management process, the exercise of scenarios is updated on a recurring basis due to the evolution of trends and the appearance of new threats in the external environment. The conclusions are used as inputs for the Annual Strategic Planning Cycle, a process with the participation of the business and support areas, the Executive Committee and the Board of Directors. Case: Vale has implemented carbon pricing in the trade-off analysis of projects and during the decision-making process for new investments, with the goal of enabling and accelerating the transition to a Net-zero economy. In addition, we use the marginal abatement cost curve-MACC tool to prioritize investments and resources in emission reduction initiatives. The association of cost to GHG emissions in the viability analysis allows us to explain the impact of emissions on project evaluation at the moment of the decision, making the Carbon Target portfolio projects viable. Our MACC curve has already mapped initiatives with a reduction potential of approximately 10MtCO<sub>2e</sub>, which is enough to cover Vale's Scope 1 and 2 emissions reduction targets. 4)Illustration for physical risks: In partnership with the ITV, we downscaled the global warming models referenced by the IPCC - RCP 4.5 and 8.5 - to Vale's operation. For managing Climate change's physical risks, Vale developed and currently, is implementing the "Vale Climate Forecast" methodology, which is an in-house developed methodology to map possible operational impacts due to climate-related variables. The methodology considers variables such as precipitation, flooding, increase in temperature, and increase in wind speed, among others. The methodology is divided into 1) Very short-term, midterm, and seasonal forecasts for the physical risks, whose main focus is the mapping and mitigating impacts on the operations and products shipment; 2) Long-term analysis, in which the main focus is the assessment of the impacts of the climate change in a multi-year horizon on the operational sites, aiming to evaluate the necessary investments in the facilities for their adaptation/mitigation (planning). Case: In Port of Ponta da Madeira, the site for the pilot for the implementation of the Vale Climate Forecast (VCF), an application with daily rain forecasts was developed making it feasible to disseminate the data to all operators at the Port. This helps decision-making in the operations of shipments and distribution of iron ore and other products. With these forecasts in hand, the operators optimize the product shipment plans and minimize the risk of non-shipment due to excessive humidity content in the ore. Vale considers an average operational loss of 0.5% in production due to abnormal precipitation conditions in Ponta da Madeira Port. Considering 2020's iron ore net operating revenues of USD 27.28bn, it would have accrued a loss of about USD 138MM per year. Moreover, damages suffered by Vale's logistics complex in the Northern region of Brazil can affect the entire operation, because all products from the Carajás mine are transported by rail to the port. Additionally, Vale has installed a Weather Radar in the Carajás region to improve short-term climate-related variables forecast. Vale also works on Long-term analysis. The long-term analysis has four steps: (1) climate projections and quantification of physical impacts; (2) identification and quantification of operational risks; (3) quantification of financial impacts of the mapped risks and (4) registration of the mapped risks in Vale's risk management systems for constant monitoring and implementing action plans when necessary. Moreover, these analyses are meant to be considered in the planning of investments-CAPEX necessary to mitigate/adapt the mapped risks to the operations. For the long-term analysis, Vale has carried out the implementation of VCF methodology for ~70% of its sites and the results indicate that sites located in Canada like Long Harbour, for example, may deal with precipitation increase and flooding on access roads, in the next decades, as well as an increase in average temperature. These impacts can cause equipment damage and operational disruptions.

**C2.2a**

**(C2.2a) Which risk types are considered in your organization's climate-related risk assessments?**

	Relevance & inclusion	Please explain
Current regulation	Relevant, always included	Vale uses a risk matrix that considers the severity and probability of each occurrence. In the case of risks related to climate change, Vale has developed specific analysis methodologies divided between impacts arising from Transition risks (Regulatory changes, Legal, Technological, Market and Reputation) and Physical risks (physical Acute and physical Chronic), according to TCFD. Vale has also implemented a proprietary carbon pricing model to assess risks linked to climate change, by projecting possible impacts on the operating costs of each business unit. This model considers the impacts on direct cost, including impacts on the supply chain. Main Climate-related Regulatory risks mapped by Vale, for example: • More stringent emission regulations, particularly on the Chinese iron and steel industry, may come to have a negative impact on demand for iron ore and metallurgical coal; • Increasing restrictions, adopted by the International Maritime Organization (IMO), will make it mandatory to reduce shipping emissions, which may be reflected in the average freight cost; In 2021, Vale received an international award (Wind Propulsion Innovation Awards) for its innovative use of rotor sails on its large ships. The award was in the category for companies promoting the adoption of this type of technology through prototypes or commercial use. In the same year, Vale tested the world's first VLCC (Very Large Ore Carrier) equipped with a system that produces air bubbles in its hull to make it more fuel efficient and reduce GHG emissions. • Operating in countries with a sparse or under-developed renewable energy capacity leads to reliance upon an emissions profile which in time may come to be restricted • Country-specific carbon pricing policies will affect margins for carbon intensive businesses. Policy and regulatory risks are particularly relevant for Vale where regulations aimed at reducing emissions may have a particularly direct effect on its operations, value chain, and demand for its products. For example: In 2021, 21.5% of global GHG emissions are covered by carbon pricing instruments in operation, according to the World Bank's report "State and Trends of Carbon Pricing 2021". Vale has low exposure to carbon pricing, but if Brazil adopts carbon pricing, this reality changes completely and may lead to a consequent increase in the cost of Vale's products.



	Relevance & inclusion	Please explain
Emerging regulation	Relevant, always included	Vale follows trends and studies on climate change in global forums, which aim to determine regulatory and economic strategies to mitigate risks and adapt worldwide. The emergence of more restrictive policies and regulations regarding air pollution and resource extraction leads to adaptation challenges for companies involved in the extraction and transformation of natural resources, such as Vale. For example: One study carried out by the IEA (International Energy Agency) in the report entitled "Net Zero by 2050 - A Roadmap for the Global Energy Sector" projects the carbon price of US\$ 90/tCO <sub>2</sub> e for Brazil in 2030. If Brazil adopts this carbon pricing, the consequence will be an increase in the cost of Vale's products, in addition to indirect costs, such as those of the value chain (mainly energy supply and impacts on contract costs). The construction of climate-related scenarios allows Vale to identify indicators to monitor the external environment and more quickly recognize changes in scenarios, allowing for an agile adaptation to current needs. As a result, the company invests in businesses and technologies that support the growth of a low-carbon economy and provide solutions for the supply chain and for society as a whole. To anticipate this risk Vale has adopted, in 2019, an internal carbon price (shadow price) of USD 50 per ton of CO <sub>2</sub> equivalent applicable for economic-financial analysis of current and capital investments, used in Marginal Abatement Cost Curve (MACC) and projects prioritization. The carbon price methodology started to be applied in June 2020. The association of cost to the greenhouse gas emissions in the feasibility analysis enables explaining the impact of the emissions on the project valuation at the time of decision making the projects from the Carbon Target portfolio feasible. This price is also aligned with the 2°C scenario, following the recommendations of the Carbon Pricing Leadership Coalition.
Technology	Relevant, always included	Since 2011, Vale's technology department promotes several seminars with the national and international scientific community to discuss the future of the mining sector and the perspectives of the industry. The main topics are climate change and natural phenomena, production and utilization of energy, planning and integrated management of resources and sustainable practices throughout the value chain. This department has set up a research group focused on climate change that seeks to understand the science of climate change and to develop new technologies aiming for a better adaption of Vale in the new low-carbon economy. More than 90% of our Scope 3 emissions relate to the processing of iron ore in the steel industry. We have identified two pillars of the Scope 3 roadmap: (i) portfolio differentiation, with high quality products and low CO <sub>2</sub> iron-making technologies and services for the steel industry; and (ii) partnerships in shipping and in the steel sector. We can offset up to 20% of the target with nature-based solutions. For the first pillar, we are considering our higher-quality iron products and agglomerates which will favor the migration to the lower emitting Electric-Arc Furnace (EAF) route. Moreover, steel emission reductions will be reached based on biomass-based pig iron production (through our proprietary Tecored technology), among other solutions. For the second pillar in Scope 3 emissions roadmap, we completed an investment of US\$6 million in Boston Electrometallurgical Company to acquire a minority stake and promote the development of a technology focused on steel decarbonization by using electricity, in early 2021.
Legal	Relevant, always included	For transition risks (Regulatory changes, Legal, Technological, Market and Reputation), Vale created a carbon shadow pricing tool that foresees possible future impacts on the operational cost for each Project. It includes direct costs due to carbon pricing mechanisms and indirect costs, considering the impact on the supply chain related to carbon pricing mechanisms. Environmental legislation is becoming more stringent around the world, which can lead to higher costs for compliance with environmental laws. Vale expects more attention from several governments on issues associated with reducing greenhouse gas emissions as a result of climate change concerns, especially as of the entry into force of the Paris Agreement at the end of 2016. Through this, Vale works to identify and mitigate legal risks. In 2019, the company reviewed its climate goals, including new commitments to reduce greenhouse gas (GHG) emissions, bolder goals than previously established in 2018, aiming to become a net zero mining company. The 33% absolute scope 1 and 2 emissions reduction target by 2030, with 2017 as a baseline, is aligned with the Paris Agreement's objective of limiting global warming to below 2°C. In 2020, Vale committed to a target to reduce scope 3 net emissions by 15% until 2035, with 2018 as a baseline.
Market	Relevant, always included	For transition risks, Vale created a carbon shadow pricing tool that foresees possible future impacts on operational costs for each Project. We have developed an integrated framework for managing the risks to which we are exposed, to support the achievement of our goals, financial strength, and business continuity. In 2021, we expanded the use of our global risk management platform to promote synergies among our lines of defense, ensuring greater sharing of knowledge and process simplification. Our risk management strategy considers the impact on our business of market risk factors, risks associated with inadequate or failed internal processes, people, systems or external events (operational risk), risks arising from third-party obligations (credit risk), risks from exposure to legal penalties, fines or reputational losses associated with failure to act according to applicable laws and regulations, internal policies or best practices (compliance risk), and risks associated with our business model, ESG, and political and regulatory conditions in countries in which we operate (strategic risk), among others. One of the market-related climate risks would be the change in consumer mentality, with the search for products with a lower carbon footprint, which will drive the reduction in the use of coal. This risk represents a great opportunity to continue to improve Vale's portfolio in order to provide solutions to its customers and to adapt to potential market demands. Vale has developed premium products that can reduce emissions in steelmaking and fulfill regional needs. Moreover, there are other risks such as steel demand may stagnate due to building retrofit, alternative options of urban mobility, assumed efficiencies down the value chain, etc; the possibility of arising a nickel-free battery may suppress nickel demand; and recycling for both Nickel and Copper, where the significant level of recycling is critical for the base metal's strategy. However, the main emerging technologies in a low-carbon economy are based on direct reduction via low carbon hydrogen and CCUS associated with different commercials or innovator's production routes. These technologies can differently impact Vale's strategy for high quality products, pushing direct reduction pellets or downplaying the importance of high-quality materials if carbon capture massively succeeds.
Reputation	Relevant, always included	Risks and opportunities related to climate change are the responsibility of the Sustainability Department and are identified based on strategic business planning, existing risk management processes and regulatory environment monitoring. These topics are periodically presented to the Business Risk Executive Committees, where they are reviewed for quarterly reporting to the Board of Directors and published in the Annual Report and the Sustainability Report. Identified risks are monitored and reviewed annually if no material change occurs during the year. Vale has an area named Sustainability, institutional relations and reputational risks that monitors and manages all reputational risks, such as Consumer and investor perceptions of the Company's adherence to greener policies. In the Climate Change Report of 2018, in relation to the reputation-related climate risk, it is worth noting that coal, one of Vale's products and traditionally recognized as a highly polluting element in all production chains, tends to be increasingly associated with companies that disrespect greener policies. The Board of Directors is continuously evaluating these risks as well as opportunities to further align Vale's portfolio to a low carbon economy. In 2019, Vale committed to the new pact with society is to positively impact society, going beyond taxes, social projects and reparation of Brumadinho, by becoming a development enabler in the areas where Vale operates and fostering a safer and more sustainable Brazilian mining industry. Also, in 2019, the company published a group of sustainability goals (link to the governance part - goals), including new commitments to reduce greenhouse gas (GHG) emissions, bolder than goals established previously in 2018, aiming to become a net zero mining company: • To reduce 33% of the absolute emission of scopes 1 and 2 in 2030, aligned with the Paris Agreement.; • To become net zero (scope 1 and 2) by 2050. In 2020, Vale committed to a target to reduce scope 3 net emissions by 15% until 2035, with 2018 as the baseline.
Acute physical	Relevant, always included	For managing Climate change's physical risks, Vale developed and currently, is implementing the "Vale Climate Forecast" methodology, which is an in-house developed methodology to map possible operational impacts due to climate-related variables. The methodology considers variables such as precipitation, flooding, increase in temperature, and increase in wind speed, among others. The methodology is divided into: (i) Very short-term, midterm, and seasonal forecasts for the physical risks, whose main focus is the mapping and mitigating impacts on the operations and products' shipment; (ii) Long-term analysis, which the main focus is the assessment of the impacts of the climate change in a multi-year horizon on the operational sites, aiming to evaluate the necessary investments in the facilities for their adaptation/mitigation (planning). The long-term analysis has four steps: (i) climate projections and quantification of physical impacts; (ii) identification and quantification of operational risks; (iii) quantification of financial impacts of the mapped risks and (iv) registration of the mapped risks in Vale's risk management systems for constant monitoring and implementing action plans when necessary. For acute physical risks, the possibility of exacerbation of periods of rain and drought was identified, as well as natural disasters such as hurricanes and tsunamis, which can affect ore production and distribution, leading to losses. Vale considers an average operational loss of 0.5% in the production due to abnormal precipitation conditions in Ponta da Madeira Port. Considering 2020's iron ore net operating revenues of USD 27.28 billion, it would have accrued a loss of about USD 138 million per year. These risks are monitored on an asset level using sensors and satellite data, consolidate in the company's Integrated Operations Center, and mitigated through production planning and emergency response. ~70% of Vale's assets have been assessed under climate change physical risks exposure. Vale has also installed a Weather Radar in the Carajás region to improve short-term climate-related variables forecast.
Chronic physical	Relevant, always included	For managing Climate change's physical risks, Vale developed and currently, is implementing the "Vale Climate Forecast" methodology, which is an in-house developed methodology to map possible operational impacts due to climate-related variables. The methodology considers variables such as precipitation, flooding, increase in temperature, and increase in wind speed, among others. The methodology is divided into: (i) Very short-term, midterm, and seasonal forecasts for the physical risks, whose main focus is the mapping and mitigating impacts on the operations and products' shipment; (ii) Long-term analysis, which the main focus is the assessment of the impacts of the climate change in a multi-year horizon on the operational sites, aiming to evaluate the necessary investments in the facilities for their adaptation/mitigation (planning). The long-term analysis has four steps: (i) climate projections and quantification of physical impacts; (ii) identification and quantification of operational risks; (iii) quantification of financial impacts of the mapped risks and (iv) registration of the mapped risks in Vale's risk management systems for constant monitoring and implementing action plans when necessary. For the chronic physical risk it was identified the possibility of sea-level rise which may affect the production and distribution of the ore, leading to losses. For example: a possible long-term mapped impact is Vale's Guaíba Island (TIG) terminal in Mangaratiba, Rio de Janeiro, which due to rising sea levels may become unusable. or will need investment for adaptation. Mitigation actions at TIG that are underway: drainage solutions, containment of overflow water from the patio and emergency/permanent treatment stations. Mitigation actions at Vale's Guaíba Island (TIG) terminal in Mangaratiba, Rio de Janeiro, that are underway: drainage solutions, containment of overflow water from the patio and emergency/permanent treatment stations.

## C2.3

**(C2.3) Have you identified any inherent climate-related risks with the potential to have a substantive financial or strategic impact on your business?**

Yes

## C2.3a

**(C2.3a) Provide details of risks identified with the potential to have a substantive financial or strategic impact on your business.**

**Identifier**

Risk 1

**Where in the value chain does the risk driver occur?**

Upstream

**Risk type & Primary climate-related risk driver**

Current regulation	Mandates on and regulation of existing products and services
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**Primary potential financial impact**

Increased direct costs

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

Demand for our iron ore and nickel products depends on global demand for steel and other materials. Iron ore and iron ore pellets, which together accounted for 84% of our 2021 net operating revenues from continuing operations, are used to produce carbon steel. Nickel, which accounted for 6.0% of our 2021 net operating revenues from continuing operations, is used mainly to produce stainless and alloy steels. Ferrrous minerals: Demand for steel products is influenced by many factors, such as global manufacturing production, civil construction and infrastructure spending. In 2021, China accounted for 64% of our iron ore and iron ore pellet shipments, and Asia as a whole accounted for 79%, Brazil accounted for 10%, Europe accounted for 7% followed by the Middle East with 3% and others with 1%. Our ten largest customers collectively purchased 127 million metric tons of iron ore and iron ore pellets from us, representing 41% of our 2021 iron ore and iron ore pellet sales volumes and 40% of our total iron ore and iron ore pellet revenues. Base metals: Our nickel customers are broadly distributed on a global basis. In 2021, 36.5% of our refined nickel sales were delivered to customers in Asia, 27.8% in Europe, 33.5% in North America and 2.2% in other markets. Our nickel production represented 6.1% of global consumption for primary nickel in 2021. Europe, in 2021, accounted for approximately 34.8% of our ferrous minerals and base metals shipments. If the proposal for establishing a carbon border adjustment mechanism (CBAM) will be approved and, considering the worst scenario where Vale's assets will be taxed, will potentially impact the direct cost of Vale's products sold.

**Time horizon**

Short-term

**Likelihood**

Virtually certain

**Magnitude of impact**

Medium-high

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

215731024.8

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

According to the proposal, the CBAM will mirror the ETS in the sense that the system is based on the purchase of certificates by importers. The price of the certificates will be calculated depending on the weekly average auction price of EU ETS allowances expressed in € / tonne of CO2 emitted (products' carbon footprint). Importers of the goods will have to, either individually or through a representative, register with national authorities where they can also buy CBAM certificates. Some studies showed when the tax is fully implemented the importers will be required to pay an estimated €75 per metric ton of CO2 emission and is projected to approach €100 per metric ton by 2030. In 2021, Europe accounted for 7% of Vale iron ore and iron ore pellet shipments. It represents approximately 21,543.34 thousand metric tons produced. Nickel, our base metal, accounted for 27.8% of shipments to Europe and it represents approximately 50.60 thousand metric tons produced. To calculate our financial impact figure, we apply Skarn carbon intensity benchmarking for Vale of 49 kg CO2e/t ore and Vale's nickel carbon footprint of 33.1 t CO2e/t nickel (we used the higher number in Vale's nickel carbon footprint range, calculating the worst scenario for this risk). In other words, we multiply our sale volume shipped to Europe by the factors cited before. (Sources: Skarn, 2021 and <http://www.vale.com/EN/aboutvale/news/Pages/vale-receives-third-party-assurance-for-additional-low-carbon-nickel-products.aspx>.) Iron ore: 49.00 kg CO2e/t ore x 21,543.34 thousand metric tons = 1,055,623.66 tCO2e x €75 per metric ton of CO2 = € 79,171,725 Nickel: 33.1 tCO2e/t nickel x 50.60 thousand metric tons = 1,674,860.00 tCO2e x €75 per metric ton of CO2 = € 125,614,500.00 The total financial impact figure is € 204,786,225 which represents US\$ 215,731,024.8

**Cost of response to risk**

1430600000

**Description of response and explanation of cost calculation**

The scenarios analyzed by Vale showed that the steel industry's decarbonization will put a high value on high-quality, lower-emission products. S: To achieve our Scope 1 and 2 emission reduction commitment, we have announced in 2021 that we will invest USD 4.6bn until 2030. In order to prioritize the most cost-efficient initiatives to be implemented, the company has an annually updated marginal abatement cost curve(MACC). We are committed to developing and implementing innovative lower carbon technologies. T/A: Vale has invested in R&D to identify less carbon intensive initiatives, including alternatives that may lead to a diversification of Vale's activities and access to new markets. Pelletizing and metallurgy are responsible for more than half of Vale's emissions and the main decarbonization solutions are: increased use of bioenergy, electrification through the use of plasma to substitute fossil fuels, and energy efficiency gains. Mining trucks can also have their emissions reduced through increased automation. An initiative is the S11Dproject. S11D project aims at increasing production in the state of Pará to 230million metric tons per year, the project brings innovative solutions such as the truckless system, which replaces traditional off-highway trucks for conveyor belts and will reduce diesel consumption by about 70% and produce high quality ore, contributing to GHG emission reductions. S11Dproject had an investment of US\$ 14,3bn and, to develop this project, BNDES has provided us with a credit line of US\$1.9bn. This investment is distributed in infrastructure (equipment, machinery, etc) and for operating activities. The CLN S11D project was launched in 2014 to increase the logistics capacity of the Northern System to support the S11Dmine, including the expansion of approximately 570km of railway, construction of a railway spur of 101km, acquisition of wagons and locomotives and port expansion. R: Some benefits that our technologies make possible. Replacing fixed crushers and off highway trucks. This replacement will enable a 77% reduction in fuel consumption. By adopting this technology, we will also reduce the consumption of electric energy. Among the modern automation and control practices adopted in the S11D, we can highlight the more efficient management of energy resources, using smart devices that adequate the supply of raw materials according to process demands. The total cost consists of the investment in the S11D project and Boston Metal.

**Comment**

Case - S: Vale has invested US\$6 million in Boston Electrometallurgical Company to acquire a minority stake and promote the development of a technology focused on steel decarbonization by using electricity, in early 2021. Boston Metal has a diverse shareholder base which includes venture capital funds, mining companies and private investors. Founded in 2012 by professors from the Massachusetts Institute of Technology, its objective is to develop an innovative technology called Molten Oxide Electrolysis (MOE), which reduces metal oxides such as iron ore with the use of electricity. Molten oxide electrolysis (MOE) is an electrometallurgical technique that enables the direct production of metal in the liquid state from oxide feedstock and compared with traditional methods of extractive metallurgy offers both a substantial simplification of the process and a significant reduction in energy consumption. MOE is also considered a promising route for mitigation of CO2 emissions in steelmaking and in the production of metals free of carbon. T/A: Vale is committed to leading the mining industry to achieve net zero carbon emissions and to provide "scope three" emission reduction solutions through a high-grade product portfolio and a variety of innovative technologies. In order to provide low carbon solutions to the steel industry, we have signed a memorandum of understanding (MoU) with Ternium S.A., Baowu Steel Group and Jiangsu Shagang Group Co., Ltd, where the companies agreed to pursue opportunities to develop steelmaking solutions focused on reducing CO2 emissions. Additionally, we have signed an MoU with Posco related to developing ironmaking solutions to reduce CO2 emissions, and an MoU with XCMG Construction Machinery Limited to evaluate the potential supply of mining and infrastructure equipment, including zero-emission and autonomous equipment. R: These initiatives are in line with our goal to continuously reduce scopes 1 and 2 emissions by 33% and scope 3 by 15% through innovative processes, technologies, and partnerships.

**Identifier**

Risk 2

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Emerging regulation	Carbon pricing mechanisms
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**Primary potential financial impact**

Increased indirect (operating) costs

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

The pricing of GHG emissions may impact Vale's operational costs, mainly through higher price for fossil fuels as mining is an energy intensive industry. The consumer has been searching for products with a lower carbon footprint. Vale has used the TCFD climate-related metrics for transition and physical risks and according to Vale's results of these metrics 4% of Vale's assets are currently highly exposed to transition risks. The assets considered highly exposed are Vale's coal assets. The use of TCFD climate-related metrics into the decision-making process helped us decide to sell, in December 2021, our coal assets in line with Vale's ambition to transition to a zero-carbon mining economy. In 2021 the scope 1 emission from the coal business division was 951,753.52 tCO2e which represents 10% of Vale's gross global emission As a mining company, Vale is an energy intensive company, that relies on fossil fuels to compose the energy matrix – For example: Our costs of fuel oil, gas and electricity are a significant component of our cost of production, representing 7.6% of our total cost of goods sold in 2021. To fulfill our energy needs, we rely on the following sources: oil byproducts, which represented 37.7% of total energy needs in 2021, coal (14.8%), electricity (29.6%), natural gas (13.6%) and other energy sources (4.3%). If carbon is priced, it will represent a direct cost for operations. In addition, some carbon pricing systems in regions where Vale is present (Europe, Canada, Japan, China), include the mining activity under their carbon programs. This might result in higher compliance costs. This is a transition risk (Policy and legal: Increased pricing of GHG emissions) according to TCFD. To manage this risk, Vale established, in accordance with the Carbon Pricing Leadership Coalition (CPLC), internal carbon pricing.

**Time horizon**

Medium-term

**Likelihood**

Very likely

**Magnitude of impact**

Medium-high

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

490000000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

Vale has adopted in 2019 an internal carbon price of USD 50 per ton of CO2 equivalent applicable for economic-financial analysis of current and capital investments, utilized in Marginal Abatement Cost Curve (MACC) and projects prioritization. The carbon price methodology started to be applied in June 2020. The association of cost to the greenhouse gas emissions in the feasibility analysis enables explaining the impact of the emissions on the project valuation at the time of decision making the projects from the Carbon Target portfolio feasible. Estimating the financial implications may be complex since it depends on how the legislation will be downscaled for each sector. Indirect impacts, such as those in the value chain (mainly energy supply and impacts in contract costs) are also difficult to be estimated. However, an approximation can be done considering the risk if Vale's total scope 1 (approximately 9.8 MtCO2e) were taxed. This tax would represent US\$ 490,000,000 = 9.8 MtCO2e x USD50/tCO2e

**Cost of response to risk**

187000000

**Description of response and explanation of cost calculation**

At the end of 2019, Vale adopted an internal carbon price of US\$50/tCO2eq. This price is aligned to the temperature targets of the Paris Agreement (well below 2°C), according to the recommendations of the Carbon Pricing Leadership Coalition (CPLC). The carbon price started supporting the risk and opportunity assessment, selection and prioritization of projects, contributing to Vale's decarbonization trajectory. It shall be pointed out that Vale also elaborated its Marginal Abatement Cost Curve (MACC) which shows the emission (Scopes 1 and 2) reduction initiatives that were mapped in the company. Vale has invested efforts and resources to reduce greenhouse gas emissions and mitigate climate change. We have built a roadmap, with clear milestones, to meet the reduction targets in Scopes 1 and 2. We plan to invest US\$4 to 6 bn over the next 10 years to develop low carbon solutions, such as electrification, biofuels use and renewable electricity generation and use. Our current portfolio of initiatives consolidates more than 40 projects, prioritizing the most cost-competitive initiatives to achieve the 2030 target, based on a MAC Curve. From this new forecast, US\$ 2 bn will be allocated to the electrical matrix, electrification and breakthrough technologies and US\$ 2-4 bn to energy efficiency, renewable electricity and Biofuels. The increase in investments is due to the greater maturity acquired in the company's portfolio of direct emissions reduction initiatives (Scope 1) and these initiatives can mitigate the risks

of carbon taxes estimated previously. In 2020, we spent approximately US\$ 81 MM and, in 2021, we made several efforts to reduce greenhouse gas emissions and mitigate climate change, and we spent US\$187 MM on these initiatives. Case: S: Vale has created an internal program called PowerShift to support its sustainability goals, focusing on the transition to a low-carbon economy. T/A: The program aims to make the Company's energy matrix clean by focusing on the use of renewable energy and alternative fuels, and greater efficiency of operations using new technologies. In 2021, we conducted several tests in our operations, particularly the use of bio-oil, vegetable charcoal (biocarbon), and additives to reduce energy consumption in pelletizing plants. R: PowerShift-linked initiatives are expected to contribute approximately 40% of Vale's planned reductions to help us reach the United Nations 2030 Agenda target.

**Comment**

n.a.

**Identifier**

Risk 3

**Where in the value chain does the risk driver occur?**

Direct operations

**Risk type & Primary climate-related risk driver**

Chronic physical	Changing precipitation patterns and types (rain, hail, snow/ice)
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**Primary potential financial impact**

Increased indirect (operating) costs

**Climate risk type mapped to traditional financial services industry risk classification**

<Not Applicable>

**Company-specific description**

Vale assesses physical risks using the in-house methodology called "Vale Climate Forecast". The analysis is done by mapping impacts on Vale's operations caused by climate-related variables which are forecasted by Vale using IPCC scenarios such as RCP 4.5 and RCP8.5. These mapped risks and impacts are registered in Vale's risks management tools to be monitored and, when necessary, action plans to minimize and/or mitigate its impacts are created. ~70% of Vale's assets have been assessed under climate change physical risks exposure. The lack of water resources may jeopardize the maintenance of air quality in operations, a mandatory condition to operate. On the other hand, a heavy rainy season may impact the piles' stability, railway operation and the quality of the product (high humidity in the ores). Changes in precipitation patterns may present a risk to Vale's operations, as heavier rainfall may cause damage to equipment and logistic assets, reducing or even disrupting production. The failure or unavailability of any critical asset, whether resulting from natural events or operational issues, could have a material adverse effect on our business. Substantially all of our iron ore production from the Northern system is transported from Carajás-PA to the port of Ponta da Madeira-MA through the Carajás railroad (EFC). Any interruption related to flooding of the EFC or of the port of Ponta da Madeira could significantly impact our ability to sell our products from the Northern system. With respect to the EFC, there is a particular risk of interruption at the bridge over the Tocantins River, in which the trains run on a single line railway. In the port of Ponta da Madeira, there is a particular risk of interruption at the São Marcos access channel, a deep-water channel that provides access to the port. The EFC railroad links our Northern System mines in the Carajás region in the Brazilian state of Pará to the Ponta da Madeira maritime terminal, in São Luis-MA. In 2021, the EFC railroad transported 188,335 thousand metric tons of iron ore and 14,020 thousand metric tons of other cargo. EFC also carried 187 thousand passengers in 2021. EFC supports the largest train, in terms of capacity, in Latin America, which measures approximately 3.4 kilometers, weighs approximately 41.5 thousand gross metric tons when loaded and has 333 cars. In 2021, EFC had a fleet of 298 locomotives and 25,175 wagons, which were operated by Vale and third parties.

**Time horizon**

Long-term

**Likelihood**

More likely than not

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

193505000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

It depends on the type of asset/operation that will be impacted. There may be Capital Expenditure necessary to replace a damaged asset. The physical impact may increase operational costs, maintenance costs, etc. For the estimation, Vale considers an average operational loss of 0.5% in the production due to abnormal precipitation conditions in Ponta da Madeira Port. Considering 2021's iron ore net operating revenues of USD 38.7 billion, it would have accrued a loss of about USD 193.5 million per year, therefore, our potential financial impact. This value represents 0.5% of the net operating revenues from iron ore (USD 38.7 billion x 0.5% = US\$ 193.5 million). Moreover, damages suffered by Vale's logistics complex in the Northern region of Brazil can affect the entire operation, because all product from the Carajás mine is transported by rail to the port.

**Cost of response to risk**

1865000

**Description of response and explanation of cost calculation**

S: At Vale, nearby 67% of Vale's assets were evaluated for climate change physical risks exposure. T/A: In partnership with ITV, we downscaled the global warming models referenced by the IPCC - RCP 4.5 and 8.5 - to Vale's operation. For managing Climate changes physical risks, Vale developed and currently, is implementing the "Vale Climate Forecast" methodology, which is an in-house developed methodology to map possible operational impacts due to climate-related variables. The methodology considers variables such as precipitation, flooding, increase in temperature, increase in wind speed, among others. R: To be implemented in Port of Ponta da Madeira, the site for the pilot, the Vale Climate Forecast short-term analysis had an investment of approximately US\$ 10 thousand (BRL 50,000). Vale developed an app and a dashboard to disseminate precipitation forecast data on daily basis to help operators on their port activities. This data is now available to assist in Vale's Production Programming, helping decision-making in the operations of shipments and distribution of iron ore and other products. With these forecasts in hand, the operators optimize the product shipment plans and minimize the risk of non-shipment due to excessive humidity content in the iron ore. The analysis of short-term climate risks enables the inclusion of climate variables in the decision-making processes of Vale's operations systematically. It generates a higher control against the impacts of climate change

impacts which are already being witnessed in/around Vale's operations. Vale has also installed a Weather Radar in the Carajás region to improve short-term climate-related variables forecast. The radar had an investment of approximately US\$ 1.6 million (BRL 8 million). Vale also has an operational risk area that conducts periodic risk analyses for all Vale businesses and operations, including those related to climate change. This risk management staff is supported by the Climate Change team and Strategic Planning and Risk Management teams. The costs of responding to the risk of changes in precipitation patterns and extreme variability in weather patterns are the sum of the investments in Vale Climate Forecast (US\$ 10 thousand) and Physical Impact Map which includes the investment in the weather radar and studies regarding long-term forecast data based on IPCC scenarios RCP 4.5 and RCP 8.5 that was carried out in 2021 (US\$ 1.6 million + US\$ 255,000).

**Comment**

n.a.

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C2.4

**(C2.4) Have you identified any climate-related opportunities with the potential to have a substantive financial or strategic impact on your business?**

Yes

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C2.4a

**(C2.4a) Provide details of opportunities identified with the potential to have a substantive financial or strategic impact on your business.**

**Identifier**

Opp1

**Where in the value chain does the opportunity occur?**

Direct operations

**Opportunity type**

Energy source

**Primary climate-related opportunity driver**

Use of lower-emission sources of energy

**Primary potential financial impact**

Returns on investment in low-emission technology

**Company-specific description**

In 2019, Vale anticipated its goal to consume only electricity from renewable sources in Brazil by 2025 and globally by 2030 and, in 2021, established the goal to improve 5% of the indicator of global energy efficiency compared to the baseline of 2017 by 2030. To achieve this goal, the company, among other actions, has structured a roadmap of initiatives, which involves restructuring the current generation portfolio to implement projects and partnerships to insert wind and solar energy sources. In 2021, electricity represented 29.6% of Vale's energy consumption matrix, with 89% coming from renewable sources. In Brazil, this percentage is even higher, 99% come from renewable sources, with 96% guaranteed by concession contracts for own assets, as well as by Vale's energy acquisition contracts. This contracted renewable energy was attested through certificates or declarations from generators, having been audited by a third party. As an important contribution to this goal, Vale announced the Sol do Cerrado Solar Power Generation Project [located in -15.382586855662854, -43.78296452026223 according to Coordinates (WGS 84)] in the municipality of Jaíba (Minas Gerais state) in Brazil in December 2020. With an installed capacity of 766 peak megawatts and scheduled to come on stream in the fourth quarter of 2022, the project will produce approximately 193 average megawatts (MWmed) of energy per year for Vale's operations. The solar project will be one of the largest ones in Latin America. Vale also has an option to purchase 60% or 100% of the shares of the Folha Larga Sul wind project in Campo Formoso (Bahia State). It has an installed capacity of 151.2 MW and is already in operation, with 60% of its production destined for Vale or its subsidiaries by 2023.

**Time horizon**

Medium-term

**Likelihood**

Very likely

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

103500000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

What approach was employed to calculate the figure: The presented financial impact refers to the amount that would be spent with carbon pricing systems if the emissions reduced through the energy related climate actions would have to be paid for via compliance. The figures used in your calculations: Vale estimates these actions can reduce up to 2,070,000 tCO<sub>2</sub>/year. Vale has adopted in 2019 an internal carbon price (shadow price) of USD 50 per ton of CO<sub>2</sub> equivalent applicable for economic-financial analysis of current and capital investments, utilized in Marginal Abatement Cost Curve (MACC) and projects prioritization. Multiplying these values, the annual financial impact would be USD 103,500,000.

**Cost to realize opportunity**

500000000

**Strategy to realize opportunity and explanation of cost calculation**

S: Energy management and efficient supply in Brazil are priorities for us, given the uncertainties associated with changes in the regulatory environment and the risk of rising electricity prices. In 2020, Vale's installed capacity in Brazil was 1.8 GW, sourced from both directly and indirectly owned power plants. T: Vale has developed its energy assets based on the current and projected energy needs of its operations, with the goal of reducing its energy costs, minimizing the risk of energy shortages, while

also meeting its consumption needs through renewable sources. A: In December 2020, Vale announced the Sol do Cerrado project for the generation of solar energy, in the municipality of Jaíba, in the state of Minas Gerais, Brazil. The project contemplates the construction of a photovoltaic plant, including 17 sub-parks that total an installed capacity of 766 megawatts peak (MWp). It also includes the implementation of an elevator substation, transmission line and connection bay at the 230kV Jaíba substation, with contracts signed for connection to the Brazilian National Interconnected System. The implementation of the project will require investments of approximately US\$500 million, this amount corresponds to the CAPEX of the Sol de Cerrado Project, which includes equipment installation, infrastructure, power generation, etc – This project is in line with the total investment of USD 2 bn to reduce Vale's carbon emissions. The project will produce approximately 193 average megawatts (MWa) of energy per year for Vale's operations, corresponding to 13% of its estimated demand in 2025, and its operational start-up is expected for the fourth quarter of 2022. In addition to investing in the generation, Vale entered into agreements in 2021 to use energy storage batteries in its operations at the Ilha da Guaíba Terminal and in Sudbury, Canada, thus helping to ensure greater competitiveness and security of energy supply to these operations. R: Sol do Cerrado project will bring an annual cost reduction of US\$ 70 million to Vale besides from a reduction in the emission. 36% of the Sol do Cerrado Solar Project implemented in 2021. Operations start in 2022 and the project will reduce 145 ktCO<sub>2</sub>e per year from Scope 2.

**Comment**

n.a.

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**Identifier**

Opp2

**Where in the value chain does the opportunity occur?**

Downstream

**Opportunity type**

Resilience

**Primary climate-related opportunity driver**

Other, please specify (Biodiversity conservation)

**Primary potential financial impact**

Increased value of fixed assets

**Company-specific description**

In 2021, Vale made a public commitment not to operate in UNESCO Natural World Heritage Sites. The Vale Natural Reserve (RNV in Portuguese), a protected area owned by the company that is dedicated to the conservation of 23,000 ha of Atlantic Forest remnants, as well as the Sooretama Biological Reserve (REBio), a protected area that Vale protects in partnership with ICMBio, are part of the Discovery Coast Atlantic Forest Reserves World Heritage Site. They also constitute a Key Area for Biodiversity Conservation. The Vale Natural Reserve, located in BR 101 Highway, KM 122 Linhares, Espírito Santo, Brazil, preserves an almost-untouched, unique area of Atlantic Forest in Linhares (Espírito Santo). It is about 23 thousand hectares – equivalent to the size of 23 thousand soccer fields. In 1978, RNV became an area officially designed for conservation and scientific research. Vale Natural Reserve's entomological collection started in 1986. Today, the collection has almost 12,600 insect specimens from several groups. Most of them are dry preserved using entomological pins, but there are also insects on mats. Vale Natural Reserve's herbarium started in 1963 and its collection has 16,150 exsiccata from several plant groups. The scientific collections of Vale Natural Reserve have a wide diversity of species, including rare and endangered species. Among the samples of plants preserved in the Herbarium, the tree called Jueirana-facão (Dinizia jueirana-facao) stands out, a rare and threatened species, found exclusively in the Atlantic Forest of Tabuleiro in Espírito Santo. The tree can reach 40 meters in height and weigh about 62 tons. Vale Natural Reserve has a collection of beehives of different species: Mosquitinho (Plebeia sp.); Jataí (Tetragonisca angustula) and; Uruçu-amarela (Melipona mondury). It works as an important environmental tool because bees have a direct participation in the reproduction of most Brazilian botanical species and are an important bioindicator for the analysis of the quality of the environment.

**Time horizon**

Long-term

**Likelihood**

Virtually certain

**Magnitude of impact**

High

**Are you able to provide a potential financial impact figure?**

Yes, a single figure estimate

**Potential financial impact figure (currency)**

1100000000

**Potential financial impact figure – minimum (currency)**

<Not Applicable>

**Potential financial impact figure – maximum (currency)**

<Not Applicable>

**Explanation of financial impact figure**

What approach was employed to calculate the figure: Vale Natural Reserve conducted a total economic value (TEV) study, aimed at identifying the financial values associated with environmental resources. The study, conducted in partnership with the Lawrence Berkeley Laboratory, University of California, assigned to Vale Natural Reserve a total intangible value estimated at US\$1.1 billion. The figures used in your calculations: This amount can be divided in three aspects: almost US\$1 billion is allocated to the economic benefits of the existence of biodiversity at Vale Natural Reserve; US\$77 million are related to the direct use value, derived from the carbon stored in the reserve, the carbon sequestered by plants produced in the nursery and recreation activities, and approximately US\$25 million associated with the indirect use value, such as pollination, water supply and regulation of air, water and soil.

**Cost to realize opportunity**

2079300

**Strategy to realize opportunity and explanation of cost calculation**

S: For Vale, biodiversity and ecosystem services – benefits that people receive from ecosystems, such as clean water, erosion control, etc. – are essential and intrinsic themes to your business. Vale's strategy for Biodiversity is based on the Sustainability Policy, with the long-term objective of achieving the Neutral or Positive Net Impact (PNI) on biodiversity based on the sustainable management of the territories in which it operates and is guided by three main axes: (i) Risk and Impact Management (ii) Environmental Attributes Management; (iii) Performance Management. And to implement and consolidate this strategy, T/A: Vale adopts as approaches and tools the Hierarchy of Impact Mitigation, Risk Analysis/Sensitivity Biodiversity, Database and Local/Action management Plans. An example of a project, is the Vale Natural Reserve (RNV in Portuguese). For 35 years, Vale has been maintaining 23 hectares of Vale Natural Reserve in Linhares, Espírito Santo, where 20% of the birds registered in Brazil and more than 2,800 species of plants can be found. The company invests in 2020 US\$ 2,079,300 in the reserve, one of the last great remnants of the threatened Tabuleiro and Posto Avançado Forest at the Atlantic Forest Biosphere Reserve. This investment was used to some spent in Reserve: Staff relative-expenditure US\$ 851,709 (41%); AIP expenditure US\$ 462,587 (22%); Operational expenditure US\$ 148,108 (7%) and; Maintenance expenditure with Vale Natural Reserve (RNV in Portuguese) US\$

126,328 (6%). In addition, RNV invested in equipment US\$ 60,994 (3%), socioenvironmental initiatives US\$ 297,001 (14%) and donation to Vale Environmental Institute US\$ 132,571 (6%). In addition to R: the conservation of flora and fauna, at the reserve there are education and recreation activities, scientific research (with over 100 scientific articles published), as well a seedling nursery, that since 1976 has contributed to the reforestation of more than 18,000 hectares.

#### Comment

Vale has been seeking to increasingly integrate biodiversity management and ecosystem services into its strategy and business, as these services are essential and intrinsic to the company's operations and life on the planet. The company's guidelines regarding biodiversity, as it is a cross-cutting topic, are reflected in its Sustainability Policy. In 2019, Vale prepared a normative standard containing guidelines and processes for biodiversity management, focused on all stages of the life cycle, from project planning to post-closing, published in early 2020. The document reflects the company's commitments focused on risk and impact management, aligned with Vale's long-term objective to neutralize impacts aiming to reduce significant biodiversity loss.

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#### Identifier

Opp3

#### Where in the value chain does the opportunity occur?

Direct operations

#### Opportunity type

Products and services

#### Primary climate-related opportunity driver

Ability to diversify business activities

#### Primary potential financial impact

Other, please specify (Shift in consumer preferences)

#### Company-specific description

In 2020, Vale conducted a climate change scenario analysis of its portfolio based on the International Energy Agency (IEA) scenarios, which are recognized industry-wide and have ample international support. Our key commodities will be at the forefront of the challenges and opportunities posed by the climate crisis. Copper and nickel will fully support the energy transition, representing key materials for building up the necessary renewable infrastructure and supporting the transport electrification through electric vehicles (EV). 68% of Vale's assets are currently highly exposed to climate opportunities. The assets considered highly exposed are the North Corridor assets, which represent around 54% of Vale's iron ore assets, and Vale's pellets, copper, and nickel assets. Copper has a solid long-term growth profile, driven by industrialization, construction, and electrical grid infrastructure expansion. Governments around the world have set ambitious decarbonization targets that, along with the dropping of renewable energy costs and green economy and stimulus investments, will be crucial for more intensive use of copper in renewable energy and electric vehicle-related infrastructure projects. We have significant opportunities to expand our copper business through organic growth. We have a strong portfolio of copper assets - a fundamental commodity for the energy transition, and we intend to develop a multi-year copper expansion plan, with Salobo III, Alemão and Cristalino as competitive projects that will support our strategic objective of 450 thousand tons per year of production capacity by 2027. In addition to these projects, we have other opportunities to grow in the future, leveraging the knowledge and logistics that already exist in the Carajás region, while also evaluating opportunities to increase copper production in Canada and Indonesia. In Indonesia, we are advancing studies to develop the Hu'u project, a world-class deposit, which could further expand our copper business. We are also engaged in greenfield exploration for copper in some of the world's most prolific belts, looking for tier-one assets for future development. In 2021 Vale's copper production was 296.8 kt and copper products accounted for 4.8 % of our 2021 net operating revenues from continuing operations.

#### Time horizon

Long-term

#### Likelihood

Likely

#### Magnitude of impact

Medium-low

#### Are you able to provide a potential financial impact figure?

Yes, a single figure estimate

#### Potential financial impact figure (currency)

543418.06

#### Potential financial impact figure – minimum (currency)

<Not Applicable>

#### Potential financial impact figure – maximum (currency)

<Not Applicable>

#### Explanation of financial impact figure

Copper - What approach was employed to calculate the figure: We have a strong portfolio of copper assets, and we intend to develop a multi-year copper expansion plan, with Salobo III, Alemão and Cristalino as competitive projects that will support our strategic objective of 450 thousand tons per year of production capacity by 2027. To estimate the impact magnitude, we considering our production goal of 450 thousand tons per year until 2027 in Brazil, which could help meet the demand increase for copper estimated for the energy and transportation sectors. At an average price of 9,337.08 US\$ per metric ton (We determine average realized prices based on our net operating revenues, which consist of the price charged to customers, excluding certain items that we deduct in arriving at net operating revenues, mainly value-added tax.), the potential financial impact figure is calculated by multiplying the increase in the production by the average copper price. In 2021 Vale's copper production was 296.8 kt and for 2022 the expected production is ~355 kt. This forecast represents an increase of 58.2 kt - 20% higher than 2021 - in line with our strategic objective to achieve a production capacity of 450 kt by 2027. The figures used in your calculations: Production increase by 2022 (58,200 t/yr) x Average price (9,337.08 US\$ per metric ton) = US\$ 543,418.06.

#### Cost to realize opportunity

816000000

#### Strategy to realize opportunity and explanation of cost calculation

Vale is monitoring this opportunity through public studies and announcements about the electric vehicles industry and energy transition. However, nickel and copper prices and demand should first shift, in order to drive more precise actions. In the long term, the battery and energy transition segments show important upside potential as electric vehicle production and low-carbon power generation continues to attract significant investments, which could positively affect nickel and copper price and demand. The cost to manage this opportunity would be related to the increase in nickel and copper production. Case - Copper: The Salobo III copper project, approved in October 2018 by our Board of Directors, is a brownfield expansion of our Salobo operations, increasing processing throughput capacity. The project encompasses a third concentrator line and will use Salobo's existing infrastructure. Salobo III is expected to produce an average copper volume of approximately 50 ktpa in the first 5 years, 42 ktpa in the first 10 years and 36 ktpa throughout the life of the mine. Start-up is scheduled for the first half of 2022 with a ramp-up of 15 months. In 2021, the project achieved 85% of the physical progress completion, with civil works nearly complete, electro-mechanical assembly well advanced and the main substation commissioned

energized. For the Salobo III project, the total CAPEX executed so far is US\$346 million, being US\$ 210 million spent in 2020 and is expected to cost a total of US\$ 816 million, so US\$ 470 million will still be invested. All this investment was estimated for 3.5 years, in infrastructure and productive activities. Moreover, under several climate change scenarios, Vale's EBITDA performs in a range of 90% to 140% in relation to the base case (Volumes from Strategic Plan in 2040, considering prices from Wood Mackenzie in September 2020). Such resilience is the result of a flexible portfolio; capable of adapting to different market conditions and well aligned with energy transition trends. The cost to realize this opportunity consists of the total cost to realize The Salobo III copper project (816,000,000).

**Comment**

n.a.

**C3. Business Strategy**

**C3.1**

**(C3.1) Does your organization's strategy include a transition plan that aligns with a 1.5°C world?**

**Row 1**

**Transition plan**

No, but our strategy has been influenced by climate-related risks and opportunities, and we are developing a transition plan within two years

**Publicly available transition plan**

<Not Applicable>

**Mechanism by which feedback is collected from shareholders on your transition plan**

<Not Applicable>

**Description of feedback mechanism**

<Not Applicable>

**Frequency of feedback collection**

<Not Applicable>

**Attach any relevant documents which detail your transition plan (optional)**

<Not Applicable>

**Explain why your organization does not have a transition plan that aligns with a 1.5°C world and any plans to develop one in the future**

As a mining industry, we have some challenges to reduce our emissions in line with the 1.5°C world. However, we have an ambition to develop a transition plan in line with the commitment to limit the global temperature rise to 1.5°C and we have been working towards achieving that ambition. As part of its commitment to lead the transition towards low-carbon mining, Vale has set a target for net-zero scopes 1 and 2 emissions by 2050, aligned with a 1.5 °C scenario. Also, through its annually updated marginal abatement cost curve (MACC), Vale has mapped a set of solutions with potential to reduce the companies' scopes 1 and 2 emissions with a 1.5°C trajectory by 2030. Nevertheless, due to a high degree of technological uncertainty, so far the company's interim targets are aligned with a well below 2°C scenario (-33% scopes 1 and 2 by 2030 versus 2017) and 2°C scenario (-15% net scope 3 emissions by 2035 versus 2018). The company is continuously monitoring technological development in order to better align its business and climate targets with a 1.5°C scenario.

**Explain why climate-related risks and opportunities have not influenced your strategy**

<Not Applicable>

**C3.2**

**(C3.2) Does your organization use climate-related scenario analysis to inform its strategy?**

	Use of climate-related scenario analysis to inform strategy	Primary reason why your organization does not use climate-related scenario analysis to inform its strategy	Explain why your organization does not use climate-related scenario analysis to inform its strategy and any plans to use it in the future
Row 1	Yes, qualitative and quantitative	<Not Applicable>	<Not Applicable>

**C3.2a**

**(C3.2a) Provide details of your organization's use of climate-related scenario analysis.**

Climate-related scenario	Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices



Climate-related scenario		Scenario analysis coverage	Temperature alignment of scenario	Parameters, assumptions, analytical choices
Transition scenarios	IEA SDS	Company-wide	<Not Applicable>	In 2020, Vale conducted a climate change scenario analysis of its portfolio based on the International Energy Agency (IEA) scenarios, which are recognized industry-wide and have ample international support. While the Current Policies Scenario (CPS) and the Stated Policies Scenario (STEPS) illustrate the consequences of ongoing policies and stated commitments, respectively, the Sustainable Development Scenario (SDS) identifies the policies and assumptions needed to achieve the UN Sustainable Development Goals related to energy i.e., (i) ensure universal access to electricity, (ii) reduce severe health impacts caused by air pollution, and (iii) address climate change. Once climate change risks are identified, they are included in Vale's risk management process and are assessed based on their severity and probability of occurrence. To measure Vale's impact, we use internal carbon pricing, one of the tools to manage transition risks. The use of the shadow price of USD 50/tCO2e, established in accordance with the Carbon Pricing Leadership Coalition (CPLC)5, is integrated to the decision-making process to guide our capital allocation enabling a faster and more effective transition to a low-carbon economy. Assumptions/Analytical choices: The different behaviors of supply and demand under IEA's three scenarios result in changing competitive dynamics that impact the long-term price of our key commodities and our strategy by extension. For Vale, the Current Policies Scenario partially impacts our capacity to generate value. In addition to greater exposure to physical risks, CPS does not consider the opportunity for growth in renewables, transport electrification and the need to decarbonize the steel industry, which are nowadays fundamental parts of our strategy. In turn, the SDS creates an ecosystem that encourages our growth options and amplifies the relevance of our strategic pillars i.e., Base Metals Transformation and the Maximization of flight to quality in Iron Ore. All scenarios analyzed showed that the steel industry decarbonization will put a high value in high-quality, lower-emission products. Vale's current strategy already considers a portfolio with a 90% share of these products by 2024.
Transition scenarios	IEA STEPS (previously IEA NPS)	Company-wide	<Not Applicable>	In 2020, Vale conducted a climate change scenario analysis of its portfolio based on the International Energy Agency (IEA) scenarios, which are recognized industry-wide and have ample international support. While the Current Policies Scenario (CPS) and the Stated Policies Scenario (STEPS) illustrate the consequences of ongoing policies and stated commitments, respectively, the Sustainable Development Scenario (SDS) identifies the policies and assumptions needed to achieve the UN Sustainable Development Goals related to energy i.e., (i) ensure universal access to electricity, (ii) reduce severe health impacts caused by air pollution, and (iii) address climate change. Once climate change risks are identified, they are included in Vale's risk management process and are assessed based on their severity and probability of occurrence. To measure Vale's impact, we use internal carbon pricing, one of the tools to manage transition risks. The use of the shadow price of USD 50/tCO2e, established in accordance with the Carbon Pricing Leadership Coalition (CPLC)5, is integrated to the decision-making process to guide our capital allocation enabling a faster and more effective transition to a low-carbon economy. Assumptions/Analytical choices: The different behaviors of supply and demand under IEA's three scenarios result in changing competitive dynamics that impact the long-term price of our key commodities and our strategy by extension. For Vale, the Current Policies Scenario partially impacts our capacity to generate value. In addition to greater exposure to physical risks, CPS does not consider the opportunity for growth in renewables, transport electrification and the need to decarbonize the steel industry, which are nowadays fundamental parts of our strategy. In turn, the SDS creates an ecosystem that encourages our growth options and amplifies the relevance of our strategic pillars i.e., Base Metals Transformation and the Maximization of flight to quality in Iron Ore. All scenarios analyzed showed that the steel industry decarbonization will put a high value in high-quality, lower-emission products. Vale's current strategy already considers a portfolio with a 90% share of these products by 2024.
Transition scenarios	IEA CPS	Company-wide	<Not Applicable>	In 2020, Vale conducted a climate change scenario analysis of its portfolio based on the International Energy Agency (IEA) scenarios, which are recognized industry-wide and have ample international support. While the Current Policies Scenario (CPS) and the Stated Policies Scenario (STEPS) illustrate the consequences of ongoing policies and stated commitments, respectively, the Sustainable Development Scenario (SDS) identifies the policies and assumptions needed to achieve the UN Sustainable Development Goals related to energy i.e., (i) ensure universal access to electricity, (ii) reduce severe health impacts caused by air pollution, and (iii) address climate change. Once climate change risks are identified, they are included in Vale's risk management process and are assessed based on their severity and probability of occurrence. To measure Vale's impact, we use internal carbon pricing, one of the tools to manage transition risks. The use of the shadow price of USD 50/tCO2e, established in accordance with the Carbon Pricing Leadership Coalition (CPLC), is integrated to the decision-making process to guide our capital allocation enabling a faster and more effective transition to a low-carbon economy. Assumptions/Analytical choices: The different behaviors of supply and demand under IEA's three scenarios result in changing competitive dynamics that impact the long-term price of our key commodities and our strategy by extension. For Vale, the Current Policies Scenario partially impacts our capacity to generate value. In addition to greater exposure to physical risks, CPS does not consider the opportunity for growth in renewables, transport electrification and the need to decarbonize the steel industry, which are nowadays fundamental parts of our strategy. In turn, the SDS creates an ecosystem that encourages our growth options and amplifies the relevance of our strategic pillars i.e., Base Metals Transformation and the Maximization of flight to quality in Iron Ore. All scenarios analyzed showed that the steel industry decarbonization will put a high value in high-quality, lower-emission products. Vale's current strategy already considers a portfolio with a 90% share of these products by 2024.
Physical climate scenarios	RCP 4.5	Company-wide	<Not Applicable>	In partnership with the ITV, we downscaled the global warming models referenced by the IPCC - RCP 4.5 and 8.5 - to Vale's operation. For managing Climate changes physical risks, Vale developed and currently, is implementing the "Vale Climate Forecast" methodology, which is an in-house developed methodology to map possible operational impacts due to climate-related variables. The methodology considers variables such as precipitation, flooding, increase in temperature, increase in wind speed, among others. The methodology is divided into: i) Very short-term, midterm, and seasonal forecasts for the physical risks, whose main focus is the mapping and mitigating impacts on the operations and in shipment of products; ii) Long-term analysis, which the main focus is the assessment of the impacts of the climate change in a multi-year horizon on the operational sites, aiming to evaluate the necessary investments in the facilities for their adaptation/mitigation (planning). The long-term analysis has four steps: i. climate projections and quantification of physical impacts; ii identification and quantification of operational risks; iii quantification of financial impacts of the mapped risks and iv registration of the mapped risks in Vale's risk management systems for constant monitoring and implementing action plans when necessary. For the short-term analysis, the Ponta da Madeira Port was the site for the implementation pilot of the Vale Climate Forecast methodology. Vale developed an app and a dashboard to disseminate precipitation forecast data on daily basis to help operators on their port activities. This data is now available to assist in Vale's Production Programming, helping decision-making in the operations of shipments and distribution of iron ore and other products. The analysis of short-term climate risks enables the inclusion of climate variables in the decision-making processes of Vale's operations systematically. It generates a higher control against the impacts of climate change-impacts which are already being witnessed in/around Vale's operations. For the long-term analysis the results indicate that sites located in Canada like Long Harbour, for example, may deal with precipitation increase and flooding in access roads, in the next decades, as well as increase in average temperature. These impacts can cause equipment damages and operational disruptions.
Physical climate scenarios	RCP 8.5	Company-wide	<Not Applicable>	In partnership with the ITV, we downscaled the global warming models referenced by the IPCC - RCP 4.5 and 8.5 - to Vale's operation. For managing Climate changes physical risks, Vale developed and currently, is implementing the "Vale Climate Forecast" methodology, which is an in-house developed methodology to map possible operational impacts due to climate-related variables. The methodology considers variables such as precipitation, flooding, increase in temperature, increase in wind speed, among others. The methodology is divided into: i) Very short-term, midterm, and seasonal forecasts for the physical risks, whose main focus is the mapping and mitigating impacts on the operations and in shipment of products; ii) Long-term analysis, which the main focus is the assessment of the impacts of the climate change in a multi-year horizon on the operational sites, aiming to evaluate the necessary investments in the facilities for their adaptation/mitigation (planning). The long-term analysis has four steps: i. climate projections and quantification of physical impacts; ii identification and quantification of operational risks; iii quantification of financial impacts of the mapped risks and iv registration of the mapped risks in Vale's risk management systems for constant monitoring and implementing action plans when necessary. For the short-term analysis, the Ponta da Madeira Port was the site for the implementation pilot of the Vale Climate Forecast methodology. Vale developed an app and a dashboard to disseminate precipitation forecast data on daily basis to help operators on their port activities. This data is now available to assist in Vale's Production Programming, helping decision-making in the operations of shipments and distribution of iron ore and other products. The analysis of short-term climate risks enables the inclusion of climate variables in the decision-making processes of Vale's operations systematically. It generates a higher control against the impacts of climate change-impacts which are already being witnessed in/around Vale's operations. For the long-term analysis the results indicate that sites located in Canada like Long Harbour, for example, may deal with precipitation increase and flooding in access roads, in the next decades, as well as increase in average temperature. These impacts can cause equipment damages and operational disruptions.

C3.2b

**(C3.2b) Provide details of the focal questions your organization seeks to address by using climate-related scenario analysis, and summarize the results with respect to these questions.**

**Row 1**

**Focal questions**

F1: In 2020, Vale conducted a climate change scenario analysis of its portfolio based on the International Energy Agency (IEA) scenarios, which are recognized industry-wide and have ample international support. While the Current Policies Scenario (CPS) and the Stated Policies Scenario (STEPS) illustrate the consequences of ongoing policies and stated commitments, respectively, the Sustainable Development Scenario (SDS) identifies the policies and assumptions needed to achieve the UN Sustainable Development Goals related to energy i.e., (i) ensure universal access to electricity, (ii) reduce severe health impacts caused by air pollution, and (iii) address climate change. The different behaviors of supply and demand under IEA's three scenarios result in changing competitive dynamics that impact the long-term price of our key commodities and our strategy by extension. For Vale, the Current Policies Scenario partially impacts our capacity to generate value. In addition to greater exposure to physical risks, CPS does not consider the opportunity for growth in renewables, transport electrification and the need to decarbonize the steel industry, which are today fundamental parts of our strategy. In turn, the SDS creates an ecosystem that encourages our growth options and amplifies the relevance of our strategic pillars i.e., Base Metals Transformation and the Maximization of flight to quality in Iron Ore. F2: At Vale, nearly ~70% of Vale's assets were evaluated for climate change physical risks exposure. In partnership with the Vale Institute of Technology, we downscaled the global warming models referenced by the Intergovernmental Panel on Climate Change (IPCC). This allowed Vale to identify changes in rainfall patterns and volumes, and temperature variation for all operations in Brazil. The RCP 4.5 and 8.5 models were regionalized. This methodology to identify physical impacts of climate change in Vale is called The Vale Climate Forecast, which enables: Short-term analysis and seasonal forecasts for physical risks associated with climate change, with the main focus on impacts on our operations and product shipment. For the long-term analysis Vale has carried out the implementation of Vale Climate Forecast methodology for the sites located in Canada like Long Harbour, for example, may deal with precipitation increase and flooding in access roads, in the next decades, as well as increase in average temperature. These impacts can cause equipment damages and operational disruptions.

**Results of the climate-related scenario analysis with respect to the focal questions**

R-F1: The different behaviors of supply and demand under IEA's three scenarios result in changing competitive dynamics that impact the long-term price of our key commodities and our strategy by extension. All scenarios analyzed showed that the steel industry decarbonization will put a high value in high-quality and lower-emission products. Vale's current strategy already considers a portfolio with a 90% share of these products by 2024. To reinforce our position and offer additional solutions to the steel industry, we are focused on increasing the supply of our high-quality sinter feed from the North System, offering higher grade products using New Steel technology, leading the world production of pellets and other direct-charge products, and finally, promoting Metallics, which through partnerships and in an asset light platform provides low-carbon solutions. Each scenario was evaluated in a 12-year horizon (up to 2030). The analysis enabled to identify Vale's high degree of resilience of segments of ferrous minerals and base metals. To prioritize the most cost-competitive initiatives to achieve its 2030 target, Vale have drawn up a marginal abatement cost curve (MAC curve), which analyses more than 40 projects, and it is constantly evolving. R-F2: In Port of Ponta da Madeira, site for the pilot for implementation of the Vale Climate Forecast, an application with daily rain forecasts was developed making it feasible to disseminate the data to all operators at the Port. This helps decision-making in the operations of shipments and distribution of iron ore and other products. With these forecasts in hand, the operators optimize the product shipment plans and minimize the risk of non-shipment due to excessive humidity content in the ore. Vale considers an average operational loss of 0.5% in the production due to abnormal precipitation conditions in Ponta da Madeira Port. Considering 2020's iron ore net operating revenues of USD 27.28 billion, it would have accrued a loss of about USD 138 million per year. Vale Climate Forecast also enables long term physical risks identification, such as future exposure to flood, heat, wind, and precipitation. We have run a pilot for Vale's Canadian operations, including Long Harbour, Voisey's Bay, Sudbury, Port Colborne and Thompson. To identify potential physical impacts, we used the climate scenario SSP5-8 and the thirty-year timeframe. We have found that, Long Harbour, for example, may deal with precipitation increase and flooding in access roads, in the next decades, as well as increase average temperature. These impacts can cause equipment damages and operational disruptions. However, Vale can be resilient to extreme events in the next decades, because already has action plans to deal with these possible impacts.

**C3.3**

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**(C3.3) Describe where and how climate-related risks and opportunities have influenced your strategy.**

	Have climate-related risks and opportunities influenced your strategy in this area?	Description of influence
Products and services	Yes	<p>1): One of the market-related climate risks would be the change in consumer mentality, with the search for products with a lower carbon footprint. These risks may also represent significant opportunities for positively transforming company's products and services. 2): Thus, Vale is making possible the Substitution of existing products and services with lower emissions options in a short-term. Vale conducts a business resilience test in the various climate change scenarios for a long-term horizon (10 years or more), aiming to be prepared for the challenges of the transition to a low carbon world. 3) S: Costumer and investors are searching for companies with transition to a low carbon economy aim. Vale is looking beyond for a greener portfolio in the long term and a great example of that is the iron ore green briquette. T: In Ferrous to increase the value of the company in a sustainable way, we developed a portfolio of initiatives where the "green briquette" has a prominent position as a new product with low energy intensity and and with the potential to reduce both ours and our customers emissions. The briquette is Vale's exclusive technology, the result of several years of technological development and already patented in more than 47 countries, with three plants already approved and another five in the analysis phase. A: In December 2020, we approved the conversion of pelletizing plants 1 and 2 at the Tubarão complex, into iron ore briquetting plants, to produce the "green briquette". This project aims to reduce Scope 3 net emissions by 15% by 2035, with 2018 as baseline. We also approved the construction of a new briquetting plant in the Vargem Grande complex. In 2021, we announced the launch of iron ore green briquette, a new proprietary product, developed by the company through over 20 years of research, which can allow a reduction of over 10% of greenhouse gases emissions in the steel production by our steelmaking clients. R: The "green briquette" is a result of cold agglomeration of iron ore, by using a breakthrough technology solution that can use in its binder a composition sand from the treatment of mining tailings, resisting the blast furnace's high temperatures without disintegrating. The low temperature of cold agglomeration (200°C) allows for 80% less CO2 emission when compared to pelletizing process (approximately 1300°C).</p>
Supply chain and/or value chain	Yes	<p>Vale supports the IMO's levels of ambition to reduce emissions from international shipping, which include: reduction of CO2intensity, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by2050; Reduction of the total annual GHG emissions from international shipping by at least 50%by2050. Vale also is developing solutions for other alternative fuels, like methanol and ammonia, where preliminary assessment indicated emissions reductions could be between 40% and 80%. Vale signed in June 2021 MoU with different mining, shipping, O&amp;G companies, and port terminals to test the usage of ammonia in ships, including safety standards, procedures for fueling, and GHG emissions. Vale partnered in 2020 with VLOC(Very Large Ore Carrier) owner Pan Ocean and in 2021 has delivered 2 pioneering projects: The largest Rotor Sails installation onboard the 325000DWT VLOC MV Sea Zhoushan and the largest Air Lubrication System onboard the 325000DWT VLOC MV Sea Victoria. Both vessels are already considered the most efficient class of vessels in the world and the energy efficiency technologies installation are expected to show it is possible to further reduce emissions. In addition, Vale received an international award for its innovative use of rotor sails on its large ships. Along with that, Vale has used its influence with partners to identify strategic opportunity(opp) to implement projects with the potential to achieve more material emissions reductions, such as the charter of 30 Valemax2G and 47 Guaibamax ships, which reduce emissions by 41% and 38%, respectively, when compared to previously used vessels. Vale also has encouraged emissions management in your value chain through a contractual clause and the application of an annual questionnaire on GHG. Vale suppliers considered key in terms of emissions in the Supply Chain-SC are annually invited to participate in the CDP SC program. As result, 500 suppliers were selected to participate in the program in 2021, with 75%adherence and 91%adherence of the 2020 respondents invited for the 2nd year=221suppliers. 22% of the suppliers were classified as leaders or with good management in the theme, with 63%evaluated as having a low level of maturity. We identified a total of 288 opp with substantial strategic or financial impact and emission reduction partnership opp with several suppliers.</p>
Investment in R&D	Yes	<p>Through the adoption of existing technologies into new forms or developing new technologies and processes in R&amp;D initiatives, Vale seeks to transform its businesses. At Vale, the use of technology seeks to redesign the way Vale works, helping to eliminate certain risk scenarios, positioning us as a leader in safety and risk management and promoting sustainability and adaptation to climate change. Vale enrolls in partnerships with academies and scientific institutions, and with local governments aiming at the development of Brazilian scientific capacity to study physical impacts and to propose adaptation measures. Investment in R&amp;D represents a crucial risk mitigation strategy for a long-term horizon (10 years or more) and a substantial opportunity, generating the development of new technologies capable of increasing productivity and decreasing GHG emissions.Case: Vale created the Center for Advanced Climate Studies in partnership with the Espírito Santo Government and the University of Espírito Santo. The center has the objective of conducting climate-related researches that will assist the state, the country and Vale itself to better understand the climate change issues and how to deal with them. The center had an initial financial contribution of US\$175,000 from Vale and already has 21 projects under development. Another example is the Vale Technological Institute (ITV), founded in 2009, that is developing low carbon and clean/renewable energy R&amp;D and products. This institute has a dedicated group of researches focused on climate change that seeks to understand the science of climate change and to develop new technologies in order for Vale to better adapt to the new low-carbon economy. So far, 85 masters have graduated, 45% of whom are Vale professionals. In 2019, ITV created the Resident Master's Student Program with the purpose of boosting and influencing local professionals' training on topics related to the 17 SDGs, offering 10 scholarships. ITV already invested (between 2011 to 2021) USD 209.2 million in research projects and published 747 scientific articles in collaboration with universities, research centers, and other companies, supported 154 R&amp;D projects. In order to prioritize the most cost-efficient low carbon technologies and R&amp;D projects, Vale uses a Marginal Abatement Cost Curve (MACC).</p>
Operations	Yes	<p>For the physical risks of climate change, in partnership with the Vale Institute of Technology, we downscaled the global warming models referenced by the IPCC - RCP 4.5 and 8.5 - to Vale's operation. This methodology to identify physical impacts of climate change in Vale is called The Vale Climate Forecast. In Port of Ponta da Madeira, site for the pilot for implementation of the Vale Climate Forecast, an application with daily rain forecasts was developed making it feasible to disseminate the data to all operators at the Port. Vale considers an average operational loss of 0.5% in the production due to abnormal precipitation conditions in Ponta da Madeira Port. Considering 2020's iron ore net operating revenues of USD 27.28 billion, it would have accrued a loss of about USD 138 million per year. Also, environmental legislation is becoming more stringent around the world, which can lead to higher costs for compliance with environmental laws. Thus, in the medium-term, Vale will have to be in compliance with regulations and laws. This strategy is aligned with the Paris Agreement's to become a net zero mining company. At Vale, nearby ~70% of Vale's assets were evaluated for climate change physical risks exposure. Once climate change risks are identified, they are included in Vale's risk management process and are assessed based on their severity and probability of occurrence. For transition risk, Vale use internal carbon pricing, one of the tools to manage this risk. The use of the shadow price of USD 50/tCO2e is integrated to the decision-making process to guide our capital allocation enabling a faster and more effective transition to a zero-carbon economy. The association of cost to the greenhouse gas emissions in the feasibility analysis enables explaining the impact of the emissions on the project valuation at the time of decision making the projects from the Carbon Target portfolio feasible. Estimating the financial implications may be complex since it depends on how legislation will be downscaled for each sector. Indirect impacts, such as those in the value chain (mainly energy supply and impacts in contracts costs) are also difficult to be estimated. However, an approximation can be done considering the risk if Vale's total scope 1 in 2021 were taxed. This tax would represent US\$ 490,000,000 = 9.8 MtCO2e x USD50/tCO2e.</p>

**C3.4**

**(C3.4) Describe where and how climate-related risks and opportunities have influenced your financial planning.**

	Financial planning elements that have been influenced	Description of influence
Row 1	Revenues Direct costs Indirect costs Capital expenditures Capital allocation Acquisitions and divestments	<p>Revenues: Natural disasters can cause serious damage to operations and projects in countries where Vale operates and may have a negative impact on sales to countries affected by such disasters. In its turn, transition risks, in particular, may affect demand for its products and, consequently, revenues. In countries such as Canada, China, Japan and the United Kingdom for example, emissions from thermal electricity generation or from the use of fossil fuels for other purposes are already being considered for taxation. In this challenging context of decarbonization, our key commodities will be at the forefront of the challenges and opportunities posed by the climate crisis. In 2020, Vale conducted a climate change scenario analysis of its portfolio based on the International Energy Agency (IEA) scenarios, which are recognized industry-wide and have ample international support. All scenarios analyzed showed that the steel industry decarbonization will put a high value in high-quality, lower-emission products. Vale's current strategy already considers a portfolio with a 90% share of these products by 2024. Vale have been looking beyond for a greener portfolio in the long term and a great example of that is our Class 1 nickel assets, that place us in a unique position with competitive operations in the North Atlantic.</p> <p>The base metals transformation follows a net zero agenda geared towards recycling electric vehicle batteries, using biofuel and biomass, decarbonizing rotary kilns and electrification from renewables. In addition, as part of Vale's Nickel strategy, investment opportunities in Indonesia through JVs in the Bahodopi and Pomalaa projects, production stabilization in the South Atlantic and other projects ensure options capable of sustaining a significant EBITDA increase in 2040 in SDS. Direct costs: Demand for our iron ore and nickel products depends on global demand for steel. Iron ore and iron ore pellets, which together accounted for 84% of our 2021 net operating revenues from continuing operations, are used to produce carbon steel. Nickel, which accounted for 6.0% of our 2021 net operating revenues from continuing operations, is used mainly to produce stainless and alloy steels. The copper demand is affected by the demand for copper wire, and a sustained decline in the construction industry could have a negative impact on our copper business. Copper products accounted for 4.8 % of our 2021 net operating revenues from continuing operations. Ferrous minerals: Demand for steel products is influenced by many factors, such as global manufacturing production, civil construction and infrastructure spending. In 2021, China accounted for 64% of our iron ore and iron ore pellet shipments, Asia accounted for 79%, Brazil accounted for 10%, Europe accounted for 7%, the Middle East with 3% and others with 1%. Our ten largest customers collectively purchased 127 Mmt of iron ore and iron ore pellets from us, representing 41% of our 2021 iron ore and iron ore pellet sales volumes and 40% of our total iron ore and iron ore pellet revenues. Base metals: Our nickel customers are broadly distributed on a global basis. In 2021, 36.5% of our refined nickel sales were delivered to customers in Asia, 27.8% to Europe, 33.5% to North America and 2.2% to other markets. Our nickel production represented 6.1% of global consumption for primary nickel in 2021. In 2021, Europe accounted for approximately 34.8% of our ferrous minerals and base metals shipments. If the proposal for establishing a carbon border adjustment mechanism (CBAM) is approved and considering the worst scenario where our assets will be taxed, will potentially impact the direct cost of Vale's products sold. This risk can represent an opportunity to continue to improve our portfolio in order to provide solutions to our customers and to adapt to potential market demands. Indirect costs: Considering a future scenario, Vale faces the risk of energy shortages in countries where the company maintain operations and projects, especially in Brazil, due to lack of infrastructure or climatic conditions such as floods or droughts. Future scarcity and government efforts to respond to or avoid shortages can have an adverse impact on the cost or supply of electricity in its operations, this cost is also related to carbon pricing, as well as the cost of fossil fuel production. Vale is an energy intensive industry, if fossil fuels and electricity are taxed (and increase their prices), it is very likely that Vale will face higher direct and indirect costs. This impact on its revenues is considered to be medium-high magnitude and the time horizon covered by the financial planning is short-term. Vale currently has a direct participation in three hydroelectric power plants and three small hydroelectric plants in operation, besides the indirect participation in other ones. Vale anticipated its goal for self-sufficiency in clean energy in Brazil to 2025 and globally to 2030. To achieve this goal, the company, among other actions, has structured a roadmap of initiatives, which involves restructuring the current generation portfolio to implement projects and partnerships to insert wind and solar energy sources. An example of these initiatives is the Sol do Cerrado. The Sol do Cerrado Project generates solar energy in the city of Jaiba (MG-Brazil). With an installed capacity of 766 megawatts-peak, the project will produce a mean capacity of approximately 193 megawatts of energy per year for Vale's operations, corresponding to 13% of our demand for 2025. Capital Allocation: Climate issues are considered in its capital allocation framework. Vale shifting its energy matrix to renewable is an example of how climate change issues are being discussed at capital allocation discussions, that serve as an action plan for us to reassess the resiliency of its portfolio, with the aggregate magnitude of the risk being low. For example: in 2019 Vale has developed a proprietary carbon pricing model to assess risks linked to climate change, by projecting possible impacts on the operating costs of each business unit. This model was officially implemented on June 1, 2020 and takes into account the impacts on direct and indirect costs, including impacts on the supply chain. All project/investments that have a GHG emission associated to its operation and/or will be responsible for the deforestation of native forest during its implantation will estimate its GHG emission and incorporate the shadow price for the project/investment's evaluation and approval. Also, Vale's investments in R&amp;D represent a crucial risk mitigation strategy and a substantial opportunity, generating the development of new technologies capable of increasing productivity and decreasing GHG emissions. In 2021, Vale announced investments of USD 4 to 6 billion by 2030 to reduce its Scope 1 and 2 emissions. Reduction initiatives are prioritized by the company according to its emission abatement curve.</p>

**C4. Targets and performance**

**C4.1**

**(C4.1) Did you have an emissions target that was active in the reporting year?**

Absolute target

**C4.1a**

**(C4.1a) Provide details of your absolute emissions target(s) and progress made against those targets.**

**Target reference number**

Abs 1

**Year target was set**

2019

**Target coverage**

Company-wide

**Scope(s)**

Scope 1

Scope 2

**Scope 2 accounting method**

Market-based

**Scope 3 category(ies)**

<Not Applicable>

**Base year**

2017

**Base year Scope 1 emissions covered by target (metric tons CO2e)**

12141726.55

**Base year Scope 2 emissions covered by target (metric tons CO2e)**

1364671.17

**Base year Scope 3 emissions covered by target (metric tons CO2e)**

<Not Applicable>

**Total base year emissions covered by target in all selected Scopes (metric tons CO2e)**

13506397.72

**Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1**

100

**Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2**

100

**Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)**

<Not Applicable>

**Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes**

100

**Target year**

2030

**Targeted reduction from base year (%)**

33

**Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]**

9049286.4724

**Scope 1 emissions in reporting year covered by target (metric tons CO2e)**

9834242.74

**Scope 2 emissions in reporting year covered by target (metric tons CO2e)**

371132.37

**Scope 3 emissions in reporting year covered by target (metric tons CO2e)**

<Not Applicable>

**Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)**

10205375.11

**% of target achieved relative to base year [auto-calculated]**

74.0619299502001

**Target status in reporting year**

Underway

**Is this a science-based target?**

Yes, we consider this a science-based target, and the target is currently being reviewed by the Science Based Targets initiative

**Target ambition**

Well-below 2°C aligned

**Please explain target coverage and identify any exclusions**

This target is company-wide and covers 100% of both our Scope 1 and 2 emissions. Vale doesn't have any exclusions for this target.

**Plan for achieving target, and progress made to the end of the reporting year**

Vale's first pillar of climate action is related to minimizing our operational emissions. We have a target of reducing scope 1 and 2 emissions by 33% by 2030, aligned with the Paris Agreement goal of limiting global average temperature rise to well-below 2 degrees Celsius. To achieve our Scope 1 and 2 emission reduction commitment, we have announced in 2021 that we will invest USD 4-6 billion until 2030.. One important component to deliver that reduction is achieving 100% renewable electricity consumption in our operations. We will do that in Brazil within only 4 years, by 2025, and globally, by 2030. In order to prioritize the most cost-efficient initiatives to be implemented, the company has an annually updated marginal abatement cost curve (MACC). In its 2021 update, we have increased the number of initiatives mapped from 30 to 40+, while increasing their technology maturity through the implementation of pilots. We are committed to developing and implementing innovative lower carbon technologies, and ~50% of commercial initiatives mapped in our MACC are already entering FEL stage. Also, ~80% of initiatives mapped are NPV positive<sup>2</sup> at the shadow price of USD 50/tCO<sub>2</sub>e.

**List the emissions reduction initiatives which contributed most to achieving this target**

<Not Applicable>

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**Target reference number**

Abs 2

**Year target was set**

2020

**Target coverage**

Company-wide

**Scope(s)**

Scope 3

**Scope 2 accounting method**

<Not Applicable>

**Scope 3 category(ies)**

Category 1: Purchased goods and services

Category 2: Capital goods

Category 3: Fuel-and-energy-related activities (not included in Scopes 1 or 2)

Category 4: Upstream transportation and distribution

Category 6: Business travel

Category 7: Employee commuting  
Category 9: Downstream transportation and distribution  
Category 10: Processing of sold products  
Category 11: Use of sold products

**Base year**

2018

**Base year Scope 1 emissions covered by target (metric tons CO2e)**

<Not Applicable>

**Base year Scope 2 emissions covered by target (metric tons CO2e)**

<Not Applicable>

**Base year Scope 3 emissions covered by target (metric tons CO2e)**

585176307.35

**Total base year emissions covered by target in all selected Scopes (metric tons CO2e)**

585176307.35

**Base year Scope 1 emissions covered by target as % of total base year emissions in Scope 1**

<Not Applicable>

**Base year Scope 2 emissions covered by target as % of total base year emissions in Scope 2**

<Not Applicable>

**Base year Scope 3 emissions covered by target as % of total base year emissions in Scope 3 (in all Scope 3 categories)**

100

**Base year emissions covered by target in all selected Scopes as % of total base year emissions in all selected Scopes**

100

**Target year**

2035

**Targeted reduction from base year (%)**

15

**Total emissions in target year covered by target in all selected Scopes (metric tons CO2e) [auto-calculated]**

497399861.2475

**Scope 1 emissions in reporting year covered by target (metric tons CO2e)**

<Not Applicable>

**Scope 2 emissions in reporting year covered by target (metric tons CO2e)**

<Not Applicable>

**Scope 3 emissions in reporting year covered by target (metric tons CO2e)**

49506984681

**Total emissions in reporting year covered by target in all selected scopes (metric tons CO2e)**

49506984681

**% of target achieved relative to base year [auto-calculated]**

-55734.5512901287

**Target status in reporting year**

Underway

**Is this a science-based target?**

Yes, we consider this a science-based target, and the target is currently being reviewed by the Science Based Targets initiative

**Target ambition**

2°C aligned

**Please explain target coverage and identify any exclusions**

This company-wide target covers 100% of all our Scope 3 emissions, focusing on the largest categories most relevant to our business activities (Purchased goods and services, Fuel-and-energy-related activities [not included in Scope 1 or 2], Upstream transportation and distribution, Downstream transportation and distribution, Processing of sold products, Use of sold products) while excluding just two categories (Waste generated in operations - the calculations demonstrated that the emissions from Solid Waste and Wastewater treatment remains not material, representing 0.03% of Vale's Scope 3 emissions in 2021 and; Upstream leased assets - This category may cause double counting at Vale's scope 1 emission).

**Plan for achieving target, and progress made to the end of the reporting year**

We recognize that we can only lead the mining industry toward a low carbon economy if we induce our value chain in the same direction. Vale's scope 3 emissions, annually calculated and verified by independent third parties, represent 98% of our total emissions as of 2020, but they are not under our direct control. About 97% of these Scope 3 emissions are downstream in our value chain, in other words, they were due to the processing, transport and use of products sold by Vale in 2020. In late 2020, Vale set the first quantitative scope 3 targets among our peers. We will reduce net scope 3 emissions by 15% by 2035, based on the development of new products, nature-based solutions, partnerships and engagement with clients and suppliers. This means a reduction from 586 MtCO2e in 2018 to 496 MtCO2e in 2035. Vale will review its scope 3 targets by 2025 and every five years, given the uncertainties regarding low carbon technologies and climate policies. Vale's scope 3 targets were set based on the Science Based Target Initiative (SBTi) Target Setting Tool as of December 2020, given a scope 3 SBT target needed to encompass at least 2/3 of total scope 3 emissions, and these should be reduced by 21% as of 2035 in order to be aligned with a 2°C scenario. Considering that the other 1/3 of emissions could remain flat, the total scope 3 emissions would reduce by 14-15% by 2035, versus 2018 levels.

**List the emissions reduction initiatives which contributed most to achieving this target**

<Not Applicable>

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**(C4.2) Did you have any other climate-related targets that were active in the reporting year?**

Target(s) to increase low-carbon energy consumption or production

Net-zero target(s)

**C4.2a**

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**(C4.2a) Provide details of your target(s) to increase low-carbon energy consumption or production.**

**Target reference number**

Low 1

**Year target was set**

2019

**Target coverage**

Company-wide

**Target type: energy carrier**

Electricity

**Target type: activity**

Consumption

**Target type: energy source**

Renewable energy source(s) only

**Base year**

2017

**Consumption or production of selected energy carrier in base year (MWh)**

17317873

**% share of low-carbon or renewable energy in base year**

79

**Target year**

2030

**% share of low-carbon or renewable energy in target year**

100

**% share of low-carbon or renewable energy in reporting year**

89

**% of target achieved relative to base year [auto-calculated]**

47.6190476190476

**Target status in reporting year**

Underway

**Is this target part of an emissions target?**

ABS1 (C4.1a question)

**Is this target part of an overarching initiative?**

Science Based Targets initiative

**Please explain target coverage and identify any exclusions**

In 2019, the company reviewed its climate goals, including new commitments to reduce greenhouse gas (GHG) emissions, bolder goals than previously established in 2018, aiming to become a net zero mining company. The reduction of scope 2 emissions has an important contribution to this climate goal, as the company is committed to consuming 100% of electricity based on renewable energy sources. until 2030.

**Plan for achieving target, and progress made to the end of the reporting year**

To achieve our target to get 100% renewable electricity globally by 2030 we have some initiatives to drive it. The Sol do Cerrado Project stands out among the initiatives on this front for generating solar energy in the municipality of Jaíba (MG), in Brazil. With an installed capacity of 766 megawatts-peak, the project will produce a mean capacity of approximately 193 megawatts of energy per year for Vale's operations, corresponding to 13% of our demand for 2025. Scheduled to come online in late 2022, the solar project will be one of the largest in Latin America. In addition to investing in a generation, Vale entered into agreements in 2021 to use energy storage batteries in its operations at the Ilha da Guaíba Terminal and in Sudbury, Canada, thus helping to ensure greater competitiveness and security of energy supply to these operations.

**List the actions which contributed most to achieving this target**

<Not Applicable>

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**C4.2c**

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**(C4.2c) Provide details of your net-zero target(s).**

**Target reference number**

NZ1

**Target coverage**

Company-wide

**Absolute/intensity emission target(s) linked to this net-zero target**

Abs1

**Target year for achieving net zero**

2050

**Is this a science-based target?**

No, but we anticipate setting one in the next 2 years

**Please explain target coverage and identify any exclusions**

Vale is committed to leading the transition towards a net-zero mining industry. Vale is committed to contributing with solutions that will help limit the increase in the average global temperature to well below 2°C, as set forth in the Paris Agreement. Vale endorsed and follow the Task Force on Climate-related financial disclosures (TCFD) framework for risks and opportunities related to climate change. We have ambitious goals related to climate change risk management, including targets to reduce scopes 1 and 2 absolute emissions by 33% until 2030, with 2017 as a baseline, and to become net zero by 2050. Vale recognizes that it can only lead the mining industry toward a low carbon economy if the company induces its value chain in the same direction. Vale's scope 3 emissions, annually calculated and verified by independent third parties, represent 98% of its total emissions and are not under our direct control. In 2020 Vale assumed the goal of reducing Scope 3 net emissions by 15% until 2035, compared to the base year of 2018. The reduction volume was defined based on the Science Based Target Initiative (SBTI) calculation tool, the Absolute Contraction Approach method, so it is also considered a science-based target. The scope 3 targets will be revised every five years, given the uncertainties regarding low carbon technologies and climate policies. Both targets are aligned with the Paris Agreement's ambition.

**Do you intend to neutralize any unabated emissions with permanent carbon removals at the target year?**

Yes

**Planned milestones and/or near-term investments for neutralization at target year**

To reach our net zero target by 2050, our number one priority is to continuously reduce our operational emissions, through innovation and technology. Science recognizes that, as a hard-to-abate sector, we may also rely to a limited extent on carbon offsets and removals. We will leverage our expertise and know-how to address sound nature-based solutions. Also, we will count on high-quality and credible carbon markets, aligned with international best practices for offsetting the residual emissions.

**Planned actions to mitigate emissions beyond your value chain (optional)**

n.a.

**C4.3**

**(C4.3) Did you have emissions reduction initiatives that were active within the reporting year? Note that this can include those in the planning and/or implementation phases.**

Yes

**C4.3a**

**(C4.3a) Identify the total number of initiatives at each stage of development, and for those in the implementation stages, the estimated CO2e savings.**

	Number of initiatives	Total estimated annual CO2e savings in metric tonnes CO2e (only for rows marked *)
Under investigation	344	
To be implemented*	7	641787
Implementation commenced*	5	3128
Implemented*	6	74888
Not to be implemented		

**C4.3b**

**(C4.3b) Provide details on the initiatives implemented in the reporting year in the table below.**

**Initiative category & Initiative type**

Energy efficiency in production processes	Automation
---	------------

**Estimated annual CO2e savings (metric tonnes CO2e)**

3045

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

0



**Investment required (unit currency – as specified in C0.4)**

7420925

**Payback period**

No payback

**Estimated lifetime of the initiative**

Ongoing

**Comment**

N/A

**Initiative category & Initiative type**

Energy efficiency in production processes	Process optimization
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**Estimated annual CO2e savings (metric tonnes CO2e)**

12679

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

3955542

**Investment required (unit currency – as specified in C0.4)**

1379231

**Payback period**

<1 year

**Estimated lifetime of the initiative**

Ongoing

**Comment**

N/A

**Initiative category & Initiative type**

Energy efficiency in production processes	Process optimization
---	----------------------

**Estimated annual CO2e savings (metric tonnes CO2e)**

55600

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

11554904

**Investment required (unit currency – as specified in C0.4)**

2326174

**Payback period**

<1 year

**Estimated lifetime of the initiative**

Ongoing

**Comment**

N/A

**Initiative category & Initiative type**

Energy efficiency in production processes	Process optimization
---	----------------------

**Estimated annual CO2e savings (metric tonnes CO2e)**

2274

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 2 (location-based)

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

517930

**Investment required (unit currency – as specified in C0.4)**

5600000

**Payback period**

11-15 years

**Estimated lifetime of the initiative**

Ongoing

**Comment**

N/A

**Initiative category & Initiative type**

Energy efficiency in buildings	Lighting
--------------------------------	----------

**Estimated annual CO2e savings (metric tonnes CO2e)**

1238

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 2 (location-based)

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

239769

**Investment required (unit currency – as specified in C0.4)**

239769

**Payback period**

1-3 years

**Estimated lifetime of the initiative**

Ongoing

**Comment**

N/A

**Initiative category & Initiative type**

Company policy or behavioral change	Resource efficiency
-------------------------------------	---------------------

**Estimated annual CO2e savings (metric tonnes CO2e)**

51

**Scope(s) or Scope 3 category(ies) where emissions savings occur**

Scope 1

**Voluntary/Mandatory**

Voluntary

**Annual monetary savings (unit currency – as specified in C0.4)**

117000

**Investment required (unit currency – as specified in C0.4)**

0

**Payback period**

No payback

**Estimated lifetime of the initiative**

Ongoing

**Comment**

N/A

C4.3c

**(C4.3c) What methods do you use to drive investment in emissions reduction activities?**

Method	Comment
Compliance with regulatory requirements/standards	Vale is aware of the targets and established its own target in order to comply with Brazilian policy as well as other regulations worldwide. Vale also follows national discussions on the implementation of the NDC. Since 2019, Vale is committed to the new pact with society to positively impact society, going beyond taxes, social projects and reparation of Brumadinho, by becoming a development enabler in the areas where Vale operates and fostering a safer and more sustainable Brazilian mining industry. Also, in 2019, the company published a group of sustainability goals (linked to the governance part - goals), including new commitments to reduce greenhouse gas (GHG) emissions, bolder than goals established previously in 2018, aiming to become a net zero mining company. To reduce 33% of the absolute emission of scopes 1 and 2 in 2030, aligned with the Paris Agreement to become net zero (scope 1 and 2) by 2050. In adherence to Vale's Global Climate Change Policy and the climate-related risks and opportunities analysis, Vale created the Carbon Program in the Value Chain. Initially, the program involved the training of suppliers to prepare an inventory of GHG emissions. Nowadays, it provides for the annual reporting commitment of GHG emissions from critical suppliers to Vale, as well as other information on emission management. This commitment is formalized through the insertion of a voluntary clause in contracts signed in Brazil. The program is aimed at companies from any region, provided they have active contracts with Vale. Vale suppliers considered key in terms of emissions in the supply chain are annually invited to participate in the CDP Supply Chain program.
Dedicated budget for low-carbon product R&D	Through the adoption of existing technologies into new forms or develop new technologies and processes in R&D initiatives, Vale seeks to transform its businesses. At Vale, the use of technology seeks to redesign the way the company works, helping to eliminate certain risk scenarios, positioning us as a leader in safety and risk management and promoting sustainability and adaptation to climate change. Vale enrolls in partnerships with academies and scientific institutions, and with local governments aiming at the development of Brazilian scientific capacity to study physical impacts and to propose adaptation measures. Investment in R&D represents a crucial risk mitigation strategy for a long-term horizon (10 years or more) and a substantial opportunity, generating the development of new technologies capable of increasing productivity and decreasing GHG emissions. Case: Vale created the Center for Advanced Climate Studies in partnership with the Espírito Santo Government and the University of Espírito Santo. The center has the objective of conducting climate-related research that will assist the state, the country and Vale itself to better understand the climate change issues and how to deal with them. The center had an initial financial contribution of US\$175,000 from Vale and already has 21 projects under development. Another example is the Vale Technological Institute (ITV), founded in 2009, which is developing low carbon and clean/renewable energy R&D and products. This institute has a dedicated group of researchers focused on climate change that seeks to understand the science of climate change and to develop new technologies in order for Vale to better adapt to the new low-carbon economy. So far, 85 masters have graduated, 45% of whom are Vale professionals. In 2019, ITV created the Resident Master's Student Program with the purpose of boosting and influencing local professionals' training on topics related to the 17 SDGs, offering 10 scholarships. ITV already invested (between 2011 to 2021) USD 209.2 million in research projects and published 747 scientific articles in collaboration with universities, research centers, and other companies, and supported 154 R&D projects. In order to prioritize the most cost-efficient low carbon technologies and R&D projects, Vale uses a Marginal Abatement Cost Curve (MACC).
Employee engagement	Vale Climate Change team developed an online course on GHG Inventory and Climate Change, available to any employee, and provides training sessions about these issues in order to mobilize its employees around the necessity of reducing emissions in the company's operations and projects. Vale also has focal points in the business areas engaged in identifying opportunities to reduce energy and GHG emissions. Aligned with the Paris Agreement's goal of limiting global warming to below 2°C, Vale linked the target of reduction of 33% absolute scope 1 and 2 emissions with the variable remuneration of all Vale's employees.
Internal incentives/recognition programs	The Sustainability KPI goals program encourages the continuous improvement of the company's performance on material socio-environmental issues. Environmental and social indicators work as metrics to assess the sustainability of the different business areas, reflecting on the teams' variable remuneration. All of these goals, once defined, are registered and monitored in the Career, Succession and Performance (CSP) system. The Sustainability KPIs integrate the variable remuneration of all Vale employees and impact all hierarchical levels, up to the CEO. As of 2021, goals related to the climate agenda represent 5% of short-term (out of 10% related to Sustainability) and 6% of long-term compensation (out of 20% ESG-related) of all employees, including our CEO and executive vice presidents. A goal composed of indicators of greenhouse gas emissions, forest recovery and protection, and renewable energy was also linked to leadership's long-term remuneration.
Marginal abatement cost curve	In order to prioritize the most cost-efficient initiatives to be implemented, the company has an annually updated marginal abatement cost curve (MACC). In its 2021 update, we have increased the number of initiatives mapped from 30 to 40+, while increasing their technology maturity through the implementation of pilots. We are committed to developing and implementing innovative lower carbon technologies, and ~50% of commercial initiatives mapped in our MACC are already entering FEL stage. Also, ~80% of initiatives mapped are NPV positive <sup>2</sup> at the shadow price of USD 50/tCO <sub>2</sub> e.
Dedicated budget for energy efficiency	A large part of GHG emissions is directly linked to Vale's operations' energy consumption, so Vale knows that energy efficiency is a key factor in reducing GHG emissions and optimizing costs. Vale's Energy-Efficiency Program aims to include the topic of energy efficiency in a structured way into operational routines, making employees think systematically about initiatives that promote energy efficiency in their processes. This work is being developed globally through multidisciplinary groups in each operation and supported by Smart Energy, the platform responsible for managing electricity consumption throughout the company, providing automated energy-efficiency indicators. In addition to making a significant contribution to reducing GHG emissions, the Energy Efficiency Program also addresses ESG issues by creating indicators of energy intensity consumed by products, as well as by setting targets for increasing energy efficiency, which will occur throughout 2021. In 2022, with centralized governance and energy-efficiency indicators in the management routine, the goal is to obtain certification in ISO 50,001, the main international reference in energy management.
Dedicated budget for other emissions reduction activities	In 2021, Vale announced investments of USD 4 to 6 billion by 2030 to reduce its Scope 1 and 2 emissions. Reduction initiatives are prioritized by the company according to its emission abatement curve for 2030, which is public and can be accessed in the Climate Change Report. About 75% of the abatement curve initiatives, consolidated in reduction potential by type of project graph showed positive NPV1, at a shadow price of USD 50/tCO <sub>2</sub> e. • In the short term, we are prioritizing energy efficiency and a switch to renewable energy. • We will also increase the role of bioenergy as a transition fuel for our operations. • For the longer term, we will count on both electrification and innovative processes.
Internal price on carbon	At the end of 2019, Vale adopted an internal carbon price of 50 dollars per ton of CO <sub>2</sub> equivalent (US\$50/tCO <sub>2</sub> eq). This price is aligned to the temperature targets of the Paris Agreement, according to the recommendations of the Carbon Pricing Leadership Coalition (CPLC). In June 2020, the use of the internal carbon price in the economic-financial analysis of new investments started. The carbon price starts supporting the risk and opportunity assessment, selection and prioritization of projects, contributing to Vale's decarbonization trajectory.

**C4.5**

**(C4.5) Do you classify any of your existing goods and/or services as low-carbon products?**

Yes

**C4.5a**

**(C4.5a) Provide details of your products and/or services that you classify as low-carbon products.**

**Level of aggregation**

Product or service

**Taxonomy used to classify product(s) or service(s) as low-carbon**

No taxonomy used to classify product(s) or service(s) as low carbon

**Type of product(s) or service(s)**

Iron and steel	Other, please specify (Nickel rounds)
----------------	---------------------------------------

**Description of product(s) or service(s)**

The nickel melt rounds from our Long Harbour processing plant, a leading-edge hydrometallurgical facility on Canada's East Coast, are one of the least carbon-intensive nickel products on the market. With a carbon footprint of 4.4t CO<sub>2</sub>e per tonne (about three times lower than the global average intensity reported by the Nickel Institute for Class I nickel.), these Class I nickel products position us well for supplying to the electric vehicle industry. Nickel Melt Rounds are a high purity form of nickel suitable for melting applications. Long Harbour Nickel Melt Rounds are manufactured by electrolytic refining at Vale's Long Harbour Processing Plant in Newfoundland, Canada and are one of the lowest carbon intensive nickel products on the market.

**Have you estimated the avoided emissions of this low-carbon product(s) or service(s)**

Yes

**Methodology used to calculate avoided emissions**

Estimating and Reporting the Comparative Emissions Impacts of Products (WRI)

**Life cycle stage(s) covered for the low-carbon product(s) or services(s)**

Cradle-to-gate

**Functional unit used**

Tonnes of CO<sub>2</sub>e per tonnes of Nickel

**Reference product/service or baseline scenario used**

Average nickel from Nickel Institute reference: 13 tonnes CO<sub>2</sub>e

**Life cycle stage(s) covered for the reference product/service or baseline scenario**

Cradle-to-gate

**Estimated avoided emissions (metric tons CO<sub>2</sub>e per functional unit) compared to reference product/service or baseline scenario**

331418.2

**Explain your calculation of avoided emissions, including any assumptions**

Calculation = ('Nickel Institute Reference' - 'Nickel Rounds Carbon Footprint from Long Harbour') x 'Nickel Round Sales from Long Harbour'

**Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year**

1.3

**Level of aggregation**

Product or service

**Taxonomy used to classify product(s) or service(s) as low-carbon**

No taxonomy used to classify product(s) or service(s) as low carbon

**Type of product(s) or service(s)**

Iron and steel	Other, please specify (Low Carbon nickel CCNR)
----------------	--

**Description of product(s) or service(s)**

Vale's Canadian operations produce some of the lowest-carbon nickel globally. Powder from the Copper Cliff Nickel Refinery in Ontario had a verified footprint of 7.3 tonnes equivalent. This includes Scope 1 and 2 emissions from mining, milling and refining as well as upstream Scope 3 emissions from inputs.

**Have you estimated the avoided emissions of this low-carbon product(s) or service(s)**

Yes

**Methodology used to calculate avoided emissions**

Estimating and Reporting the Comparative Emissions Impacts of Products (WRI)

**Life cycle stage(s) covered for the low-carbon product(s) or services(s)**

Cradle-to-gate

**Functional unit used**

Tonnes of CO<sub>2</sub>e per tonnes of Nickel

**Reference product/service or baseline scenario used**

Average nickel from Nickel Institute reference: 13 tonnes CO<sub>2</sub>e

**Life cycle stage(s) covered for the reference product/service or baseline scenario**

Cradle-to-gate

**Estimated avoided emissions (metric tons CO<sub>2</sub>e per functional unit) compared to reference product/service or baseline scenario**

266948.1

**Explain your calculation of avoided emissions, including any assumptions**

Calculation = ('Nickel Institute Reference' - 'Copper Cliff Nickel Refinery Carbon Footprint from Ontario') x 'CCNR Nickel Sales from Ontario'

**Revenue generated from low-carbon product(s) or service(s) as % of total revenue in the reporting year**

1.6

## C5. Emissions methodology

### C5.1

#### (C5.1) Is this your first year of reporting emissions data to CDP?

No

### C5.1a

#### (C5.1a) Has your organization undergone any structural changes in the reporting year, or are any previous structural changes being accounted for in this disclosure of emissions data?

##### Row 1

##### Has there been a structural change?

Yes, an acquisition

Yes, a divestment

##### Name of organization(s) acquired, divested from, or merged with

Vale completed the divestments in New Caledonia in 2021 and Biopalma in 2020. In addition, in June 2021, Vale acquired the Mitsui's stake in Nacala Logistics Corridor ("NLC"). These divestments and acquisitions led to the recalculation of base year GHG emissions

##### Details of structural change(s), including completion dates

New Caledonia - In March 2021, our subsidiary Vale Canada concluded the sale of its ownership interest in VNC to Prony Resources. Prony Resources is a consortium of VNC management and employees, supported by both the New Caledonian and French authorities and having Trafigura as a minority shareholder. Biopalma - In November 2020, we sold 100% of the shares of Biopalma da Amazonia S.A — Reflorestamento, Industria e Comércio to Brasil Biofuels Pará Ltda., a company from the Brasil Bio Fuels S.A. group, resulting in the total divestment of our palm oil business. Nacala Corridor - In June 2021, in preparation for a sale of our coal operation, the concessionaires of Nacala Logistics Corridor ("NLC"), located in Mozambique and Malawi prepaid the Nacala Corridor Project Finance, which had an outstanding balance of approximately US\$2.5 billion, with funds provided by us. The settlement of the project finance was the final condition precedent to complete our acquisition of Mitsui's interest in NLC. Following the acquisition of Mitsui's stakes, and therefore a simplification of governance and asset management, we started the process of divesting our participation in the coal business.

### C5.1b

#### (C5.1b) Has your emissions accounting methodology, boundary, and/or reporting year definition changed in the reporting year?

	Change(s) in methodology, boundary, and/or reporting year definition?	Details of methodology, boundary, and/or reporting year definition change(s)
Row 1	No, but we have discovered significant errors in our previous response(s)	<Not Applicable>

### C5.1c

#### (C5.1c) Have your organization's base year emissions been recalculated as result of the changes or errors reported in C5.1a and C5.1b?

	Base year recalculation	Base year emissions recalculation policy, including significance threshold
Row 1	Yes	Vale considers as a significant threshold a cumulative change of 5% in the total emission (Scope 1 +2) of the base year. We have adopted Brazil's GHG Protocol Programme policy. However, as we found important errors and divested from the New Caledonia operations, the historical tracking of emissions for KPI was compromised. Also, the independent audit requested the inclusion of historical emissions for the Nacala Corridor, acquired in 2021. Then, we decided to recalculate Vale's emissions in 2017 (base year). Calculation of %variation in scope 1 and 2 emissions for recalculation: [(difference in emissions due to errors + acquisition + divestments) / Scope 1 + 2 in 2017 before recalculation] *100 = [(-101,429 - 649,171 + 172,985) / 14,084,013] *100 = (-577,615 / 14,084,013) *100 = -4%.

### C5.2

#### (C5.2) Provide your base year and base year emissions.

## Scope 1

### Base year start

January 1 2017

### Base year end

December 31 2017

### Base year emissions (metric tons CO2e)

12141726.55

### Comment

The 2017 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

## Scope 2 (location-based)

### Base year start

January 1 2017

### Base year end

December 31 2017

### Base year emissions (metric tons CO2e)

1364671.17

### Comment

The 2017 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

## Scope 2 (market-based)

### Base year start

January 1 2017

### Base year end

December 31 2017

### Base year emissions (metric tons CO2e)

1364671.17

### Comment

In 2017, the low carbon energy generated and consumed by Vale, purchased by PPAs, was not tracked by energy attribute certificates. Then, the scope 2 market-based in 2017 (base year) is considered equal to scope 2 location-based.

## Scope 3 category 1: Purchased goods and services

### Base year start

January 1 2018

### Base year end

December 31 2018

### Base year emissions (metric tons CO2e)

2158753.61

### Comment

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

## Scope 3 category 2: Capital goods

### Base year start

January 1 2018

### Base year end

December 31 2018

### Base year emissions (metric tons CO2e)

19520.11

### Comment

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

## Scope 3 category 3: Fuel-and-energy-related activities (not included in Scope 1 or 2)

### Base year start

January 1 2018

### Base year end

December 31 2018

### Base year emissions (metric tons CO2e)

1683055.25

### Comment

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 4: Upstream transportation and distribution**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

13944171.31

**Comment**

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 5: Waste generated in operations**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 6: Business travel**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

6573.27

**Comment**

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 7: Employee commuting**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

45280.87

**Comment**

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 8: Upstream leased assets**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 9: Downstream transportation and distribution**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

5057520.59

**Comment**

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 10: Processing of sold products**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

549037665.51

**Comment**

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 11: Use of sold products**

**Base year start**

January 1 2018

**Base year end**

December 31 2018

**Base year emissions (metric tons CO2e)**

13223766.83

**Comment**

The 2018 emissions result is certified by a third party and may be impacted by recalculations due to significant changes in boundaries, methodologies, and data input errors, according to the GHG Protocol standard.

**Scope 3 category 12: End of life treatment of sold products**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 13: Downstream leased assets**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 14: Franchises**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3 category 15: Investments**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3: Other (upstream)**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**Scope 3: Other (downstream)**

**Base year start**

**Base year end**

**Base year emissions (metric tons CO2e)**

**Comment**

**C5.3**

**(C5.3) Select the name of the standard, protocol, or methodology you have used to collect activity data and calculate emissions.**

Brazil GHG Protocol Programme

Defra Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance, 2019

Environment Canada, Base Metals Smelting/Refining, Guidance Manual for Estimating Greenhouse Gas Emissions

IPCC Guidelines for National Greenhouse Gas Inventories, 2006

ISO 14064-1

The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition)

The Greenhouse Gas Protocol Agricultural Guidance: Interpreting the Corporate Accounting and Reporting Standard for the Agricultural Sector

The Greenhouse Gas Protocol: Scope 2 Guidance

Other, please specify (NIR (National Inventory Report) GHG Sources & Sinks Canada)

**C6. Emissions data**



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## C6.1

### (C6.1) What were your organization's gross global Scope 1 emissions in metric tons CO2e?

#### Reporting year

##### Gross global Scope 1 emissions (metric tons CO2e)

9834242.74

##### Start date

<Not Applicable>

##### End date

<Not Applicable>

##### Comment

Vale's Scope 1 emissions are calculated using the methodology recommended by: - 2006 and 2019 Refinement IPCC Guidelines for National Greenhouse Gas Inventories - The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) - Brazil GHG Protocol Programme - ISO 14064-1 - Environment Canada, Base Metals Smelting/Refining, Guidance Manual for Estimating Greenhouse Gas Emissions - NIR GHG Sources & Sinks Canada - Defra Voluntary Reporting Guidelines

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## C6.2

### (C6.2) Describe your organization's approach to reporting Scope 2 emissions.

#### Row 1

##### Scope 2, location-based

We are reporting a Scope 2, location-based figure

##### Scope 2, market-based

We are reporting a Scope 2, market-based figure

##### Comment

Scope 2 emissions in 2021, accounted for by the Market Based methodology, totaled 0.37 million tCO2e. These emissions, unlike the accounting by the Location methodology, presented above, consider Vale's energy acquisition contracts as well as concession contracts for its own assets, attesting their renewable origin through certificates or declarations from generators. In 2021, from the total energy contracted and consumed via GRID, by Vale's operations in Brazil, Vale deducted a total of 6.7 TWh, from renewable sources.

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## C6.3

### (C6.3) What were your organization's gross global Scope 2 emissions in metric tons CO2e?

#### Reporting year

##### Scope 2, location-based

1217981.9

##### Scope 2, market-based (if applicable)

371132.37

##### Start date

<Not Applicable>

##### End date

<Not Applicable>

##### Comment

Vale Scope 2 emissions are calculated using the methodology recommended by: - The Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard (Revised Edition) - Brazil GHG Protocol Programme - ISO 14064-1 - NIR GHG Sources & Sinks Canada - Defra Voluntary Reporting Guidelines

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## C6.4

### (C6.4) Are there any sources (e.g. facilities, specific GHGs, activities, geographies, etc.) of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure?

Yes

---

## C6.4a

**(C6.4a) Provide details of the sources of Scope 1 and Scope 2 emissions that are within your selected reporting boundary which are not included in your disclosure.**

**Source**

Solid Waste and Wastewater treatment

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

Emissions are not relevant

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

Emissions are not relevant

**Explain why this source is excluded**

Vale has assessed the materiality of these emission sources in 2009 and again in 2022, regarding the 2021 calendar year, and the calculations demonstrated that the emissions from Solid Waste and Wastewater treatment remain not material, representing 0.25% of Scope 1 and 2 emissions in 2021 and 0.03% of Vale's total emissions (Scope 1, 2 and 3). Then, we will not include these emission sources as they are irrelevant to Vale's inventory and to the mining sector.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Calculation: "Estimated emissions from Waste and Wastewater treatment" / ("Scope 1 and 2 emissions" + "Estimated emissions from excludes sources") = 25,374 / (10,205,375 + 25,953) = 0.25 %

---

**Source**

Fire Extinguisher Fugitive Emissions

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

No emissions from this source

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

No emissions from this source

**Explain why this source is excluded**

Fugitive GHG emissions from fire extinguishers were estimated in 2017 and excluded from Vale's GHG Inventory as they are irrelevant to Vale's mining sector and activities.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Calculation: "Estimated emissions from fire extinguishers" / ("Scope 1 and 2 emissions" + "Estimated emissions from fire extinguishers") = 52 / (10,205,375 + 25,953) = 0.0005 %

---

**Source**

Emissions from combustion of acetylene

**Relevance of Scope 1 emissions from this source**

Emissions are not relevant

**Relevance of location-based Scope 2 emissions from this source**

No emissions from this source

**Relevance of market-based Scope 2 emissions from this source (if applicable)**

No emissions from this source

**Explain why this source is excluded**

GHG combustion emissions from the use of acetylene were estimated in 2017 and excluded from Vale's GHG Inventory as they are irrelevant to Vale's mining sector and activities.

**Estimated percentage of total Scope 1+2 emissions this excluded source represents**

0

**Explain how you estimated the percentage of emissions this excluded source represents**

Calculation: "Estimated emissions from acetylene use" / ("Scope 1 and 2 emissions" + "Estimated emissions from acetylene use") = 527 / (10,205,375 + 25,953) = 0.01 %

---

**C6.5**

**(C6.5) Account for your organization's gross global Scope 3 emissions, disclosing and explaining any exclusions.**

## Purchased goods and services

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

1673982.62

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

n.a.

## Capital goods

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO2e)

14751.73

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This emissions category is considered not relevant or not material due to its representativeness in relation to the total of Scope 3 emissions. It represented 0.003% of Vale's Scope 3 in 2021. As a mining and metallurgical company, downstream emissions are more relevant for Vale than upstream emissions categories, as the products sold are processed or used by other companies in the manufacture of final products. And due to the high volumes of commodities (products sold), the categories associated with transport and distribution, especially maritime transport, are also relevant.

## Fuel-and-energy-related activities (not included in Scope 1 or 2)

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

1596664.3

### Emissions calculation methodology

Average data method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

n.a.

## Upstream transportation and distribution

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

11767848.56

### Emissions calculation methodology

Fuel-based method  
Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

n.a.

## Waste generated in operations

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

Vale has assessed the materiality of these emission sources in 2009 and again in 2022, regarding 2021 calendar year, and the calculations demonstrated that the emissions from Solid Waste and Wastewater treatment remains not material, representing 0.03% of Vale's Scope 3 emissions in 2021. Then, we will not include these emission sources as they are irrelevant to Vale's inventory and to the mining sector.

## Business travel

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO2e)

6709.55

### Emissions calculation methodology

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This emissions category is considered not relevant or not material due to its representativeness in relation to the total of Scope 3 emissions. It represented 0.001% of Vale's Scope 3 in 2020. As a mining and metallurgical company, downstream emissions are more relevant for Vale than upstream emissions categories, as the products sold are processed or used by other companies in the manufacture of final products. And due to the high volumes of commodities (products sold), the categories associated with transport and distribution, especially maritime transport, are also relevant.

## Employee commuting

### Evaluation status

Not relevant, calculated

### Emissions in reporting year (metric tons CO2e)

47610.59

### Emissions calculation methodology

Fuel-based method

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

0

### Please explain

This emissions category is considered not relevant or not material due to its representativeness in relation to the total of Scope 3 emissions. It represented 0.01% of Vale's Scope 3 in 2020. As a mining and metallurgical company, downstream emissions are more relevant for Vale than upstream emissions categories, as the products sold are processed or used by other companies in the manufacture of final products. And due to the high volumes of commodities (products sold), the categories associated with transport and distribution, especially maritime transport, are also relevant.

## Upstream leased assets

### Evaluation status

Not relevant, explanation provided

### Emissions in reporting year (metric tons CO2e)

<Not Applicable>

### Emissions calculation methodology

<Not Applicable>

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

<Not Applicable>

### Please explain

This category may cause double counting at Vale's scope 1 emission due to the type of contract Vale has with the leased assets, because where Vale has operational control all the GHG emissions are accounted.

## Downstream transportation and distribution

### Evaluation status

Relevant, calculated

### Emissions in reporting year (metric tons CO2e)

2398639

### Emissions calculation methodology

Fuel-based method

Distance-based method

### Percentage of emissions calculated using data obtained from suppliers or value chain partners

100

### Please explain

n.a.

#### Processing of sold products

**Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO2e)**

466404683.82

**Emissions calculation methodology**

Average data method

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

n.a.

#### Use of sold products

**Evaluation status**

Relevant, calculated

**Emissions in reporting year (metric tons CO2e)**

11158956.62

**Emissions calculation methodology**

Methodology for direct use phase emissions, please specify (Quantity of sold product (coal) multiplied by the coal emissions factors for stationary combustion)

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

0

**Please explain**

n.a.

#### End of life treatment of sold products

**Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Not applicable. Vale's products can have numerous different uses and also be recycled. It is not possible to estimate or assume a hypothetical destination for Vale's products to estimate the end life GHG emissions.

#### Downstream leased assets

**Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Not applicable. Vale does not have any leased assets to account for. Therefore this category is not relevant.

#### Franchises

**Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

Not applicable. Vale does not operate any franchises. Therefore this category is not relevant.

**Investments**

**Evaluation status**

Not relevant, explanation provided

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

In 2021, Vale estimated the emissions (scopes 1 + 2) associated with its investments, considering Vale's share (equity share). These emissions would represent less than 1% of Scope 3 in 2021 and therefore were considered non-material for the full Scope 3 accounting.

**Other (upstream)**

**Evaluation status**

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

**Other (downstream)**

**Evaluation status**

**Emissions in reporting year (metric tons CO2e)**

<Not Applicable>

**Emissions calculation methodology**

<Not Applicable>

**Percentage of emissions calculated using data obtained from suppliers or value chain partners**

<Not Applicable>

**Please explain**

C6.7

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**(C6.7) Are carbon dioxide emissions from biogenic carbon relevant to your organization?**

Yes

C6.7a

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**(C6.7a) Provide the emissions from biogenic carbon relevant to your organization in metric tons CO2.**

	CO2 emissions from biogenic carbon (metric tons CO2)	Comment
Row 1	335198.46	Despite an increase in production, the biogenic emissions in 2021 were ~31% lower than in 2020 due to the reduction in the total area of vegetation cover removed (land-use change)

C6.10

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**(C6.10) Describe your gross global combined Scope 1 and 2 emissions for the reporting year in metric tons CO2e per unit currency total revenue and provide any additional intensity metrics that are appropriate to your business operations.**

**Intensity figure**

0.000184

**Metric numerator (Gross global combined Scope 1 and 2 emissions, metric tons CO2e)**

10205375

**Metric denominator**

unit total revenue

**Metric denominator: Unit total**

55585000000

**Scope 2 figure used**

Market-based

**% change from previous year**

26.5

**Direction of change**

Decreased

**Reason for change**

This indicator has decreased by ~ 27% mainly due to a relevant increase in Vale's net operating revenue by 39% in 2021 compared to 2020. Vale recorded pro-forma adjusted from continuing operations EBITDA of USD 31.3 billion, USD 13.8 billion higher than the previous year, due to higher iron ore and pellet sales volumes and the prices charged, which also contributed to a USD 15.0 billion increase in net operating revenues from continuing operations, which totaled USD 54.5 billion in 2021. In addition, higher production volumes led to a slight increase in GHG emissions (2%), due to the resumption of Iron Ore and Pellet production volumes and, more significantly, Coal, despite the reduction in Nickel and Copper production, mainly as a result of the strike in Sudbury. Due to this slight volume recovery and maintenance of the consumption level, the global energy intensity was 0.349 TJ/thousand tons of Iron Ore equivalent, a 1% reduction from that verified in 2020. This decrease is also related to our scope 1 and 2 emission reduction initiatives implemented in 2021 that contributed to a reduction of approximately 78 thousand tCO2e and are mainly related to energy efficiency initiatives. , Vale's Energy Efficiency program and the official system to report sustainability initiatives, CR360 system contributed with 29 initiatives mapped, considering implemented + implemented commenced initiatives. In the 4.3b question, we distribute the implemented initiatives in 6 different categories.

**C7. Emissions breakdowns**

**C7.1**

**(C7.1) Does your organization break down its Scope 1 emissions by greenhouse gas type?**

Yes

**C7.1a**

**(C7.1a) Break down your total gross global Scope 1 emissions by greenhouse gas type and provide the source of each used greenhouse warming potential (GWP).**

Greenhouse gas	Scope 1 emissions (metric tons of CO2e)	GWP Reference
CO2	8856957.25	IPCC Fifth Assessment Report (AR5 – 100 year)
CH4	587052.51	IPCC Fifth Assessment Report (AR5 – 100 year)
N2O	351832.53	IPCC Fifth Assessment Report (AR5 – 100 year)
HFCs	35646.95	IPCC Fifth Assessment Report (AR5 – 100 year)
SF6	2753.5	IPCC Fifth Assessment Report (AR5 – 100 year)

**C7.2**

**(C7.2) Break down your total gross global Scope 1 emissions by country/region.**

Country/Region	Scope 1 emissions (metric tons CO2e)
Brazil	5573672.17
Canada	452305.24
China	0
Indonesia	1968544.26
Japan	6585.99
Malaysia	7978.71
Mozambique	1075204.16
Oman	684901.95
Paraguay	21103.63
United Kingdom of Great Britain and Northern Ireland	43622.37
Other, please specify (International (Air space and waters))	324.25

**C7.3**

**(C7.3) Indicate which gross global Scope 1 emissions breakdowns you are able to provide.**

- By business division
- By facility

**C7.3a**

**(C7.3a) Break down your total gross global Scope 1 emissions by business division.**

Business division	Scope 1 emissions (metric ton CO2e)
Ferrous minerals: Iron ore and iron ore pellets, Ferroalloys and manganese	4378044.1
Base Metals: Nickel, Copper and other products	3152733.46
Logistics Infrastructure: Railways and Ports	1320682.73
Coal	951753.52
Others (Aviation, Corporate, Energy - Biopalma, Mineral Research and "Reparação Brumadinho")	31028.93

**C7.3b**



**(C7.3b) Break down your total gross global Scope 1 emissions by business facility.**

Facility	Scope 1 emissions (metric tons CO2e)	Latitude	Longitude
Corporative Brazil	89945.27	-22.910169	-43.173635
Corumbá Complex	19928.54	-19.187434	-57.607705
Itabira Complex	312076.23	-19.593315	-43.221606
Mariana Complex	103399.42	-20.20212	-43.445293
Vargem Grande Complex	415294.25	-20.236804	-43.864175
Paraopeba Complex	90844.7	-20.41899	-43.876104
Ferrosos Norte	567324.52	-6.059807	-50.167448
Serra Sul - S11D	114297.89	-6.411224	-50.341333
Ponta da Madeira Complex	416725.82	-2.574198	-44.342135
Tubarão Complex	1428976.11	-20.262567	-40.244273
Oman Operations	684901.95	24.511622	56.598384
Onça Puma	414808.11	-6.542229	-51.114634
PT Vale Indonesia	1968544.26	-2.568121	121.389641
Port Colborne Refinery	11291.19	42.879598	-79.237737
Sudbury Complex	257076.45	46.480663	-81.045879
Thompson Complex	14969.9	55.71292	-97.836879
Long Harbour Operations	35957.69	47.418623	-53.792404
Voisey's Bay Complex	83744.71	56.334705	-62.072704
Clydach Refinery	43622.37	51.693711	-3.889591
Matsuzaka Refinery	6585.99	34.604467	136.549806
Vale Nouvelle-Calédonie Operations	0	-22.307823	166.927244
Dalian Refinery	0	39.026029	121.812161
Salobo	169716.05	-5.794425	-50.531521
Sossego	97151.43	-6.433417	-50.069884
Moatize Complex	1075204.16	-16.166062	33.807821
Carajás Railway (EFC)	852368.28	-2.56835	-44.346151
Vitória to Minas Railway (EFVM)	299091.14	-20.27682	-40.246181
Transbarga Navegacion (TBN)	21103.63	-25.278819	-57.637724
Barbacena's Ferroalloy Plant	69853.61	-21.202882	-43.816482
Ouro Preto's Ferroalloy Plant	36545.86	-20.418724	-43.552753
Simões Filho's Ferroalloy Plant	233.4	-12.787931	-38.412447
Malaysia Distribution Center (Teluk Rubiah)	7978.71	4.170708	100.619682
Ilha de Gualaíba's Terminal (TIG)	5541.51	-23.004488	-44.032523
Itaguaí's Terminal (CPBS)	712.75	-22.910695	-43.819408
New Steel	176.75	-22.615068	-43.309027
Água Limpa e Brucutu Complex	118250.08	-19.86914	-43.39307

**C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4**

**(C-CE7.4/C-CH7.4/C-CO7.4/C-EU7.4/C-MM7.4/C-OG7.4/C-ST7.4/C-TO7.4/C-TS7.4) Break down your organization's total gross global Scope 1 emissions by sector production activity in metric tons CO2e.**

	Gross Scope 1 emissions, metric tons CO2e	Net Scope 1 emissions, metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Electric utility activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	9834242.74	<Not Applicable>	This includes all emissions from Energy Dept, Mineral Research activities, corporate (offices and Brumadinho reparation activities), logistics business operations (EFC and EFVM railways and Ports), coal business mining operations and Projects.
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (midstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

**C7.5**

**(C7.5) Break down your total gross global Scope 2 emissions by country/region.**

Country/Region	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Brazil	878692.13	31842.59
Canada	42834.88	42834.88
China	299.21	299.21
Indonesia	2530.49	2530.49
Japan	6579.31	6579.31
Malaysia	47040.25	47040.25
Mozambique	24192.65	24192.65
Oman	207382.13	207382.13
Paraguay	0	0
United Kingdom of Great Britain and Northern Ireland	8430.85	8430.85

**C7.6**

**(C7.6) Indicate which gross global Scope 2 emissions breakdowns you are able to provide.**

By business division

By facility

**C7.6a**

**(C7.6a) Break down your total gross global Scope 2 emissions by business division.**

Business division	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Ferrous minerals: Iron ore and iron ore pellets, Ferroalloys and manganese	789201.21	236019.72
Base Metals: Nickel, Copper and other products	285131.49	60674.74
Logistics Infrastructure: Railways and Ports	119063.49	50627.75
Coal	23367.89	23367.89
Others (Aviation, Corporate, Energy - Biopalma, Mineral Research and "Reparação Brumadinho")	1317.82	542.26

**C7.6b**

**(C7.6b) Break down your total gross global Scope 2 emissions by business facility.**

Facility	Scope 2, location-based (metric tons CO2e)	Scope 2, market-based (metric tons CO2e)
Corporative Brazil	1317.82	542.26
Corumbá Complex	1766.23	1185.43
Itabira Complex	153225.31	0
Mariana Complex	19244.26	0
Vargem Grande Complex	71626.52	0
Paraopeba Complex	24521.62	0
Ferrosos Norte	62463.09	0
Serra Sul - S11D	35214.09	0
Ponta da Madeira Complex	62290.23	44.09
Tubarão Complex	136037.81	0
Oman Operations	207382.13	207382.13
Onça Puma	78123.47	0
PT Vale Indonesia	2530.49	2530.49
Port Colborne Refinery	716.18	716.18
Sudbury Complex	32776.8	32776.8
Thompson Complex	297.99	297.99
Long Harbour Operations	9043.91	9043.91
Voisey's Bay Complex	0	0
Clydach Refinery	8430.85	8430.85
Matsuzaka Refinery	6759.31	6759.31
Vale Nouvelle-Calédonie Operations	0	0
Dalian Refinery	299.21	299.21
Salobo	105159.57	0
Sossego	41173.71	0
Moatize Complex	24192.65	24192.65
Carajás Railway (EFC)	1170.18	785.38
Vitória to Minas Railway (EFVM)	2581.55	1732.65
Transbarga Navegacion (TBN)	0	0
Barbacena's Ferroalloy Plant	29085.56	19521.21
Ouro Preto's Ferroalloy Plant	11432.2	7672.9
Simões Filho's Ferroalloy Plant	500.51	335.92
Malaysia Distribution Center (Teluk Rubiah)	47040.25	47040.25
Ilha de Gualaíba's Terminal (TIG)	3969.39	0
Itaguaí's Terminal (CPBS)	2681.39	0
New Steel	33.89	22.74
Água Limpa e Brucutu Complex	35073.74	0

**C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7**

**(C-CE7.7/C-CH7.7/C-CO7.7/C-MM7.7/C-OG7.7/C-ST7.7/C-TO7.7/C-TS7.7) Break down your organization's total gross global Scope 2 emissions by sector production activity in metric tons CO2e.**

	Scope 2, location-based, metric tons CO2e	Scope 2, market-based (if applicable), metric tons CO2e	Comment
Cement production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Chemicals production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Coal production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Metals and mining production activities	1217981.9	371132.37	This includes all emissions from Energy Dept, Mineral Research activities, corporate (offices and Brumadinho reparation activities), logistics business operations (EFC and EFVM railways and Ports), coal business mining operations and Projects.
Oil and gas production activities (upstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (midstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Oil and gas production activities (downstream)	<Not Applicable>	<Not Applicable>	<Not Applicable>
Steel production activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport OEM activities	<Not Applicable>	<Not Applicable>	<Not Applicable>
Transport services activities	<Not Applicable>	<Not Applicable>	<Not Applicable>

**C7.9**

**(C7.9) How do your gross global emissions (Scope 1 and 2 combined) for the reporting year compare to those of the previous reporting year?**

Increased

**C7.9a****(C7.9a) Identify the reasons for any change in your gross global emissions (Scope 1 and 2 combined), and for each of them specify how your emissions compare to the previous year.**

	Change in emissions (metric tons CO2e)	Direction of change	Emissions value (percentage)	Please explain calculation
Change in renewable energy consumption	17978	Decreased	0.18	The decrease in emissions was due to the increase in the volume of energy certificates used to abate Vale's scope 2 emissions in 2021 compared to 2020. Then, emissions decreased by -0.18% in FY2021 compared to FY2020. Calculation: $(-17,978 / 10,000,936) * 100 = -0.18\%$ . In 2021, Vale's energy consumption (6,951,678 MWh) was 96.4% supported by renewable energy certificates in Brazil. However, in 2020 this number was lower (94.3%). Then, the calculations is based on these differences in the %share in renewable energy certificates between 2021 and 2020: $(6,951,678 \text{ MWh} * (94.3\% - 96.4\%) * 0.1264 \text{ tCO}_2\text{e/MWh}) = -17,978 \text{ tCO}_2\text{e}$ .
Other emissions reduction activities	78016	Decreased	0.78	Other emission reduction initiatives as reported in question C4.3b contributed to -0.78% of the change. Calculation: $(-78,016 / 10,000,936) * 100 = -0.78\%$
Divestment	0	No change	0	No change in emissions
Acquisitions	0	No change	0	No change in emissions
Mergers	0	No change	0	No change in emissions
Change in output	304082	Increased	3.04	An increase in emissions due to an increase in output (production volumes) contributed to 3.04% of the change in emissions from FY2020 to FY2021. Calculation: $(304,082 / 10,000,936) * 100 = 3.04\%$ . Where the emissions increased 304,082 tCO2e, are calculated based on the emissions intensity for FY2021 (24.4 kgCO2eq / tMFe-eq) and the difference in production volumes between FY2021 and FY2020 (418,5-406,0 = 12.5 Million tons MFe-eq). Calculation: $(24,4/1000 * 12,5) = 304,082 \text{ tCO}_2\text{e}$ . The production and sales highlights in 2021 were: (a) the volume increase in Iron Ore production (5% p.a.) and sales (9% p.a.) driven by higher production at our Minas Gerais operations (17% p.a.), partially offset by weaker performance at S11D (-11% p.a.); (b) a favorable market price scenario (46% p.a.); (c) the strike in Sudbury, interrupting our operations for 70 days and contributing to a 9% reduction in Nickel production and an 18% reduction in Copper production; and (d) the stronger performance of Coal production in Moatize (45% p.a.), along with the signing of a binding agreement to sell the asset. Note: The Iron Ore indicator (MFe-eq) represents the sum of production volumes of Vale's main products, such as Pellets, Coal, Nickel and Copper, which are converted into tons of Iron Ore equivalent by using an equivalence based on the commodities average price over the years.
Change in methodology	15735	Decreased	0.16	The decrease in emissions from FY2020 to FY2021 due to a "Change in methodology" is related to a change in emissions factors (EF), mainly due to Scope 2 EF, and a change in GWP from AR4 to AR5. Calculation: $(-15,735 / 10,000,936) * 100 = -0.16\%$
Change in boundary	0	No change	0	No change in emissions
Change in physical operating conditions	0	No change	0	No change in emissions
Unidentified	0	No change	0	No change in emissions
Other	12086	Increased	0.12	The increase in emissions is related to differences in efficiency in operations, and changes in production methods and procedures, which contributed to and a slight increase of 0.12% from FY2020 to FY2021. Calculation: $(12,086 / 10,000,936) * 100 = 0.12\%$ .

**C7.9b****(C7.9b) Are your emissions performance calculations in C7.9 and C7.9a based on a location-based Scope 2 emissions figure or a market-based Scope 2 emissions figure?**

Market-based

**C8. Energy****C8.1****(C8.1) What percentage of your total operational spend in the reporting year was on energy?**

More than 5% but less than or equal to 10%

**C8.2**

**(C8.2) Select which energy-related activities your organization has undertaken.**

	Indicate whether your organization undertook this energy-related activity in the reporting year
Consumption of fuel (excluding feedstocks)	Yes
Consumption of purchased or acquired electricity	Yes
Consumption of purchased or acquired heat	No
Consumption of purchased or acquired steam	No
Consumption of purchased or acquired cooling	No
Generation of electricity, heat, steam, or cooling	Yes

**C8.2a**

**(C8.2a) Report your organization's energy consumption totals (excluding feedstocks) in MWh.**

	Heating value	MWh from renewable sources	MWh from non-renewable sources	Total (renewable and non-renewable) MWh
Consumption of fuel (excluding feedstock)	LHV (lower heating value)	1743313.89	26856103.7	28599417.59
Consumption of purchased or acquired electricity	<Not Applicable>	8277280.05	1281109.05	9558389.1
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	2451713.77	<Not Applicable>	2451713.77
Total energy consumption	<Not Applicable>	12472307.71	28137212.75	40609520.46

**C-MM8.2a**

**(C-MM8.2a) Report your organization's energy consumption totals (excluding feedstocks) for metals and mining production activities in MWh.**

	Heating value	Total MWh
Consumption of fuel (excluding feedstocks)	LHV (lower heating value)	22338751.6
Consumption of purchased or acquired electricity	<Not Applicable>	8630980.45
Consumption of purchased or acquired heat	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired steam	<Not Applicable>	<Not Applicable>
Consumption of purchased or acquired cooling	<Not Applicable>	<Not Applicable>
Consumption of self-generated non-fuel renewable energy	<Not Applicable>	2451713.77
Total energy consumption	<Not Applicable>	33421445.82

**C8.2b**

**(C8.2b) Select the applications of your organization's consumption of fuel.**

	Indicate whether your organization undertakes this fuel application
Consumption of fuel for the generation of electricity	Yes
Consumption of fuel for the generation of heat	Yes
Consumption of fuel for the generation of steam	Yes
Consumption of fuel for the generation of cooling	No
Consumption of fuel for co-generation or tri-generation	No

**C8.2c**

**(C8.2c) State how much fuel in MWh your organization has consumed (excluding feedstocks) by fuel type.**

**Sustainable biomass**

**Heating value**

Unable to confirm heating value

**Total fuel MWh consumed by the organization**

0

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

0

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

n.a.

**Other biomass**

**Heating value**

LHV

**Total fuel MWh consumed by the organization**

12.44

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

12.44

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

Charcoal

**Other renewable fuels (e.g. renewable hydrogen)**

**Heating value**

LHV

**Total fuel MWh consumed by the organization**

1743301.45

**MWh fuel consumed for self-generation of electricity**

4394.24

**MWh fuel consumed for self-generation of heat**

1737533.12

**MWh fuel consumed for self-generation of steam**

1374.1

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

Biodiesel Biogasoline

**Coal****Heating value**

LHV

**Total fuel MWh consumed by the organization**

6008643.65

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

6008643.65

**MWh fuel consumed for self-generation of steam**

0

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self- cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Comment**

Anthracite Coal Bituminous Coal Coal Lignite Coal Subbituminous Coal

**Oil****Heating value**

LHV

**Total fuel MWh consumed by the organization**

2898258.2

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

2893164.14

**MWh fuel consumed for self-generation of steam**

5094.06

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self- cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Comment**

Light Distillate Other, please specify: Residual Fuel Oil - Óleo Combustível Brasil Residual Fuel Oil

**Gas****Heating value**

LHV

**Total fuel MWh consumed by the organization**

5545912.42

**MWh fuel consumed for self-generation of electricity**

0

**MWh fuel consumed for self-generation of heat**

5508998.86

**MWh fuel consumed for self-generation of steam**

36913.56

**MWh fuel consumed for self-generation of cooling**

&lt;Not Applicable&gt;

**MWh fuel consumed for self- cogeneration or self-trigeneration**

&lt;Not Applicable&gt;

**Comment**

Liquefied Petroleum Gas (LPG) Natural Gas Propane Gas

**Other non-renewable fuels (e.g. non-renewable hydrogen)**

**Heating value**

LHV

**Total fuel MWh consumed by the organization**

12399674.97

**MWh fuel consumed for self-generation of electricity**

305001.99

**MWh fuel consumed for self-generation of heat**

11982018.75

**MWh fuel consumed for self-generation of steam**

112654.23

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

Diesel Jet Kerosene Kerosene Motor Gasoline Other, please specify: Coke and Petroleum Coke Marine Fuel

**Total fuel**

**Heating value**

LHV

**Total fuel MWh consumed by the organization**

28595803.13

**MWh fuel consumed for self-generation of electricity**

309396.23

**MWh fuel consumed for self-generation of heat**

28130370.96

**MWh fuel consumed for self-generation of steam**

156035.95

**MWh fuel consumed for self-generation of cooling**

<Not Applicable>

**MWh fuel consumed for self- cogeneration or self-trigeneration**

<Not Applicable>

**Comment**

n.a

**C8.2d**

**(C8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed in the reporting year.**

	Total Gross generation (MWh)	Generation that is consumed by the organization (MWh)	Gross generation from renewable sources (MWh)	Generation from renewable sources that is consumed by the organization (MWh)
Electricity	2558717.75	2558717.75	2451713.77	2451713.77
Heat	28133153.33	28133153.33	1737545.56	1737545.56
Steam	156035.94	156035.94	1374.1	1374.1
Cooling	0	0	0	0

**C-MM8.2d**

**(C-MM8.2d) Provide details on the electricity, heat, steam, and cooling your organization has generated and consumed for metals and mining production activities.**

	Total gross generation (MWh) inside metals and mining sector boundary	Generation that is consumed (MWh) inside metals and mining sector boundary
Electricity	2558717.75	2558717.75
Heat	22159734.39	22159734.39
Steam	156035.94	156035.94
Cooling	0	0

**C8.2e**

**(C8.2e) Provide details on the electricity, heat, steam, and/or cooling amounts that were accounted for at a zero or near-zero emission factor in the market-based Scope 2 figure reported in C6.3.**



**Sourcing method**

Direct procurement from an off-site grid- connected generator e.g. Power purchase agreement (PPA)

**Energy carrier**

Electricity

**Low-carbon technology type**

Large hydropower (>25 MW)

**Country/area of low-carbon energy consumption**

Brazil

**Tracking instrument used**

Contract

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

3793201

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Brazil

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)****Comment**

Consumption from Hydro Power Plants (>25MW) totalizing 9 assets.

---

**Sourcing method**

Direct procurement from an off-site grid- connected generator e.g. Power purchase agreement (PPA)

**Energy carrier**

Electricity

**Low-carbon technology type**

Small hydropower (<25 MW)

**Country/area of low-carbon energy consumption**

Brazil

**Tracking instrument used**

Contract

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

62433

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Brazil

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)****Comment**

Two Small Hydro powerplants (Mello and Gloria) are owned 100% by Vale.

---

**Sourcing method**

Direct procurement from an off-site grid- connected generator e.g. Power purchase agreement (PPA)

**Energy carrier**

Electricity

**Low-carbon technology type**

Wind

**Country/area of low-carbon energy consumption**

Brazil

**Tracking instrument used**

Contract

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

199125

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Brazil

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)****Comment**

Four Wind Power Plants (São Raimundo, Garrote, Santo Inácio III and IV)

---

**Sourcing method**

Unbundled energy attribute certificates (EACs) purchase

**Energy carrier**

Electricity

**Low-carbon technology type**

Large hydropower (>25 MW)

**Country/area of low-carbon energy consumption**

Brazil

---

**Tracking instrument used**

I-REC

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

2150000

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Brazil

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)**

**Comment**

Consumption from Hydro Power Plants (>25MW) totalizing 3 different sources.

---

**Sourcing method**

Unbundled energy attribute certificates (EACs) purchase

**Energy carrier**

Electricity

**Low-carbon technology type**

Wind

**Country/area of low-carbon energy consumption**

Brazil

**Tracking instrument used**

I-REC

**Low-carbon energy consumed via selected sourcing method in the reporting year (MWh)**

495000

**Country/area of origin (generation) of the low-carbon energy or energy attribute**

Brazil

**Commissioning year of the energy generation facility (e.g. date of first commercial operation or repowering)**

**Comment**

Consumption from Wind Power Plants from CPFL.

---

**C8.2g**

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**(C8.2g) Provide a breakdown of your non-fuel energy consumption by country.**

**Country/area**

Brazil

**Consumption of electricity (MWh)**

6969220.97

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

6969220.97

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

Canada

**Consumption of electricity (MWh)**

1823642.25

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

1823642.25

**Is this consumption excluded from your RE100 commitment?**

<Not Applicable>

---

**Country/area**

China

**Consumption of electricity (MWh)**

447.74

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

447.74

---

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

---

**Country/area**

Indonesia

**Consumption of electricity (MWh)**

2292684.67

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

2292684.67

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

---

**Country/area**

Japan

**Consumption of electricity (MWh)**

13464

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

13464

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

---

**Country/area**

Malaysia

**Consumption of electricity (MWh)**

70773.49

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

70773.49

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

---

**Country/area**

Mozambique

**Consumption of electricity (MWh)**

283612.28

**Consumption of heat, steam, and cooling (MWh)**

0

**Total non-fuel energy consumption (MWh) [Auto-calculated]**

283612.28

Is this consumption excluded from your RE100 commitment?

<Not Applicable>

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## C9. Additional metrics

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### C9.1

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**(C9.1) Provide any additional climate-related metrics relevant to your business.**

**Description**

Energy usage

**Metric value**

0.3

**Metric numerator**

12,472,307.71

**Metric denominator (intensity metric only)**

40,609,520.46

**% change from previous year**

1.8

**Direction of change**

Increased

**Please explain**

The indicator is related to the renewable energy usage at Vale. Formula =  $RE/(RE + NR)$ , where RE: renewable energy and NR: non-renewable energy consumed.

Explanation: The increase in the share of renewables in 2021 when compared to 2020, is justified by the increase in renewable electricity consumption.

---

C-MM9.3a

---

**(C-MM9.3a) Provide details on the commodities relevant to the mining production activities of your organization.**

**Output product**

Copper

**Capacity, metric tons**

290000

**Production, metric tons**

226400

**Production, copper-equivalent units (metric tons)**

226400

**Scope 1 emissions**

266867.48

**Scope 2 emissions**

0

**Scope 2 emissions approach**

Market-based

**Pricing methodology for copper-equivalent figure**

The copper conversion factor for the calculation of the copper-equivalent figure: Copper average price divided by copper average price for the period of 2019 to 2021 = 1.000

**Comment**

It includes the GHG emissions from Brazilian copper operations (Salobo and Sossego), comprising mine and processing plants to produce copper concentrate.

---

**Output product**

Iron ore

**Capacity, metric tons**

477255745

**Production, metric tons**

315610000

**Production, copper-equivalent units (metric tons)**

5696793.38

**Scope 1 emissions**

4258577

**Scope 2 emissions**

208049.45

**Scope 2 emissions approach**

Market-based

**Pricing methodology for copper-equivalent figure**

Iron ore conversion factor for the calculation of the copper-equivalent figure: Iron ore and pellets average price divided by copper average price for the period of 2019 to 2021 = 0.0181

**Comment**

It includes the GHG emissions from iron ore mines in Brazil, which we refer to as the Northern, Southeastern, Southern and Midwestern Systems. Northern System comprises Serra Norte, Serra Leste and Serra Sul mines. The Southeastern System comprises three mining complexes: Itabira, Mariana and Minas Centrais. The Southern System comprises two major mining complexes: Vargem Grande and Paraopeba. The Midwestern System comprises two mines and two plants.

---

**Output product**

Other mining (Please specify) (Manganese Ore)

**Capacity, metric tons**

4976000

**Production, metric tons**

350000

**Production, copper-equivalent units (metric tons)**

<Not Applicable>

**Scope 1 emissions**

3784.91

**Scope 2 emissions**

523.24

**Scope 2 emissions approach**

Market-based

**Pricing methodology for copper-equivalent figure**

<Not Applicable>

**Comment**

It includes the GHG emissions from Morro da Mina, Mina Urucum e Mina do Azul.

---

**(C-MM9.3b) Provide details on the commodities relevant to the metals production activities of your organization.**

**Output product**

Nickel

**Capacity (metric tons)**

412000

**Production (metric tons)**

168000

**Annual production in copper-equivalent units (thousand tons)**

391112.66

**Scope 1 emissions (metric tons CO2e)**

2836600.67

**Scope 2 emissions (metric tons CO2e)**

60674.74

**Scope 2 emissions approach**

Market-based

**Pricing methodology for-copper equivalent figure**

The nickel conversion factor for the calculation of the copper-equivalent figure: Nickel average price divided by copper average price for the period of 2019 to 2021 = 2.3281

**Comment**

It includes the GHG emissions from Nickel operations and its coproducts (metallic copper, cobalt, PGM).

**Output product**

Other ferrous metals (Please specify) (Manganese Ferroalloy)

**Capacity (metric tons)**

265000

**Production (metric tons)**

71000

**Annual production in copper-equivalent units (thousand tons)**

12493.21

**Scope 1 emissions (metric tons CO2e)**

105291.14

**Scope 2 emissions (metric tons CO2e)**

27447.03

**Scope 2 emissions approach**

Market-based

**Pricing methodology for-copper equivalent figure**

Manganese ferroalloys conversion factor for the calculation of the copper-equivalent figure: Ferroalloys average price divided by copper average price for the period of 2019 to 2021 = 0.1760

**Comment**

It includes the GHG emissions from ferroalloy production.

**C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6**

**(C-CE9.6/C-CG9.6/C-CH9.6/C-CN9.6/C-CO9.6/C-EU9.6/C-MM9.6/C-OG9.6/C-RE9.6/C-ST9.6/C-TO9.6/C-TS9.6) Does your organization invest in research and development (R&D) of low-carbon products or services related to your sector activities?**

	Investment in low-carbon R&D	Comment
Row 1	Yes	The investment in research and development represents a crucial risk mitigation strategy and a substantial opportunity, generating the development of new technologies capable of increasing productivity and decreasing GHG emissions. In 2021, Vale announced investments of USD 4 to 6 bn by 2030 to reduce its Scope 1 and 2 emissions. Reduction initiatives are prioritized by the company according to its emission abatement curve for 2030. Vale considers the opportunity to change its energy matrix in the process of defining the sustainability strategy. One opportunity consists in adapting to climate change considering R&D investments. For example, Vale created the Center for Advanced Climate Studies in partnership with the Espírito Santo Government and the University of Espírito Santo. The center, which is already in operation, has the objective of conducting climate-related research that will assist the state, the country and Vale itself to better understand the climate change issues and how to deal with them. Another example is the Vale Technological Institute (ITV), founded in 2009, which is developing low carbon and clean/renewable energy R&D and products. This institute has a dedicated group of researchers focused on climate change that seeks to understand the science of climate change and to develop new technologies in order for Vale to better adapt to the new low-carbon economy. The Institute's agenda focuses on biodiversity, environmental services, water resources, environmental genomics, reforestation with native species, recovery of degraded areas, climate change, occupation and use of land and socioeconomics. ITV already invested in research (between 2011 to 2021) USD 209.2 million in research projects and published 747 scientific articles in collaboration with universities, research centers, and other companies, and supported 154 R&D projects. For example, In Ferrous to increase the value of the company in a sustainable way, we developed a portfolio of initiatives where the "green briquette" has a prominent position as a new product with low energy intensity and with the potential to reduce our emissions and those of our customers. The briquette is Vale's exclusive technology, the result of several years of technological development and already patented in more than 47 countries, with three plants already approved and another five in the analysis phase.

(C-MM9.6a) Provide details of your organization's investments in low-carbon R&D for metals and mining production activities over the last three years.

Technology area	Stage of development in the reporting year	Average % of total R&D investment over the last 3 years	R&D investment figure in the reporting year (optional)	Comment
Green metals	Large scale commercial deployment	21 - 40%	185000000	In December 2020, we approved the conversion of pelletizing plants 1 and 2 at the Tubarão complex, into iron ore briquetting plants, to produce the "green briquette". This project is aligned with our strategy to Maximize Flight-to-Quality in Iron Ore and to reduce Scope 3 net emissions by 15% by 2035, with 2018 as the baseline. We also approved the construction of a new briquetting plant in the Vargem Grande complex. The initial production capacity of these three plants will be approximately 7 million metric tons per year. The start-up of the three plants is expected by 2023, and the total investment amounts to US\$185 million. In 2021, we announced the launch of iron ore green briquette, a new proprietary product, developed by the company through over 20 years of research, which can allow a reduction of over 10% of greenhouse gas emissions in steel production by our steelmaking clients. The "green briquette" is a result of the cold agglomeration of iron ore, by using a breakthrough technology solution that can use in its binder a composition of sand from the treatment of mining tailings, resisting the blast furnace's high temperatures without disintegrating. The low temperature of cold agglomeration (200°C) allows for 80% less CO2 emission when compared to pelletizing process (approximately 1300°C). We continue to work on the development of low CO2 iron making technologies and services to support our customers as they transition to low CO2 steelmaking. Being the first year of reporting in the Green Metals category, the calculation memory refers to the total investment in the category reported in 2021 (185,000,000), divided by the total spent on R&D for the same year (549,000,000) x 100 to find the percentage of 33.7%
Unable to disaggregate by technology area <i>CDP Ao extrair esta questão ela está se fragmentando em duas linhas. A primeira linha fica com as colunas em branco e, a coluna "comment" com comentário parcial; a segunda linha fica com as colunas preenchidas e a coluna "comment" com comentário parcial. Esse erro pode impactar na pontuação da questão.</i>	<Not Applicable>	81 - 100%	62700000	Vale is consistently focused on improving its processes throughout research and development (R&D) projects. Vale Technological Institute (ITV), founded in 2010, is a non-profit institution, maintained by Vale that operates through ITV Sustainable Development, located in Belém (PA), and ITV Mining, located in Ouro Preto and Santa Luzia (MG), to develop low carbon and clean/renewable energy R&D and products. This institute has a dedicated research group focused on climate change that seeks to understand the science of climate change and to develop new technologies in order for Vale to better adapt to the new low-carbon economy. It currently has a group of 281 researchers, 224 of whom are fellows. The ITV DS is active in training young researchers through the Professional Masters in Sustainable Use of Natural Resources in Tropical Regions. More than 120 professionals from all over the country had been trained by 2021. On this front, we highlight the research scholarship and project subsidies program for young residents in Pará whose dissertations are in line with one of the United Nations Sustainable Development Goals (SDGs). In 10 years (2011 – 2021) ITV published over 747 scientific papers; ITV already invested USD 209 million in research projects, and supported 154 R&D projects that contribute to biodiversity knowledge and conservation. An example of a project that benefitted from the cooperation of ITV is Ecoshipping, created by Vale to meet the challenge of reducing its carbon emissions, in line with what has been discussed within the scope of the International Maritime Organization (IMO).

## C10. Verification

### C10.1

(C10.1) Indicate the verification/assurance status that applies to your reported emissions.

	Verification/assurance status
Scope 1	Third-party verification or assurance process in place
Scope 2 (location-based or market-based)	Third-party verification or assurance process in place
Scope 3	Third-party verification or assurance process in place

### C10.1a

(C10.1a) Provide further details of the verification/assurance undertaken for your Scope 1 emissions, and attach the relevant statements.

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

VALESACDP22.CAR\_20.07\_ajustada\_assinada.pdf

**Page/ section reference**

Pages 2 to 3

**Relevant standard**

ISAE3000

**Proportion of reported emissions verified (%)**

100

## C10.1b

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**(C10.1b) Provide further details of the verification/assurance undertaken for your Scope 2 emissions and attach the relevant statements.**

**Scope 2 approach**

Scope 2 location-based

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

VALESACDP22.CAR\_20.07\_ajustada\_assinada.pdf

**Page/ section reference**

Pages 2 to 3

**Relevant standard**

ISAE3000

**Proportion of reported emissions verified (%)**

100

---

**Scope 2 approach**

Scope 2 market-based

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

VALESACDP22.CAR\_20.07\_ajustada\_assinada.pdf

**Page/ section reference**

Pages 2 to 3

**Relevant standard**

ISAE3000

**Proportion of reported emissions verified (%)**

100

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## C10.1c

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**(C10.1c) Provide further details of the verification/assurance undertaken for your Scope 3 emissions and attach the relevant statements.**

**Scope 3 category**

- Scope 3: Purchased goods and services
- Scope 3: Capital goods
- Scope 3: Fuel and energy-related activities (not included in Scopes 1 or 2)
- Scope 3: Upstream transportation and distribution
- Scope 3: Business travel
- Scope 3: Employee commuting
- Scope 3: Downstream transportation and distribution
- Scope 3: Processing of sold products
- Scope 3: Use of sold products

**Verification or assurance cycle in place**

Annual process

**Status in the current reporting year**

Complete

**Type of verification or assurance**

Limited assurance

**Attach the statement**

VALESACDP22.CAR\_20.07\_ajustada\_assinada.pdf

**Page/section reference**

Pages 2 to 3

**Relevant standard**

ISAE3000

**Proportion of reported emissions verified (%)**

100

**C10.2**

**(C10.2) Do you verify any climate-related information reported in your CDP disclosure other than the emissions figures reported in C6.1, C6.3, and C6.5?**

Yes

**C10.2a**

**(C10.2a) Which data points within your CDP disclosure have been verified, and which verification standards were used?**

Disclosure module verification relates to	Data verified	Verification standard	Please explain
C4. Targets and performance	Emissions reduction activities	International Standard on Assurance Engagements (ISAE) 3000	PwC "PricewaterhouseCoopers Auditores Independientes Ltda" has been engaged by Vale S.A. (Vale) to conduct an independent auditor's limited assurance report on the non-financial information included in the 2021 Integrated Report of Vale S.A. The limited assurance engagement also included the analysis of the compliance with the guidelines and criteria 1) of the Global Reporting Initiative (GRI-Standards); 2) the provisions established in the basis of preparation developed by the Company; 3) the principles for the Integrated Report, pursuant to Guidance CPC 09 – Integrated Report, related to the Basic Conceptual Framework for Integrated Report, prepared by the International Integrated Report Council (IIRC) applicable in the preparation of the information included in the 2021 Integrated Report of Vale for the year ended December 31, 2021. Please access pages 122-123, Vale 2021 Integrated Report for more information: <a href="http://www.vale.com/integrated-report-2021/Pages/default.aspx">http://www.vale.com/integrated-report-2021/Pages/default.aspx</a>
C4. Targets and performance	Progress against emissions reduction target	International Standard on Assurance Engagements (ISAE) 3000	PwC "PricewaterhouseCoopers Auditores Independientes Ltda" has been engaged by Vale S.A. (Vale) to conduct an independent auditor's limited assurance report on the non-financial information included in the 2021 Integrated Report of Vale S.A. The limited assurance engagement also included the analysis of the compliance with the guidelines and criteria 1) of the Global Reporting Initiative (GRI-Standards); 2) the provisions established in the basis of preparation developed by the Company; 3) the principles for the Integrated Report, pursuant to Guidance CPC 09 – Integrated Report, related to the Basic Conceptual Framework for Integrated Report, prepared by the International Integrated Report Council (IIRC) applicable in the preparation of the information included in the 2021 Integrated Report of Vale for the year ended December 31, 2021. Please access pages 122-123, Vale 2021 Integrated Report for more information: <a href="http://www.vale.com/EN/sustainability/integrated-report-2021/Pages/default.aspx">http://www.vale.com/EN/sustainability/integrated-report-2021/Pages/default.aspx</a>
C8. Energy	Energy consumption	International Standard on Assurance Engagements (ISAE) 3000	PwC "PricewaterhouseCoopers Auditores Independientes Ltda" has been engaged by Vale S.A. (Vale) to conduct an independent auditor's limited assurance report on the non-financial information included in the 2021 Integrated Report of Vale S.A. The limited assurance engagement also included the analysis of the compliance with the guidelines and criteria 1) of the Global Reporting Initiative (GRI-Standards); 2) the provisions established in the basis of preparation developed by the Company; 3) the principles for the Integrated Report, pursuant to Guidance CPC 09 – Integrated Report, related to the Basic Conceptual Framework for Integrated Report, prepared by the International Integrated Report Council (IIRC) applicable in the preparation of the information included in the 2021 Integrated Report of Vale for the year ended December 31, 2021. Please access pages 122-123, Vale 2021 Integrated Report for more information: <a href="http://www.vale.com/EN/sustainability/integrated-report-2021/Pages/default.aspx">http://www.vale.com/EN/sustainability/integrated-report-2021/Pages/default.aspx</a>
SC. Supply chain module	Product footprint verification	The critical review assurance exercise was performed against the general principles of ISO 14064-3 Standard (Greenhouse Gases – Part 3: Specification with Guidance for the Validation and Verification of Greenhouse Gas Assertions).	Intertek Deutschland GmbH ("Intertek") represented in this project by the sustainability team, was commissioned by Vale Canada Limited to provide independent third-party limited assurance on the carbon footprint (greenhouse gas emissions) of nickel products produced at Vale's: 1) Copper Cliff Nickel Refinery in Sudbury, Canada (for nickel pellets and nickel powder products), 2) Clydach Refinery in Wales, UK (for nickel pellet), 3) Salobo Mine in Carajás, Brazil (for copper concentrate), 4) Sudbury Mines and Mill in Sudbury, Canada (for copper concentrate) operations, and 5) Long Harbour operations in Newfoundland and Labrador, Canada (for nickel rounds products). Vale's Scope 1, 2 and 3 emissions data for 2020 have been used to calculate the carbon intensity for Vale's products. The reporting protocol against which assurance was conducted is the Greenhouse Gas Protocol – Product Life Cycle Accounting and Reporting Standard. Link to verification letter for Long Harbour Nickel products: <a href="http://www.vale.com/esg/en/Pages/low-carbon-products.aspx">http://www.vale.com/esg/en/Pages/low-carbon-products.aspx</a>

**C11. Carbon pricing**

## C11.1

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(C11.1) Are any of your operations or activities regulated by a carbon pricing system (i.e. ETS, Cap & Trade or Carbon Tax)?

Yes

### C11.1a

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(C11.1a) Select the carbon pricing regulation(s) which impacts your operations.

Canada federal fuel charge

Japan carbon tax

### C11.1c

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(C11.1c) Complete the following table for each of the tax systems you are regulated by.

#### Canada federal fuel charge

**Period start date**

January 1 2021

**Period end date**

December 31 2021

**% of total Scope 1 emissions covered by tax**

1.91

**Total cost of tax paid**

346400.63

**Comment**

In 2021, the Federal Government of Canada is charging USD\$40/tCO<sub>2</sub>e

#### Japan carbon tax

**Period start date**

January 1 2021

**Period end date**

December 31 2021

**% of total Scope 1 emissions covered by tax**

0

**Total cost of tax paid**

0

**Comment**

Taxation in Japan is paid indirectly on the purchase of energy and gas. So, the value is included in the energy cost.

### C11.1d

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**(C11.1d) What is your strategy for complying with the systems you are regulated by or anticipate being regulated by?**

Vale recognizes the risks and opportunities imposed by carbon pricing schemes, and to minimize the risks and maximize opportunities, Vale has a Policy Global Mitigation and Adaptation to Climate Change. This policy describes the guidelines on the subject, encompassing commitments to manage and reduce GHG emissions from the company. Some compliance options include strategies for establishing an internal carbon price, which starts from renewable sources, energy efficiency and biofuels and ends with electrification technology and innovation. One of the internal tools adopted to operationalize the Vale Net-Zero Strategy is carbon pricing, recently implemented at Vale. Vale has adopted an internal carbon price (shadow price) of USD 50 per ton of CO2 equivalent, applicable for economic-financial analysis of current and capital investments, utilized in the Marginal Abatement Cost Curve (MACC) and projects prioritization. Vale's methodology for carbon pricing is applicable for all projects and investments (Current and Capital) that have GHG emissions associated with its operation and/or will be responsible for the deforestation of native forests during its implantation encompassing Vale's units globally. The methodology started to be used in June 2020 and aims to help prioritize the most competitive project alternative to achieve the 2030 carbon emission target. This price is aligned to the temperature targets of the Paris Agreement, according to the recommendations of the Carbon Pricing Leadership Coalition (CPLC). In 2019, the company reviewed its climate goals, including new commitments to reduce greenhouse gas (GHG) emissions, bolder goals than previously established in 2018, aiming to become a net zero mining company in scopes 1 and 2 by 2050. The 33% absolute scope 1 and 2 emissions reduction target by 2030, with 2017 as a baseline, is aligned with the Paris Agreement's objective of limiting global warming to below 2°C. This target is linked to the variable remuneration of all Vale's employees. Vale aims to reduce 15% of its scope 3 net emissions by 2035, to encourage clients and suppliers in the same direction and aligned with its net zero commitment. Through active engagement with clients from the steel and metallurgy industries, Vale will work to reduce emissions in its value chain. The company will guide its operations based on win-win relationships, less intensive products, and new technologies. The Low Carbon Forum was also created to manage the implementation of the Vale Net Zero strategy. The Forum is coordinated by the Sustainability Executive Committee with the support of the Executive Committees: Coal, Strategy and Mineral Exploration, Business Support, Ferrous, Basic Metals and with the participation of Vale's CEO. The meetings are held monthly with the participation of the broad leadership and technical teams that deal with the topic on a day-to-day basis. Vale's goal is, throughout the climate change management process, to develop a portfolio of low carbon projects made possible by the internal carbon price, in addition to a better understanding of regulatory risks and their impacts; better understanding and communication of material risks and opportunities for climate change in business; change Vale's energy consumption matrix through higher consumption of renewable energy sources; and reduce the carbon footprint of their products. Vale also has created an internal program called PowerShift to support its sustainability goals, focusing on the transition to a low-carbon economy. The program aims to make the Company's energy matrix clean by focusing on the use of renewable energy and alternative fuels, greater efficiency of operations using new technologies, and forest promotion. PowerShift-linked initiatives are expected to contribute approximately 40% of Vale's planned reductions to help us reach the United Nations 2030 Agenda target. In addition to the company's global strategy for promoting and adopting the internal price of carbon, a strategy to reduce the impacts of carbon taxation in Canada is the "Green Energy Vehicle Program". Throughout 2019 and 2020 Vale accepted delivery of numerous battery electric vehicles within North Atlantic's underground operations. These vehicles are being trialed across a number of operations to provide learnings and diversified feedback to the business. Vale currently has 30 battery-powered vehicles operating as part of the Green Energy Vehicles test program and by the end of 2021 there will be more than 40. One of Vale's largest fleets of battery-powered electric vehicles is housed at the Creighton mine. This fleet is known as the GEV pilot project. Vale expects to see a decrease in diesel fuel consumption as its fleet transitions to alternative energy sources as a part of this program, for example, Creighton mine, that is home to the largest fleet of battery electric vehicles within Vale as it is recognized as the GEV pilot project.

**C11.2**

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**(C11.2) Has your organization originated or purchased any project-based carbon credits within the reporting period?**

No

**C11.3**

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**(C11.3) Does your organization use an internal price on carbon?**

Yes

**C11.3a**

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**(C11.3a) Provide details of how your organization uses an internal price on carbon.**

**Objective for implementing an internal carbon price**

- Navigate GHG regulations
- Stakeholder expectations
- Change internal behavior
- Drive energy efficiency
- Drive low-carbon investment
- Other, please specify (Understand the exposure to risk and the impact on the cost of the Company)

**GHG Scope**

- Scope 1
- Scope 2

**Application**

Vale has adopted an internal carbon price (shadow price) of USD 50 per ton of CO2 equivalent, applicable for economic-financial analysis of current and capital investments, utilized in the Marginal Abatement Cost Curve (MACC) and projects prioritization. Vale's methodology for carbon pricing is applicable for all projects and investments (Current and Capital) that have GHG emissions associated to its operation and/or will be responsible for the deforestation of native forests during its implantation encompassing Vale's units globally. The methodology started to be used in June 2020 and aims to help prioritize the most competitive project alternative to achieve the 2030 carbon emission target.

**Actual price(s) used (Currency /metric ton)**

50

**Variance of price(s) used**

Static pricing: a price that is constant over time.

**Type of internal carbon price**

Shadow price

**Impact & implication**

Throughout 2019 Vale has developed a proprietary carbon pricing methodology to assess risks linked to climate change, by projecting possible impacts on the operating costs of each business unit. Vale's Carbon pricing methodology was implemented on June 1,2020. The methodology is applicable to projects and investments (current and capital) and is composed by three main steps beginning with Quantification of GHG emissions. With carbon accounting finished, carbon is monetized using the shadow price generating the emission cost, the emission cost is than included in the project financial indicators and results. In this context Vale developed a carbon pricing manual and did an internal training to support the project leaders and developers to apply carbon pricing in projects evaluations. The first business case implemented in 2020 was the New Steel Project, a dry iron ore concentration unit, located in Vargem Grande Complex in the city of Nova Lima, in the state of Minas Gerais. The project is expected to be the world's first industrial-scale dry magnetic fines concentration, with total expected multi-year investments of US\$125 million. A synergy between New steel concentrating plant and briquetting aims to reduce fuel consumption, in the evaluation steps this project has two fuel.

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**C12. Engagement**

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**C12.1**

**(C12.1) Do you engage with your value chain on climate-related issues?**

- Yes, our suppliers
- Yes, our customers/clients
- Yes, other partners in the value chain

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**C12.1a**

**(C12.1a) Provide details of your climate-related supplier engagement strategy.**

**Type of engagement**

Information collection (understanding supplier behavior)

**Details of engagement**

Collect climate change and carbon information at least annually from suppliers

**% of suppliers by number**

75

**% total procurement spend (direct and indirect)**

78

**% of supplier-related Scope 3 emissions as reported in C6.5**

3.04

**Rationale for the coverage of your engagement**

Via the CDP Supply Chain Program, approximately 500 suppliers were selected to participate in the program in 2021. Vale has been reporting information on climate change through the CDP for 14 years. The company joins other companies that use this internationally recognized, standardized reporting platform that provides technical support for engaging strategic suppliers on environmental issues, especially on climate change.

**Impact of engagement, including measures of success**

An example of engagement impact is the alignment of the business portfolio to the transition to a low carbon economy, leveraging new business opportunities and raising the awareness of suppliers regarding climate change and engaging them to improve their emission management. One of Vale's engagement methodologies is to organize specific forums focused on carbon emission reductions with the exclusive participation of suppliers. For example, in 2021 was held the 3rd Forum on Carbon Emission Reduction. As a measure of success in 2021, the goal was to reach 55% of responding suppliers. In 2021, 500 suppliers were selected to participate in the program, with 75% adherence (375 suppliers). In 2022, the goal will be to reach 66% of responding suppliers.

**Comment**

n.a.

**C12.1b**

**(C12.1b) Give details of your climate-related engagement strategy with your customers.**

**Type of engagement & Details of engagement**

Collaboration & innovation	Other, please specify (Signed a Memorandum of Understanding (MoU) and Non disclosure Agreement (NDA) with relevant steelmaking customers to develop joint solutions to decarbonize and test new low-carbon products, such as the "green briquette" and Tecnoled )
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**% of customers by number**

12

**% of customer - related Scope 3 emissions as reported in C6.5**

45

**Please explain the rationale for selecting this group of customers and scope of engagement**

Clients were chosen based on their representativeness of Vale's scope 3 emission. We will achieve this target through two main pillars: (i) through our own initiatives; (ii) through Partnership with clients and suppliers. Our own initiatives may respond to between 15-25% of the emission reduction by 2035 and rely mostly on our world-class portfolio that will lead to reduced emissions in steelmaking. For the remaining 85-75% of scope 3 emissions reductions, we will lead through partnership. We are already engaging with the most relevant steel clients to foster technological development and lower carbon iron solutions. In order to provide low carbon solutions to the steel industry, Vale has signed a Memorandum of Understanding (MoU) with key clients distributed globally as Baowu Group, Shagang and Hebei in China, Nippon Steel Corporation in Japan, Posco and Hyundai Steel in Korea and Ternium S.A. pursuing opportunities to develop steelmaking solutions focused on reducing CO2 emissions. In Ternium SA MoU, both companies intend to develop economic feasibility studies of potential investment in (i) an iron ore briquetting plant (green briquette) located at Ternium Brasil facility; and (ii) plants to produce metallic products with low carbon footprint, using Tecnoled, HYL and other technologies for iron reduction. It should be noted that the percentage value indicated in the column "% of customer - related Scope 3 emissions as reported in C6.5" is an estimated value, as the values are still being consolidated. Therefore, consolidated to date, customers with MoU and NDA in 2021 were around 45%.

**Impact of engagement, including measures of success**

We measure the success of our engagement by monitoring Vale's scope 3 emissions. Scope 3 emissions, indirect GHG emissions calculated along the value chain, include upstream emissions and downstream emissions. We provide to our customers solutions to adapt to potential market demands, in 2021, Vale announced the launch of iron ore green briquette, which can allow a reduction of over 10% of greenhouse gases emissions in the steel production by our steelmaking clients. The "green briquette" is a result of cold agglomeration of iron ore. The low temperature of cold agglomeration (200°C) allows for an 80% reduction of CO2 emission when compared to pelletizing process (approximately 1300°C). The product also reduces emissions of particulates and gases such as sulphur dioxide (SOx) and nitrogen oxide (NOx), as well as eliminates the use of water in its production. In December 2020, we approved the conversion of pellet plants 1 and 2 at the Tubarão complex into iron ore briquetting plants to produce the "green briquette". This project aligns with our strategy to Maximize Fly-to-Quality in Iron Ore and reducing Scope 3 net emissions by 15% by 2035, with 2018 as a baseline. We also approved the construction of a new briquetting plant in the Vargem Grande complex. The initial production capacity of these three plants will be approximately 7 million metric tons per year. The start-up of the three plants is scheduled for 2023 and the total investment is US\$ 185 million. We continue to work on the development of low CO2 iron making technologies and services to support our customers as they transition to low CO2 steelmaking. Another engagement that we highlight in 2021 was the participation in the following events: ABM week, Singapore Iron Ore Forum, and LESA (Leadership For Enterprise Sustainability Asia) – Asia School of Business, where we presented our Net-zero strategy and work related to low-carbon products, engaging customers and potential customers.

**C12.1d**

**(C12.1d) Give details of your climate-related engagement strategy with other partners in the value chain.**

Combating the impacts of climate change is a strategic priority on Vale's agenda. Mining activity is highly dependent on logistical infrastructure, and sensitive to extreme climate risks. Case: S - Vale reviewed in 2019 its climate change goals including new commitments to reduce greenhouse gas (GHG) emissions aiming to become a net zero mining company. A - To achieve Climate Change Internal Goals and face this global challenge Vale, Rio Tinto and BHP came together as Founding Patrons to use the Innovation Hub to define and promote the Charge On Innovation Challenge, in order to develop effective solutions for mine electrification and decarbonization. The Charge on Innovation Challenge asks Vendors to present interoperable solutions that can safely deliver electricity to large battery-electric off-road haul trucks in a way that maintains or improves current productivity levels. T – Knowing that diesel-powered haul truck fleets are responsible for up to 80% of a mine's emissions, the main objective of this project is to reduce carbon emissions for the mining operations by electrifying their vast mining truck fleets. Specifically, Vale wants mechanisms capable of delivering in the order of 400kWh of electricity to each truck within a haul cycle (ie load, travel, dump, return, queue). The delivered electricity is to charge a battery and if applicable, directly propel the truck. R - The Charge On Innovation Challenge was launched in 2021 and invited vendors and technology innovators from around the world and across industries. It received interest from over 350 companies across 19 industries, with over 80 companies submitting expressions of interest (EOI). 21 companies were then invited to present a detailed pitch of their solution. The final 8 were chosen from these 21 companies and are collaborating with interested mining companies, OEMs and investors to accelerate the technology development to support the future roll-out of zero-emissions fleets.

**C12.2**

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**(C12.2) Do your suppliers have to meet climate-related requirements as part of your organization's purchasing process?**

Yes, climate-related requirements are included in our supplier contracts

**C12.2a**

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**(C12.2a) Provide details of the climate-related requirements that suppliers have to meet as part of your organization's purchasing process and the compliance mechanisms in place.**

**Climate-related requirement**

Complying with regulatory requirements

**Description of this climate related requirement**

Vale's suppliers are managed according to the same compliance standards that are upheld within the Company regarding social and environmental safety and ethics and integrity aspects. At the stage of registering new suppliers, Vale's main compliance initiatives are: Supplier Code of Ethics and Conduct, Global Anti-Corruption Program, Third-Party Due-Diligence, Environmental Licenses and Legal Requirements and Health and Safety Evaluation, to manage risks and provide greater security and confidence to its shareholders in relation to our choice of suppliers.

**% suppliers by procurement spend that have to comply with this climate-related requirement**

88

**% suppliers by procurement spend in compliance with this climate-related requirement**

69

**Mechanisms for monitoring compliance with this climate-related requirement**

Certification

Supplier scorecard or rating

**Response to supplier non-compliance with this climate-related requirement**

Exclude

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**C12.3**

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**(C12.3) Does your organization engage in activities that could either directly or indirectly influence policy, law, or regulation that may impact the climate?**

**Row 1**

**Direct or indirect engagement that could influence policy, law, or regulation that may impact the climate**

Yes, we engage directly with policy makers  
Yes, we engage indirectly through trade associations

**Does your organization have a public commitment or position statement to conduct your engagement activities in line with the goals of the Paris Agreement?**

Yes

**Attach commitment or position statement(s)**

POL0012-G\_climate change Policy\_Rev2\_E.pdf

**Describe the process(es) your organization has in place to ensure that your engagement activities are consistent with your overall climate change strategy**

Climate change represents a scientifically proven reality and a challenge that affects not only our productive activities but the entire planet. Combating the impacts of climate change is a strategic priority on Vale's agenda. The company is committed to contributing to a more sustainable future, based on its renewable energy matrix and the differentiated quality of its product. To reach our climate commitments, we have defined robust climate governance. To guide the implementation of our Net Zero Strategy, our Executive Board provides us with full support and strategic oversight. It is supported by a Sustainability Committee, comprised of Board members and an external independent advisor, in charge of overseeing Vale's actions. The Sustainability Committee advises the Board on sustainability-related issues, including climate change. Vale tracks trends and studies related to climate change in global forums, which aim to define regulatory and economic strategies for mitigation and adaptation at a global level. In Brazil, Vale participated in several discussions about the theme, collaborating with the development of policies and strategies aimed at the transition to a resilient and low carbon economy, such as participation in the Brazilian Business Council for Sustainable Development (CEBDS) and the development of "Adaptaclima" - a governmental platform for knowledge in adaptation, which seeks to contribute for access to information and the connection of stakeholders in this topic in Brazil. Vale also participates in international discussion meetings, including technical reviews on economic instruments to encourage the global reduction of GHG emissions, and relevant initiatives on climate change such as Carbon Pricing Leadership Coalition, International Council of Mining and Metals, Task Force on Climate-Related Financial Disclosure (TCFD), CDP Worldwide, and WBCSD (World Business Council for Sustainable Development). Since the voluntary adherence to the TCFD recommendations the Company began an in-house project to tailor climate risk qualification and quantification to the TCFD recommendations, considering the scenarios proposed by the International Energy Agency (IEA). Vale is committed to integrating sustainability into its business and therefore increased its engagement with socially responsible investors and key ESG stakeholders through webinars, roadshows and the development of a dedicated website, the "ESG Portal".

**Primary reason for not engaging in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate**

<Not Applicable>

**Explain why your organization does not engage in activities that could directly or indirectly influence policy, law, or regulation that may impact the climate**

<Not Applicable>

**C12.3a**

**(C12.3a) On what policy, law, or regulation that may impact the climate has your organization been engaging directly with policy makers in the reporting year?**

**Focus of policy, law, or regulation that may impact the climate**

Carbon tax

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Brazilian Carbon Pricing

**Policy, law, or regulation geographic coverage**

National

**Country/region the policy, law, or regulation applies to**

Brazil

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

In 2016, the Ministry of Treasure continued the Partnership for Market Readiness, a World Bank's initiative, to develop technical studies on feasible carbon pricing mechanisms and their impacts on the economy. Vale is working together with the government, business organizations and civil society to develop those analyses. Vale continued to support the academic initiative on simulating an emission trading scheme in Brazil ("Empresas Pelo Clima" initiative). Vale also contributed to the public consultation of documents released by the government regarding the implementation of Brazilian NDC. Vale signed a position paper in favour of a carbon pricing to help contain global warming.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

**Focus of policy, law, or regulation that may impact the climate**

Other, please specify (IMO strategy for reducing GHG)

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

IMO ambition to reduce emissions from international shipping. They include: - Reduction of CO2 intensity, as an average across international shipping, by at least 40% by 2030, pursuing efforts towards 70% by 2050 (based on 2008); - Reduction of the total annual GHG emissions from international shipping by at least 50% by 2050 (based on 2008).

**Policy, law, or regulation geographic coverage**

Global

**Country/region the policy, law, or regulation applies to**

<Not Applicable>

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

Vale has been supporting the Brazilian Government/Navy with analysis of IMO's MEPC (Marine Environment Protection Committee) technical proposals related to GHG emissions of international shipping, which could turn into decisions and/or regulations. Vale supports proposals focused on energy efficiency and climate goals to achieve the IMO GHG emissions reduction targets.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Focus of policy, law, or regulation that may impact the climate**

Mandatory climate-related reporting

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

MRV (Measurement, Reporting, and Verification) at IMO Proposes the establishment of a mandatory report of fuel consumptions from ships

**Policy, law, or regulation geographic coverage**

Global

**Country/region the policy, law, or regulation applies to**

<Not Applicable>

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

Vale has been supporting the Brazilian Government/Navy with an analysis of IMO's MEPC (Marine Environment Protection Committee) technical proposals related to GHG emissions of international shipping, which could turn to decisions and/or regulations. For example, Vale analyzed the documents regarding the establishment of a global data collection system for either a mandatory or voluntary application of the system for collection of fuel consumptions, monitoring CO2 emissions from ships and possible verifying by the flag States. Vale supports the establishment of a mandatory report of fuel consumptions from ships.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Focus of policy, law, or regulation that may impact the climate**

Carbon tax

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Canada Federal Carbon Pricing - Federal Backstop Program on Carbon Pricing

**Policy, law, or regulation geographic coverage**

National

**Country/region the policy, law, or regulation applies to**

Canada

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

Vale has participated in engagements with the federal government in relation to the Federal Backstop program.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Focus of policy, law, or regulation that may impact the climate**

Other, please specify (GHG Act)

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Newfoundland and Labrador – GHG Act Newfoundland and Labrador Carbon pricing – Greenhouse Gas Act

**Policy, law, or regulation geographic coverage**

Sub-national

**Country/region the policy, law, or regulation applies to**

Other, please specify (Newfoundland and Labrador)

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

A made in Newfoundland and Labrador carbon pricing framework is being developed by the provincial government. Vale is still waiting on specific developments by the government of Newfoundland and Labrador. A carbon pricing framework made in Newfoundland and Labrador is being developed by the provincial government. Vale is still awaiting specific developments from the government of Terra Nova and Labrador.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Focus of policy, law, or regulation that may impact the climate**

Other, please specify (TCFD)

**Specify the policy, law, or regulation on which your organization is engaging with policy makers**

Task Force on Climate Related Financial Disclosure

**Policy, law, or regulation geographic coverage**

Global

**Country/region the policy, law, or regulation applies to**

<Not Applicable>

**Your organization's position on the policy, law, or regulation**

Support with no exceptions

**Description of engagement with policy makers**

Vale signed the approval of the Task Force on Climate Related Financial Disclosure as an earlier player. Vale supports the Task Force on Climate Related Financial Disclosure and is working to align internal management with its guidelines and framework.

**Details of exceptions (if applicable) and your organization's proposed alternative approach to the policy, law or regulation**

<Not Applicable>

**Have you evaluated whether your organization's engagement is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**C12.3b**

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**(C12.3b) Provide details of the trade associations your organization engages with which are likely to take a position on any policy, law or regulation that may impact the climate.**

**Trade association**

Other, please specify (IBRAM)

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

IBRAM analyses the impacts of national and international regulation on the extractive sector. Vale supports some technical studies developed by IBRAM and share technical information about GHG emissions of the mining industry. Vale contributes with discussions about GHG emissions management and abatement opportunities. Vale also participates in several initiatives and Special Programs promoted by the IBRAM and other partners, aiming to promote sustainable development through studies, manuals, guides, research, innovation, and the use of the most modern technologies available. In 2021, IBRAM, with its associated companies, announced the mining positioning on climate change aiming to contribute to the Brazilian government in the COP 26 negotiations, as well as informing interested parties about the efforts of the mining sector in the search for a low carbon economy in Brazil.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Brazilian National Confederation of Industry (Confederação Nacional da Indústria – CNI))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

CNI has been following up on the Brazilian Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) and interacting with the government both regarding the international commitment and how it will be implemented domestically, particularly on aspects concerning the industry sector. Vale is an active participant of CNI'S working group (Rede Clima) and as such take part in discussions and can provide inputs to the position papers and discussions. Vale is also a co-financer of a Study Group headed by CNI, in regards to the evolution of the EU proposal on a Carbon Border Adjustment Mechanism.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Mining Association of Canada)

**Is your organization's position on climate change consistent with theirs?**

Consistent

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**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

Participate in government consultation regarding national environmental regulations. Vale has a member on the board and also provides technical assistance due to its expertise. Vale is an active member in the Mining Association of Canada (MAC) and voluntary participant in the association's initiative called Towards Sustainable Mining (TSM). This initiative aims to improve the industry's performance by aligning its actions with the priorities and values of Canadians. TSM provides a way of finding common ground with communities of interest in order to build a better mining industry, today and in the future.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Ontario Mining Association - OMA (Canada))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

OMA has been an active participant in the multi-sectoral consultations with the Ministry of Environment in the development of Ontario GHG reporting regulations and the ongoing development of Ontario's Cap and Trade regulation to reduce GHG emissions. Vale has a member on the board and also provides technical assistance due to its expertise.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Canadian Manufacturers and Exporters Association (CME))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

The CME is actively involved in lobbying the Canadian government and relevant bodies mainly on the development of legislation and policy. The main areas of focus are climate change and the impacts of policy and legislation on the sustainability of manufacturers and exporters. Vale provides technical assistance due to its expertise. In particular, Vale has supported the Ontario Section Environment Committee.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Association of Major Power Consumers of Ontario (AMPCO))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

AMPCO's objective is industrial electricity rates that are competitive, fair and efficient. It provides clear communications and effective advocacy on cap and trade regulation. Vale has a member on the board and also provides technical assistance due to its expertise.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Industrial Gas Users' Association (IGUA))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

The Industrial Gas Users Association, (IGUA) provides a coordinated and effective public policy and regulatory voice for its members at both the provincial and federal levels. Its focus has been on the cap and trade impacts to natural gas pricing relative to other jurisdictions. Vale has a member on the board and also provides technical assistance due to its expertise.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (International Association of Dry Cargo Shipowners (INTERCARGO))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

INTERCARGO is involved in IMO discussions concerning the IMO strategy for reducing greenhouse gas emissions from international shipping. INTERCARGO is working to avoid measures that may increase the owner's costs. INTERCARGO has also involved IMO discussions regarding the establishment of an MRV (Monitoring, Reporting and Verify) for emissions reduction from ships. INTERCARGO is fully concern regarding the confidentiality of the data to be informed/ monitored and the accuracy of the methodology to be used for monitoring the fuel consumption/emissions. Vale is participating of the INTERCARGO meetings to discuss the matter and follow up on the impacts on its maritime transport. Regarding of reducing greenhouse gas emissions from international shipping in 2021, Vale received an international award (Wind Propulsion Innovation Awards) for its innovative use of rotor sails on its large ships. The award was in the category for companies promoting the adoption of this type of technology through prototypes or commercial use. In the same year Vale tested the world's first VLOC (Very Large Ore Carrier) equipped with a system that produces air bubbles in its hull to make it more fuel efficient and reduce GHG emissions.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify ((Non-Ferrous Alliance (NFA))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

The Alliance is actively involved in lobbying the UK government and relevant bodies mainly on the development of legislation and policy. The main areas of focus are climate change, carbon taxation, carbon leakage and the impacts of policy and legislation on the sustainability of existing, established businesses. The position is focused on the carbon leakage potential for globally traded commodity materials. Vale chairs on the board of NFA and provides £6k (USD 9.2k) per annum funding. Through the Alliance, the company participates in the Manufacturers Climate Change Group (MCCG), made of senior board members of trade groups. Through these, Vale actively engages in climate change-related topics, including legislation. NFA also makes direct representation to the UK government.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

92000

**Describe the aim of your organization's funding**

Annuity. Therefore, it would not have specific application to issues of climate positioning etc., being an annual payment.

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Confederation of British Industry (CBI)

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

The Confederation is actively involved in lobbying the UK government and relevant bodies mainly on the development of legislation and policy. The main areas of focus are climate change, carbon taxation, carbon leakage and the impacts of policy and legislation on the sustainability of existing, established businesses. Vale takes part on CBI's

Energy Intensive Users Group, in which relevant topics related to climate change, including legislation, are discussed. The CBI is used as a 'sounding board' for UK Government Policy development. Vale also provide funding to CBI Wales but no longer have a position on the board.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Eurometaux

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

Eurometaux is actively involved in lobbying the UK and Europe government and relevant bodies mainly on the development of legislation and policy. The main areas of focus are climate change, carbon taxation, carbon leakage and the impacts of policy and legislation on the sustainability of existing, established businesses. Vale is an executive member of Eurometaux and sits on the body's Energy and Climate Change Committee, where relevant climate change related topics are discussed. The Eurometaux position has been directly advocated into the Cabinet of the European President, with particular concerns of carbon pricing via allowance manipulation ("backloading") and ETS revision. Vale is on the Executive Committee and also the Management Committee (delegated working committee that sets the direction of the group). Vale also provide funding.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify ((The Brazilian Business Council for Sustainable Development (CEBDS))

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We are not attempting to influence their position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

The Brazilian Business Council for Sustainable Development (CEBDS) is a non-profit civil association that promotes sustainable development through articulation with governments and civil society, as well as disseminating the most current concepts and practices on the subject. The institution has represented its members in all United Nations Climate Change Conferences since 1998 and Biological Diversity since 2000. Recognition of the work has led the institution to operate in a number of international venues such as Carbon Pricing Leadership. Coalition (CPLC); the World Water Council; the Natural Capital Coalition; Low Carbon Business Action in Brazil of the European Union; the Partnership for Market Readiness (PMR) Brazil; and We Mean Business. At the Brazilian Business Council for Sustainable Development (CEBDS), Vale participated in discussions that seek to enable the entry of the Natural Capital hub in Brazil and Vale is available to support, in whatever necessary, the implementation of a carbon pricing mechanism that is appropriate for Brazil.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (WBCSD - World Business Council for Sustainable Development)

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

WBCSD is a global, CEO-led organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. WBCSD helps make member companies more successful and sustainable by focusing on the maximum positive impact for shareholders, the environment and societies. WBCSD is a unique network where members learn from other leading companies; interact with the strongest partners and gain access to a one-stop shop for tools and expertise to push their sustainability journey forward. Companies involved in climate work offer proof that business is moving beyond talk to implement real solutions by bringing different sectors and stakeholders together to scale up solutions globally. Vale believes combating climate change and transforming the energy system are core challenges on the path to a sustainable future for business, society and the environment.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

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Yes, we have evaluated, and it is aligned

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**Trade association**

International Council on Mining & Metals (ICMM)

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

ICMM is a global leadership organization dedicated to sustainable development of mining and metals industry. Vale is one of the companies' members of ICMM who announced in 2021, in an open letter signed by the CEOs of participating companies, the commitment to achieve the goal of zero net greenhouse gas (GHG) emissions from Scope 1 and 2 by 2050 or earlier, aligned with the ambitions of the Paris Agreement.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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**Trade association**

Other, please specify (Nickel Institute)

**Is your organization's position on climate change consistent with theirs?**

Consistent

**Has your organization influenced, or is your organization attempting to influence their position?**

We publicly promote their current position

**State the trade association's position on climate change, explain where your organization's position differs, and how you are attempting to influence their position (if applicable)**

The Nickel Institute is the global association of leading primary nickel producers, aimed at promoting and supporting the proper use of nickel in appropriate applications. Vale is an active member of the Nickel Institute.

**Funding figure your organization provided to this trade association in the reporting year, if applicable (currency as selected in C0.4) (optional)**

**Describe the aim of your organization's funding**

<Not Applicable>

**Have you evaluated whether your organization's engagement with this trade association is aligned with the goals of the Paris Agreement?**

Yes, we have evaluated, and it is aligned

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## C12.4

**(C12.4) Have you published information about your organization's response to climate change and GHG emissions performance for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

**Publication**

In mainstream reports

**Status**

Complete

**Attach the document**

Form 20-F - 2021.pdf

**Page/Section reference**

Vale's Environmental, Social and Governance (ESG) Framework (pages 9 to 14); Health, Safety, Environmental And Social Risks (pages 33 and 34); Environmental Regulations (pages 113 to 115)

**Content elements**

Strategy

Risks & opportunities

Emission targets

**Comment**

n.a.

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**Publication**

In mainstream reports, incorporating the TCFD recommendations

**Status**

Complete

**Attach the document**

Vale\_Integrated\_Report\_2021\_EN.pdf

**Page/Section reference**

ESG Strategy - Material Topic - Climate Change (page 11) – Ecoefficiency (page13); Governance Structure (pages 44 to 47); Risk Management (pages 48 and 49); Compliance (pages 50 to 53); Climate change (pages 70 to 76)

**Content elements**

Governance  
Strategy  
Risks & opportunities  
Emissions figures  
Emission targets  
Other, please specify (Energy metrics and targets)

**Comment**

n.a.

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**Publication**

In voluntary communications

**Status**

Complete

**Attach the document****Page/Section reference**

Governance - Board of Directors and Leadership Environment- Climate Change

**Content elements**

Governance  
Strategy  
Risks & opportunities  
Emissions figures  
Emission targets

**Comment**

Vale ESG Portal - Climate Change: <http://www.vale.com/esg/en/Pages/ClimateChange.aspx>

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**Publication**

In mainstream reports, incorporating the TCFD recommendations

**Status**

Complete

**Attach the document**

Vale\_CC\_2021-EN.pdf

**Page/Section reference**

The whole document relates to climate change and GHG emissions (pages 1 to 51)

**Content elements**

Governance  
Strategy  
Risks & opportunities  
Emissions figures  
Emission targets

**Comment**

To increase transparency Vale's resilience to climate change risks and opportunities and to detail our commitments, Vale, in accordance with the Task Force on Climate-Related Financial Disclosures guidelines, presents its 1st Climate Change Report

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## C15. Biodiversity

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### C15.1

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**(C15.1) Is there board-level oversight and/or executive management-level responsibility for biodiversity-related issues within your organization?**

	Board-level oversight and/or executive management-level responsibility for biodiversity-related issues	Description of oversight and objectives relating to biodiversity	Scope of board-level oversight
Row 1	Yes, both board-level oversight and executive management-level responsibility	The Executive Vice President of Sustainability (EVPS), position equivalent to the CSO, is a company's legal representative and responsible for daily operations and implementation of the general policies and guidelines set by the Board of Directors. The EVPS is below the Board of Directors, being intermediated by the CEO. This role is responsible for dealing with and connecting all topics related to the company's business in an overall perspective including the identification, addressing and treatment of critical issues that result in risks or business impact, define the establishment of sustainability goals (including biodiversity), monitoring and implementing policies, strategies and specific initiatives, and the evaluation of proposals of investments in sustainability. Our Board of Directors is responsible for defining Vale's general policies and guidelines - including biodiversity issues and evaluating plans and projects proposed by the Executive Board and assessing the results achieved compared to our targets. It's also responsible for evaluating the Company's sustainability strategy, policies, conduct and performance regarding Sustainability indicators and within that track our forestry strategy and our Forestry Target. The Sustainability and Innovation Committee advises Vale's Board of Directors, proposing improvements related to its area of operation to provide greater efficiency and quality to the decisions of this collegiate body and to ensure that the Company's activities are conducted in accordance with laws, ethics and internal controls. This Committee is responsible for: Reviewing and recommending the subjects of Sustainability, Environment and Innovation, and the way they are approached, in the Company's strategic planning, evaluating, complementing and suggesting changes in the Company's socio-environmental and Innovation strategies, following the respective implementation; Assist the Board of Directors in the analysis of initiatives related to mineral research, Innovation and new technologies, aiming at the competitiveness and sustainability - social, environmental and financial - of the Society; Evaluate the Society's Policies and conduct related to Safety, Environment, Health, Community Relations, Human Rights, Communication and Institutional Relations; Evaluate Vale's performance in relation to the aspects of Sustainability and Innovation, proposing challenges and improvements based on a long-term vision; among other responsibilities.	<Not Applicable>

**C15.2**

**(C15.2) Has your organization made a public commitment and/or endorsed any initiatives related to biodiversity?**

	Indicate whether your organization made a public commitment or endorsed any initiatives related to biodiversity	Biodiversity-related public commitments	Initiatives endorsed
Row 1	Yes, we have made public commitments and publicly endorsed initiatives related to biodiversity	Commitment to No Net Loss Adoption of the mitigation hierarchy approach Commitment to not explore or develop in legally designated protected areas Commitment to secure Free, Prior and Informed Consent (FPIC) of Indigenous Peoples	CBD – Global Biodiversity Framework SDG Other, please specify (ICMM Mining Principles and PE7 Brazilian Business Commitment for Biodiversity IFC Standards Performance)

**C15.3**

**(C15.3) Does your organization assess the impact of its value chain on biodiversity?**

	Does your organization assess the impact of its value chain on biodiversity?	Portfolio
Row 1	Yes, we assess impacts on biodiversity in both our upstream and downstream value chain	<Not Applicable>

**C15.4**

**(C15.4) What actions has your organization taken in the reporting year to progress your biodiversity-related commitments?**

	Have you taken any actions in the reporting period to progress your biodiversity-related commitments?	Type of action taken to progress biodiversity-related commitments
Row 1	Yes, we are taking actions to progress our biodiversity-related commitments	Land/water protection Land/water management Species management Education & awareness Livelihood, economic & other incentives

**C15.5**

**(C15.5) Does your organization use biodiversity indicators to monitor performance across its activities?**

	Does your organization use indicators to monitor biodiversity performance?	Indicators used to monitor biodiversity performance
Row 1	Yes, we use indicators	State and benefit indicators Pressure indicators Response indicators

**C15.6**

**(C15.6) Have you published information about your organization's response to biodiversity-related issues for this reporting year in places other than in your CDP response? If so, please attach the publication(s).**

Report type	Content elements	Attach the document and indicate where in the document the relevant biodiversity information is located
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments Governance Risks and opportunities Biodiversity strategy	Indication of the relevant biodiversity content: — Biodiversity-related policies and commitments and Biodiversity strategy: pg 77 - 80 — Risks and opportunities: pg 12 Vale_Integrated_Report_2021_EN.pdf
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments Impacts on biodiversity Risks and opportunities Biodiversity strategy	Indication of the most relevant biodiversity content: — Foreword, exhibits some of Vale's commitments: pg 3 — Biodiversity Management & Action Plans exhibits strategy, impacts and lessons learnt from ongoing actions: pg 4 - 13 book_vale_biodiversidade_EN.pdf
In voluntary sustainability report or other voluntary communications	Content of biodiversity-related policies or commitments Details on biodiversity indicators Risks and opportunities Biodiversity strategy	Most relevant biodiversity content: "KPIs Reports"; Biodiversity strategy is in "Our Management"; Vision of Risks; Commitments are in "Voluntary Initiatives" and in "Commitments with Biodiversity Conservation"; Policies and Standards Biodiversity_ESG_website.pdf

## C16. Signoff

### C-FI

**(C-FI) Use this field to provide any additional information or context that you feel is relevant to your organization's response. Please note that this field is optional and is not scored.**

In the absence of the CEO, the Chief Financial Officer (CFO) takes responsibility for approving Vale's CDP questionnaire responses.

### C16.1

**(C16.1) Provide details for the person that has signed off (approved) your CDP climate change response.**

	Job title	Corresponding job category
Row 1	Executive Director of Finance and Investor Relations	Chief Financial Officer (CFO)

## SC. Supply chain module

### SC0.0