



Integrated Report 2023



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Letter from the CEO

We are a mining company evolving for the better. We recognize that an ever-changing society demands even greater commitment from the private sector to the future of people and the planet. The energy sector is undergoing a revolution, and Vale is poised to make meaningful contributions to Brazil and the world in the form of minerals for the energy transition. We play a pivotal role in global decarbonization, adopting new approaches to progress in creating value for society.

Our strategy revolves around three pillars: fostering sustainable mining, pushing low-carbon solutions, and maintaining disciplined capital allocation. We've transformed our operations through innovation, aligning our mining practices with the demands of today.

In disciplined capital allocation, we exceeded production guidance and carried out strategic divestments such as the sale of 13% of our base metals business, establishing a strategic partnership with Manara Minerals (responsible for the acquisition of 10%) to unlock energy transition opportunities.

Looking ahead, we are focused on

enhancing our portfolio and customer-centric strategy. By 2026, we will deliver projects that will increase our production capacity in the Northern System (S11D) and the Southern System (Capanema and Vargem Grande), thereby expanding our range of high-quality products while also improving our operational stability.

However, none of this would have been possible without the lessons learned from the dam breach on January 25, 2019, in Brumadinho. This incident has spurred ongoing reflection and action to undertake a commitment to prevent recurrence and inspiring daily efforts to ensure such disasters never happen again in the mining sector. As part of our response, we've not only improved our dam management but also shared our learnings with the industry, working towards reparations for the affected victims and geographies and fulfilling our commitments to Brumadinho and Mariana. Human losses are irreparable, and finding the three victims still unaccounted for in Brumadinho remains our top priority. We extend our heartfelt sympathy to affected families.

We are now a different company—safer and more open to feedback. In 2023, we recorded the lowest accident rate in the past 15 years. Despite being proud of this achievement, our operations

still suffer serious accidents, which is unacceptable. Our priority is therefore continuous learning to keep safe everyone involved in and affected by our activities, underscoring our obsession with safety.

Our tailings dams are now safer than they were five years ago, with 100% of our high-risk structures complying with the Global Industry Standard on Tailings Management (GISTM). We've invested significantly in technology and accelerated the transition to dry stacking and processing to minimize the need for tailings dams, investing over USD 1.6 billion in our dam decommissioning program, with a 43% completion rate so far (13 out of 30 dams).

The climate crisis calls for greater collaboration within our company and throughout the supply chain. Vale's high-quality iron ore can lower emissions of our steel-making clients. Our nickel and copper are vital for batteries and renewable energy chains, with independently verified carbon footprints.

We seek partnerships for the best technological solutions for decarbonization and are blazing a trail in developing MegaHubs



Photo: José Palma

We are now a different company — **safer and more open to feedback.**

Eduardo Bartolomeo CEO of Vale

for producing green steel from low-emission iron ore concentrates. On this front, we launched the world's first iron ore briquette plant at our Tubarão site in Vitória, Espírito Santo state, a groundbreaking Vale initiative after 20 years of research, positioning Brazil at the forefront of global steel industry decarbonization.

We have managed to achieve our target of using 100% renewable energy in Brazil two years ahead of schedule, and are actively investing in new fuels and technologies to further reduce our direct emissions.

At Vale, sustainability in mining means unwavering commitment to diversity, equity and inclusion, leading to the hiring of 7,500 women since 2019 and increasing female and black representation in leadership.

Our efforts are aimed at fostering regional development and building bridges with public and private sectors, social organizations, and local partners, aspiring to lift half a million people out of extreme poverty — a commitment that, in 2023, saw the launch of pilot projects onboarding 30,000 citizens.

I extend my gratitude to our thousands of direct employees, contractors, partners, communities, clients, investors, and others who have supported our journey towards our mission of "improving lives and transforming the future. Together." The more voices and ideas we are able to harness, the greater our likelihood of success on this journey and of creating shared value for society.

GRI 2-22

Letter from the Chairman of the Board

Vale is a forward-looking company, committed to responsible, low-carbon mining, while not forgetting past lessons. Our aim is to be safer, more efficient, and thrive in a dynamic global market. We strive to improve lives, transform the future, and positively impact economies and people, prioritizing environmental, risk and impact management, and contributing to nature conservation beyond our walls.

Operational and dam safety are top priorities for Vale, always cherishing life, preserving nature and guaranteeing non-repetition of incidents like Brumadinho and Mariana. In this regard, the Board monitored progress and compliance with the Global Industry Standard on Tailings Management (GISTM), and the progress of decommissioning upstream dams, which is currently at 43% of its objectives, aiming for 100% by 2035. Due to their complexity and the need to keep employees and communities safe from harm, the process requires caution and has to meet the estimated deadlines for completion.

Vale operates in a particularly challenging sector. Although it

does create socio-environmental impacts, the transition to a green economy can't happen without it. A low-carbon future needs renewable energy sources, low-carbon technology in transportation, green steel and much more. Electric vehicles, wind turbines and solar farms are an inseparable part of this transformational journey.

Nearly 97% of steel is made from iron. Vale is central to this transformation, with our future shaped to ensure sweeping greenhouse gases emissions reductions. We strive to spearhead the low-carbon journey, making the interventions needed to produce materials with a smaller carbon footprint, harnessing cleaner energy sources, testing alternative fuels, and introducing more efficient processes in our operations and the entire value chain.

Our mission is to develop a low-impact mining model, that drives the energy transition and fosters societal development and transformation, mainly in the territories where Vale operates. We believe in creating shared value, as our future is intertwined with the lives and communities impacted by

our operations. Vale has committed to lifting people out of extreme poverty and firmly upholding human rights within the company and its value chain.

Our commitment to diversity, equity and inclusion, both inside and outside the company, is therefore a relentless mantra. Our progress is evident, as shown by our 2023 goals performance: 24.38% of our leadership positions are now held by women and 34.92% by black people. We work tirelessly to eradicate discriminatory practices, prejudice and harassment of any kind.

The Board faces challenges, especially essential topics for our future. The 12-member Board, with diverse and complementary skills and experiences, is fully engaged in Vale's challenges.

In April 2023, our shareholders elected a Board with 46% renewal percentage. For the first time, Vale's Board elected a Lead Independent Director, thus enhancing governance and shareholder relations.

Success depends on excellence in identifying, managing and addressing business risks and opportunities. We are always learning and working in collaboration with key stakeholders to incorporate these lessons. Today,



Together, we are building the Vale of the future and look forward to continuing to improve life on the planet.

Daniel Stieler Chairman of the Board of Directors at Vale

we are striving to be a disciplined operator and grow sustainably, becoming a global player supplying minerals to facilitate the transition to a low-carbon economy.

In 2023, we practiced disciplined capital allocation and achieved production stability. We created a new holding company to consolidate our Energy Transition Metals assets, allowing for long-term partnerships and investments to jointly drive business growth, unlocking this segment's potential value. The Board played an active and decisive role in this transaction, while also monitoring advancements towards the non-core asset divestment program, following the divestments of Companhia Siderúrgica do Pecém (CSP) and Mineração Rio do Norte (MRN).

I extend my gratitude to each member of the Board of Directors and of the Corporate Governance team for their unwavering emphatic commitment to Vale's continuous and sustainable success. Detailed in the "Corporate Governance" section, our work

this year has undoubtedly allowed Vale to navigate in the right direction. I also pay tribute to Vale's management and all our employees and contractors, thanking them for their engagement and hard work, enabling us to fulfill our commitments in a challenging year.

I reiterate our loyalty, diligence and fiduciary duty to all Vale's stakeholders, especially our investors, whose trust and support are invaluable as we continue advancing towards our sustainable and responsible mining goals.

Together, we are building the Vale of the future and look forward to continuing to improve life on the planet.

GRI 2-22


About the Report


Vale's 2023 Integrated Report explores lessons learned in recent years and how they have led to a profound cultural transformation and tangible changes in our management that are already delivering results, which impacts business performance, and contributing to more responsible mining.


These commitments are at the heart of Vale's strategic positioning, defined in 2022 and based on three strategic pillars: championing sustainable mining practices, developing low-carbon solutions, and maintaining disciplined capital allocation, while achieving production volume and competitive costs consistently, efficiently and safely. We have decided to mirror this structure in the organization of our report, with the content divided into three major sections representing each of the three pillars.

In the first section, comprising nine chapters, we present aspects that Vale believes are integral to sustainable mining and how our strategy and performance aims to support each of these ambitions. In the second section, we present the low-carbon solutions that are driving our decarbonization efforts and renewable energy solutions. Finally, in the third section, we show how governance, risk management, and financial management have helped us in our mission to maintain discipline and enhance business results.

The lessons, challenges, and progress we share in this report were largely compiled through a stakeholder engagement exercise. Listening to these publics resulted in the selection of material topics (see more in Materiality) that we report on through indicators, management approaches and accountability on environmental, social and governance topics.

If you have any questions, suggestions, or feedback about this report, please reach out to us via our  [Contact Us channel](#) or the toll-free number **0800 285 7000**.

 Learn more about our [Reporting, Grievance, and Feedback Mechanisms](#).
GRI 2-3

 For further information about our reporting methodology, see the section [About This Report](#).

ESG Databook

Refer to the [ESG Databook](#), attached to this report, which includes content from GRI; the SASB Mining & Metals standard; TCFD; WEF Key Metrics and the SDGs, as well as adherence to the Mining Principles of ICMM. The basis for preparation cited in the PwC Assurance Report is in the Databook.

Canaã dos Carajás, Pará, Brasil.



The lessons, challenges, and progress we share in this report were largely compiled through a stakeholder engagement exercise.



Serra Sul Complex, in Canaã dos Carajás, Pará, Brazil.

GRI 2-1

About Vale: Who we are

We are a company of almost 235,000 people—including employees and contractors—producing iron ore and energy transition metals solutions globally. Vale is one of the world’s largest producers of iron ore, pellets, copper and nickel, with a portfolio that also includes, platinum group metals (PGMs), gold, silver, cobalt, and more recently, iron ore briquettes.

Alongside our mining operations, we manage an extensive network of logistics systems—including railroads, maritime terminals, ports, and distribution centers—that enable us to deliver our iron ore to customers across the globe. Directly, and through associates and joint ventures, we also have investments in the energy business segment.

Vale is headquartered in Rio de Janeiro, Brazil, and is present in 18 countries. We have been a publicly traded corporation since 1970 and are currently listed in the *Novo Mercado* segment of the São Paulo stock exchange (B3) and on the New York (NYSE) and Madrid (Latibex) exchanges.

Purpose and values

Building the Vale of the Future is an ongoing journey of continuous evolution. We built our trajectory based on collective thinking with different actors in society, reflecting on our learnings and seeking to act in a transparent, responsible, and coherent way.



Our Purpose
We exist to improve life and transform the future. **Together.**



Values

- Life matters most
- Act with integrity
- Value the people who build our company
- Make it happen
- Respect our planet and communities



Why do we exist?

Levers

- Safety
- VPS (Vale Production System)
- People
- Innovation
- Sustainability

What do we believe?



Key behaviors

- Obsession with safety and risk management
- Open and transparent dialogue
- Active listening and engagement with communities
- Empowerment with accountability
- Sense of ownership



How do we act?

Our Ambitions

- Benchmark in safety
- Best-in-class reliable operator
- Talent-driven organization
- Leader in low-carbon mining and ESG practices
- Reference in creating and sharing value



What do we look for?

Strategic pillars

The three pillars that underpin our strategy to create the Vale of the Future are:

Promote sustainable mining

- Benchmark in safety and dam management;
- Regional social and economic development;
- Shared value and trust;
- People-driven culture;
- Nature-positive.

Foster low-carbon solutions

- Iron ore solutions;
- Energy transition metals;
- Customer-centric;
- Technological innovation;
- Circular mining.

Stay disciplined

- Reliable operations and consistent delivery;
- Attractive cash returns for investors;
- Strong balance sheet;
- Cost, CAPEX, and capital allocation efficiency.

Our key drivers to unlock and boost value through 2026 are:



Photo: Marcus Desimoni

Safety journey



Photo: Gabriel Lordello

Iron ore production stability



Photo: Ricardo Teles

ESG leadership

Operations free of Tier 3 tailings dams by 2025 and access to a broader base of investors and indices.

Ensuring a stable production baseline with greater predictability, lower variability, and greater adherence to production plans.

An integrated strategy that includes commitments to embed sustainability into our ongoing business operations, aimed at achieving the **goals by 2030**



Transformation of Energy Transition Metals

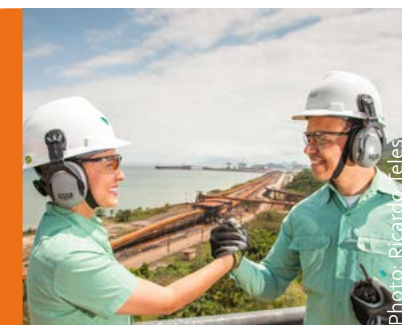


Photo: Ricardo Teles

Iron ore growth and quality



Photo: Gabriel Lordello

Solid progress on decommissioning and reparation in Brumadinho and Mariana. **See more in Performance and Targets**



Asset review and production growth exceeding **70,000** metric tons for copper and **55,000** metric tons for nickel. It is estimated that, in 2026, Vale's nickel production should be between 210 and 230 kt and copper production between 375 and 410 kt.

Execution of strategic projects in key assets with low investment intensity and focus on improving the portfolio's quality, to achieve an estimated iron ore production from

340 Mt to 360 Mt in 2026,

including

50–55 Mt

in agglomerated products.

Business Model

From mine operations to global distribution, there is a lot of organizational planning, financial, operational and logistical planning.

Value capture

FINANCIAL CAPITAL:

- USD **94.2 M** in total assets
- **Conclusion** of Vale's divestment program, with the **sale** of more than **10 non-core assets** in countries since 2019. We eliminated expenses of up to **USD 2 billion** a year, as well as simplifying and reducing business risks. In 2023, Vale sold its **50%** stake in Companhia Siderúrgica do Pecém (CSP) and its **40%** stake in Mineração Rio do Norte S.A. (MRN), including all the associated obligations and rights.

NATURAL CAPITAL:

- **108.9 M m³** of water used for operational purposes
- **147 thousand TJ** of energy consumed (30.5% renewable)
- **89 thousand** hectares occupied by our operations
- **965 thousand** hectares of protected areas

HUMAN CAPITAL:

- **234 thousand** employees (own and third parties)
- **24.4%** women in the workforce
- **34.9%** black people in leadership positions

MANUFACTURED CAPITAL:

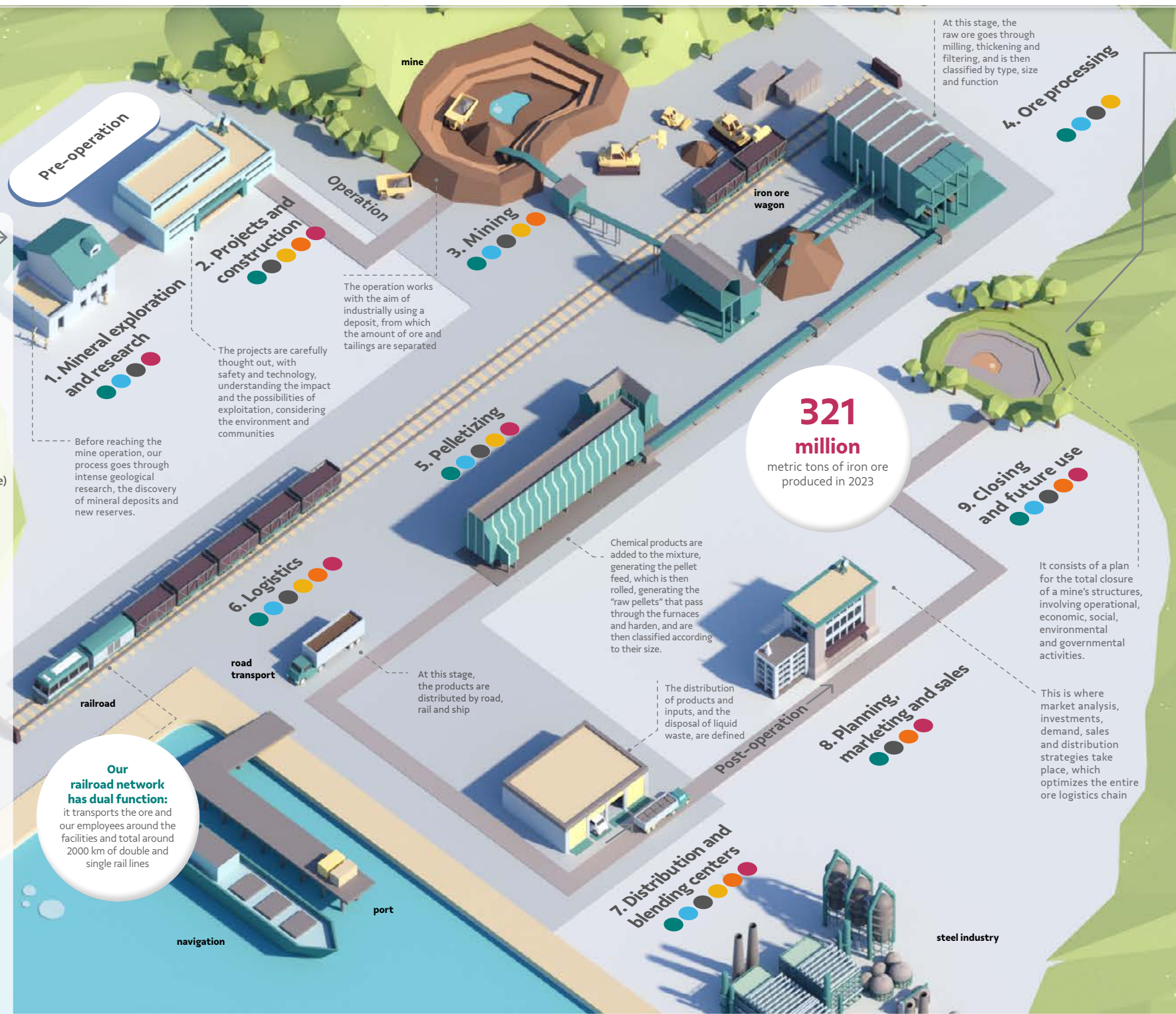
- Operating units in **eight countries**: Brazil, Canada, China, Indonesia, United Kingdom, Oman, Malaysia and Japan
- **~2,000 km** of own railroads

SOCIAL AND RELATIONSHIPS CAPITAL:

- **More than 19,000** suppliers
- **USD 12.8 billion** in local purchases (55% of the total)
- **1574** local communities, **30** Indigenous Peoples and **53** traditional communities mapped

INTELLECTUAL CAPITAL:

- **USD 177.7 M** invested in ITV-DS and ITV Mining since 2011
- **USD 103.8 M** invested in R&D in 2023 by ITVs
- **11 internal innovation hubs** and participation in the Mining Hub
- **76 patents** granted to Vale throughout 2023, 28 in Brazil and 48 abroad



Shared value

FINANCIAL CAPITAL:

- **USD 17.96 Bi** adjusted EBITDA from continuing operations
- **USD 8.1 Bi** of net income from continuing operations
- **USD 7.9 Bi** in taxes paid to governments
- **Approximately 1.6 billion** in social and environmental expenditures
- **Approximately USD 371.5 million** in voluntary investments

NATURAL CAPITAL:

- **9.7 M tCO₂** and emissions (Scopes 1 and 2), a reduction of 20.4% compared to 2017
- **8.94 TWh** of electricity generation (98.7% of which is renewable)
- **11 km²** of restored areas by 2023
- **767.4 thousand** metric tons of non-mineral waste generated
- **483.9 Mt** of mineral waste (waste rock, tailings and slag) generated

HUMAN CAPITAL:

- **Reduction of approximately 70%** in the total accident rate since 2019
- **105 events** with injuries to community members
- **An average of 79 h** of training for all employees

MANUFACTURED CAPITAL:

- **321 Mt** of iron ore; **36.5 Mt** of pellets; **326.6 kt** of copper; **164.9 Kt** of nickel; around **800 kt** of sustainable sand produced from the beneficiation of iron mining tailings
- **1.14 M** passengers transported by passenger trains
- **13 upstream dams** de-characterized in Brazil

SOCIAL AND RELATIONSHIP CAPITAL:

- Vale Foundation: **1.87 M** people impacted, through **32 projects** in the areas of education, health and income generation
- Fundo Vale: around **170 impact businesses** supported (impacting around **3,000 people** directly and indirectly through the initiatives)
- **More than 20,000 complaints** received from communities*
- **1,018 families** involved in involuntary eviction processes

INTELLECTUAL CAPITAL:

- **First place** in the mining category of the Valor Econômico newspaper award and seventh in the overall 2023 ranking. Additionally, we were among the top five in the Estádio innovation award and were recognized as one of the top 10 innovative companies in the mining industry by 100 Open Startups
- **111 scientific publications** and R&D projects supported by ITV

Vale Worldwide

Exploration

Joint Venture

Offices

Headquarter

Operation

Port

Railroad

Underground Mine

GRI 2-1

Activities map:



Vale serves industries, such as the steel industry, on all continents.

GRI 2-6

Americas

South, Central and North America

Europe

including Turkey

Asia and Africa

Middle East, North of Africa and India (Menai)

The Chinese Mainland and

Taiwan, Japan, Korea and Southeast Asia (Vietnam, Indonesia, Malaysia and the Philippines)

Oceania

Australia

In 2023, iron ore production totalled reached **321 million tonnes (Mt)** above our guidance of 315 Mt

321.2 million tonnes of iron ore produced in 2023 – growth of 4.3% compared to 2022.

Pellet feed production grew by **14%**

Copper production increased by **29%**
A total of **326,600 tonnes**.

In nickel, a total of **164,900 tonnes** were produced, 5% less than in 2022.

Product portfolio

LEGEND

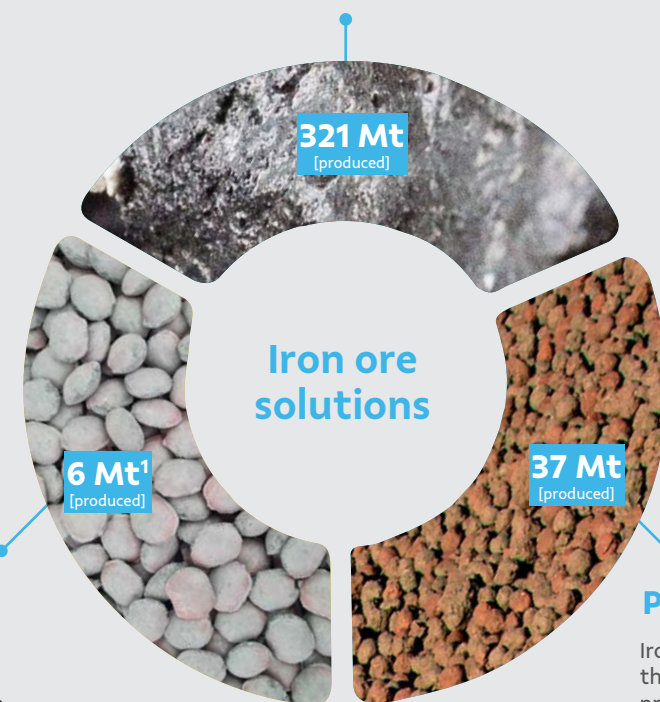
Countries of production

Examples of final products



Iron ore

Found in nature as rocks mixed with other elements. From industrial processes, it is processed and sold to industry for steel production. The iron ore from Carajás, in Pará, is considered the world's best in quality.



Iron ore solutions



Briquettes

Result of more than 20 years of R&D, it is produced from the agglomeration of iron ore at low temperatures using a technological agglomerant solution. It emits less pollutants and GHG compared to pelletizing.



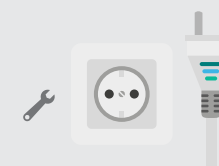
Pellets

Iron ore agglomerates from the fines remaining from ore production. This material goes through homogenization, pressing and heating processes, generating the spherical pieces. To reduce GHG emissions in pelletizing, Vale uses natural gas and biocarbon as fuels.

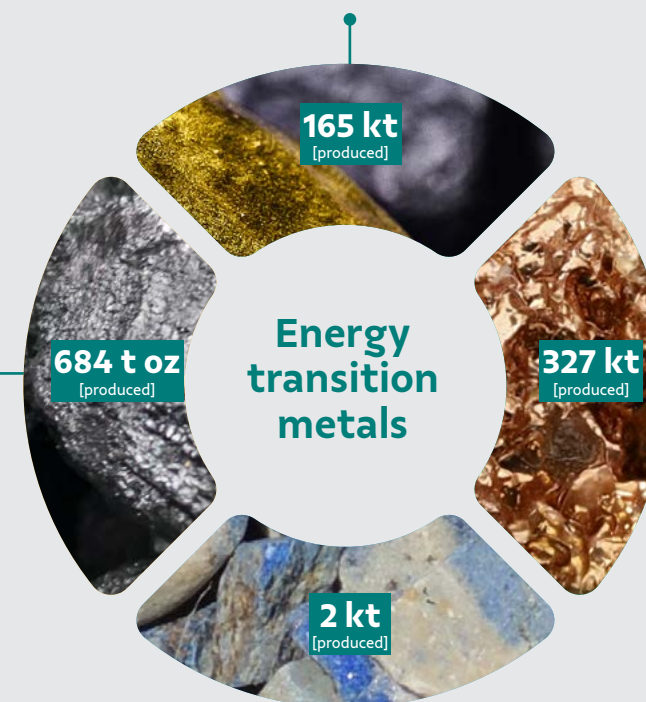


PGM, gold and silver

Platinum group metals (PGM) are byproducts of Canada's operations, as are small amounts of gold and silver. In Brazil's copper operations, there is also a portion of gold in copper concentrates. These products are sold to third parties.



Energy transition metals



Nickel

It is one of the world's most versatile metals, malleable and resistant to corrosion and high temperatures. Vale produces iron-nickel for industrial stainless-steel applications, as well as nickel sulfide and pellets.



Copper



The world's third most used metal: malleable, recyclable, and resistant to corrosion and high temperatures. In its operations, Vale produces copper concentrate and copper mate, which are intermediate products in the production chain, in addition to refined copper cathodes.



Cobalt

A byproduct recovered from nickel operations, being refined and sold as cobalt rounds. Vale's product has very high purity levels (99.8%).



¹ Production capacity per year of the first industrial plant opened, in Tubarão (ES).

GRI 2-22

Business context

The global mining industry continues to face the twofold challenge of meeting growing demand from global value chains while also transforming production models and developing innovative solutions that deliver positive social, environmental, and climate impacts.

As a global company with production operations and customers spanning multiple countries, Vale is alert to changes in the economic scenario and the resulting impacts on our operations, projects, and customers. The business environment in 2023 was highly volatile, with demand for metal commodities in China, the U.S., and Europe contracting by 12.09% according to the Brazilian Central Bank's Brazil Commodities Index.

Vale Base Metals

Our response to the economic scenario was to diversify into and explore new markets within a strategy focused on cost management and new revenue streams. This strategy is responsive to the growing demand for [energy transition metals](#) such as nickel and copper to produce

batteries within the context of the new economy and the development of products that embed sustainability.

We work to position our energy transition metals business as an important player in this sector, resulting in the creation of Vale Base Metals (VBM). Our goal is to boost operational efficiency and leverage a forward-looking commodities platform, supported by a new governance structure as well as a dedicated Board of Directors with in-depth knowledge of the sector.

VBM is uniquely positioned as the largest integrated nickel producer in North America, and among the largest copper companies in the world, with the scale, resources, and capital to supply critical minerals essential to the global megatrends of decarbonization and electrification. The company

has secured agreements to supply low-carbon, high-purity nickel to major automakers and is strategically focused on expanding mine life and developing growth projects across the portfolio.

This strategy resulted in the signing, in July 2023, of binding agreements between Vale Base Metals, Manara Minerals (a joint venture between Ma'aden and the Saudi Arabian Public Investment Fund) and Engine No. 1 (an investment company focused on decarbonization and relocation of supply chains in North America). The partnership aims to meet growing global demand and the expansion of the asset. The total amount paid for the agreements was USD3.4 billion, which corresponds to a 13% shareholding.

In nickel, highlights include the opening of second Onça Puma furnace in Brazil, the Pomalaa and Morowali projects in Indonesia, and the expansion of the Voisey's Bay mine in Canada. VBM is one of the 10 largest copper producers in the Americas, with an operating base concentrated in Brazil that includes the country's largest copper deposit at the Salobo mine, with more than 40 years of useful life remaining.

Another significant development in the year was the start of the implementation of the European

Union's Carbon Border Adjustment Mechanism (CBAM). Under this mechanism, companies exporting to EU countries (including those in the mining and steel industries) now face increased pressure to deliver low-carbon products. While this will result in added carbon pricing costs for the entire industry, it also represents an opportunity for Vale given the superior quality of our iron ore and our position in the transition metal segment.

Our response to the economic scenario was to diversify into and explore new markets within a strategy focused on cost management and new revenue streams. This strategy is responsive to the growing demand for energy transition metals such as nickel and copper.













Totten Mine, in Sudbury (Ontario), Canada. In the photo: central office.

Photo: Alexandre Rezende - Nitro

Performance metrics and targets

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We seek to align our long-term goals with the United Nations' 2030 Agenda for Sustainable Development (SDGs).

Vale Targets	SDG	Baseline	Target	Status in 2023 (progress to date)
Climate change	 	2017 baseline: 12.2 MtCO ₂ e	Achieve a 33% reduction in Scope 1 and 2 Greenhouse Gas (GHG) emissions by 2030. Achieve Net Zero Scope 1 and 2 emissions by 2050.	The progress towards the Scope 1 and 2 target of 33% is 20.4 percentage points.
		2018 baseline: 529.5 MtCO ₂ e ¹	Achieve a 15% reduction in net Scope 3 emissions by 2035.	The progress towards the Scope 3 target of 15% is 14.8 percentage points ² .
Energy		2017 baseline: Global: 79% share of renewables. Brazil: 83% share of renewables.	Global: 100% renewable energy supply by 2030. Brazil: 100% renewable energy supply by 2025. ⁵	88.5% of consumption ³ . 100% renewable consumption, attested by renewable declarations.
		2017 baseline: Global: energy efficiency stood at 0.335 GJ/tFeEq 7 and 8	Improve global energy efficiency indicator by 5% by 2030.	0.351 GJ/tFeEq (4.5% above the 2017 baseline).
Forests		2020 baseline	Restore and protect an additional 500,000 ha of forests outside company properties by 2030.	In 2023, 177,705 hectares were recovered, of which 165,093 were protected and 12,612 recovered.
Improvement in ESG practices		2019 baseline	Eliminate key ESG gaps to best practice – 63 gaps identified.	A total of 57 gaps eliminated.
Social ambition	  	2021 baseline	Attain a top-3 position for social performance in major external assessments.	We moved up in the ratings of the main external indices and ratings (MSCI, Sustainalytics, and DJSI). See more in Indexes and Ratings.
		2021 baseline	Lift 500,000 people out of extreme poverty. ⁴	We started the first concept tests, onboarding 30,000 people into the program.
		2021 baseline	Support all Indigenous communities neighboring our operations in developing plans to secure the rights outlined in the United Nations Declaration on the Rights of Indigenous Peoples.	Support provided to the Kayapó People in developing their Consultation Protocol (ongoing); training on Indigenous rights in Brazil provided to the Guajajara People from the Caru reservation and the Ka'apor People from the Alto Turiaçu reservation.
Air emissions	 	2018 baseline: Particulate matter: 7.4 kt; Sulfur oxides: 147.4 kt; Nitrogen oxides: 74.1 kt	Reduce particulate matter emissions by 16%.	Compared to the base year of 2018, there was a reduction of approximately 10% in the amount of particulate matter emitted in 2023.
			Reduce sulfur oxide emissions by 16%.	Compared to the 2018 figures, there was a significant reduction ² of around 45 per cent in sulphur oxide emissions in 2023.
			Reduce nitrogen oxide emissions by 10%.	Considering the base year of 2018, there was a reduction ¹ of approximately 33 per cent in the emission of nitrogen oxides in 2023.

¹ Due to the divestments of non-controlled companies: CSP (Companhia Siderúrgica de Pecém and MRN (Mineração Rio do Norte), Scope 3 emissions for the base year 2018 were revised and reduced from 553 million tonnes of CO₂e to 529.5 million tonnes of CO₂e.

² These reductions are mainly related to lower production compared to 2018 and also to improved operational discipline. The emissions curve tends to increase with the increase in production in the coming years, being offset by technological initiatives to be implemented by 2030.

³ The percentage of renewable electricity varies year to year depending on consumption, the volume of certificates obtained and the electrical generation matrix of each country in which we operate.

⁴ People living on less than USD 2.15 a day, according to the World Bank.

Vale Targets

Diversity, Equity, and Inclusion



Baseline

Target

Status in 2023

2019 baseline: Women in the workforce: 13%

Increase the share of women in the workforce to 26% by 2025.

24.38%

2019 baseline: Women in senior leadership positions: 12%

Increase the share of women in senior leadership positions (executive manager and above) to 26% by 2025.

24.44%

2021 baseline: Black leadership

Increase the share of Black individuals in leadership¹ roles in Brazil to 40% by 2026.

34.92%

Health & Safety



2019 baseline: 57 N2 injuries recorded

Achieve zero recordable high-potential (N2) injuries by 2025.

A total of 19 high-potential injuries (N2) were reported in 2023.

2019 baseline: 23 thousand exposures recorded

Achieve 50% reduction in exposure to health-hazardous agents in the workplace by 2025.

A total of 10.7 thousand exposure incidents were reported in 2023.

Dams



No tailings dams in critical safety condition (emergency level 3)² by 2025.

A total of two remaining tailings storage facilities with hazard level 3 facilities (Upper South and Forquilha III; compared to a total of four in 2019).

Implement GISTM⁵ in operations:

- 90% compliance by 2022;
- 100% compliance for tailings storage facilities by 2023; and 100% for other facilities by 2025.

In addition to the public commitment, GISTM was implemented for 48 EARs in 2023, considering classifications other than 'Extreme' and 'Very High'. GISTM will be implemented for a further 2 EARs by 2025, completing 100 per cent of tailings facilities in compliance with the Standard.

Decharacterize⁴ all upstream-raised dams in Brazil by 2035.

43%



Photo: Gabriel Lordello – Mosaico

ESG Portal

Vale's ESG Portal offers a repository of up-to-date information about Vale's performance across the environmental, social, and governance pillars. It also provides additional details on the initiatives described in this Report and is a transparent source of data for our stakeholders.

Learn more [here](#).

¹ Considers positions of coordinators and above, including Technical Specialists.

² The emergency level it is a category established by Brazilian legislation (ANM 95/2022) to classify potential risks that could compromise dam safety.

³ EARs (tailings storage structures) consider sediment, water and tailings dams, drained piles, and saddle and internal dikes (tailings dams can also be grouped into dam systems).

⁴ Decharacterization is the process of reshaping our upstream dams areas removing the tailings storage partially or completely, and functionally reintegrating the structure into the environment so that the structure no longer serves its primary purpose of acting as a tailings containment.

⁵ The Global Industry Standard on Tailings Management (GISTM).

GRI 2-12 | 2-25 | 2-29

Stakeholder engagement

“By linking efforts and working together alongside Brazilian Mining Institute (IBRAM), mining companies can share knowledget, experiences, and best practices, especially in ESG. Collaboration between mining companies and IBRAM strengthens the overall industry, supports more effective action on strategic issues, regulation, innovation and technological development, and helps to foster a sustainable business environment.”

Raul Jungmann – CEO of the Brazilian Mining Institute.

Stakeholder	Communities	Employees	Customers	Suppliers
Why we engage	To share information about our operations and their risks and impacts in addition to eliciting and acting on stakeholder perceptions about impacts and community expectations, aggregating opportunities for local development.	To address topics such as our commitment to operational safety, protection of the environment and people—including employees, contractors, suppliers, and communities.	To better understand their needs and address market expectations around product quality and our strategy to reduce carbon emissions throughout the value chain.	To emphasize our requirement for efficient sourcing of materials and services; properly specified items; effective management of materials inventories and of health, safety, environment, and community aspects in our supply chain.
How we engage	<ul style="list-style-type: none">Community engagement plans.Management group discussions and participatory meetings.Community visits and forums to monitor activities with communities.Reporting, grievance, and feedback mechanisms—collecting, documenting, addressing, and responding to community feedback.Human rights due diligence throughout the mine lifecycle, from design and licensing through mine closure, decommissioning, and reclamation.	<ul style="list-style-type: none">Internal communication (360°, webinars, Vale@, Management Newsletter, Intranet, Teams Card, among others).Training and academies.Focus groups, interactive dialogue, collective and volunteering initiatives, and collective bargaining with unions or other labor organizations.Human rights due diligence.Low-carbon forum.	Technical meetings/missions, commercial meetings, technical visits, email and telephone interaction, customer satisfaction survey, forums, seminars, and conferences.	<ul style="list-style-type: none">“Supplier Talks” events.Business rounds to connect large suppliers to local businesses.Human rights training, and events about critical human rights issues.“Open Doors – Pará” event to engage with local suppliers.Events to recognize suppliers that have demonstrated outstanding safety performance.Human rights due diligence.InoveCapital — a web environment offering suppliers streamlined access to working capital loans.
Key concerns and needs	<ul style="list-style-type: none">Local development agenda (support for social programs and job opportunities).Management of risks and impacts from our operations on surrounding communities.Management of impacts, and reparations in Brumadinho and Mariana (transportation, access to water, support, animal rescue, and indemnities).Community safety, related to fatal and non-fatal injuries involving members of the community.Post-mine-closure rehabilitation and reforestation methods.Dam risks and management.	<ul style="list-style-type: none">People management practices.Decent workplace conditions.A diverse, equitable, inclusive, and psychologically safe workplace environment.Freedom of association and collective bargaining;Management of risks, impacts, and opportunities relating to tailings dams.Management of health and safety risks and opportunities;Innovation (investments in R&D, automation, robotics, and artificial intelligence).	<ul style="list-style-type: none">Dam management (policies, commitments, risks, impacts, and opportunities).Eco-efficient production and distribution technology.Post-mine-closure rehabilitation and reforestation methods.Products (portfolio) and solutions to reduce Scope 3 emissions.Carbon capture and storage systems and technologies.	<ul style="list-style-type: none">Compliance with Vale’s procurement requirements and payment terms.Investment in innovation, R&D, and eco-efficient production and distribution technology.Collaboration with suppliers to implement occupational health & safety strategies.Regular supplier communications to continuously improve CARs and risk management processes.Decent workplace conditions.
Reporting and grievance channels*	<ul style="list-style-type: none">Contact Us: https://vale.com/contact-usAlô Vale for railroad-related matters: 0800 285 700 or 0800 021 9934 (for hearing-impaired)Alô Vale for communities: 0800 285 7000 or 0800 021 9934 (for hearing-impaired). Community members can also contact Vale at vale.com/rconline or by speaking directly with a Community Relations representative.Reparation Support Line: 0800 031 0831Whistleblowing hotline: 0800 821 5000 or 21 3485-3000. For Canada: +1 844 450 5001 Other countries: +55 21 3485-3000	<ul style="list-style-type: none">Whistleblowing hotline: 0800 821 5000 or 21 3485-3000. For Canada: +1 844 450 5001 Other countries: +55 21 3485-3000 <div><p>* Vale’s Whistleblowing Channel can be used by anyone, inside or outside the company, who wants to report a case of suspicion or violation of our Code of Conduct.</p></div>	<ul style="list-style-type: none">Telephone and e-mail contacts.Meetings, seminars, and technical visits.Satisfaction surveys.Contact Us: https://vale.com/contact-us	<ul style="list-style-type: none">Minabot¹ via Microsoft Teams tool.Telephone and WhatsApp: 31 39164024.Intranet self-service form.

1 Vale’s corporate chatbot for internal audiences.



Stakeholder	Investors	Partners, academia, experts, nongovernmental organizations (NGOs)	Government agencies	Media
Why we engage	To reiterate our commitment to delivering solid business performance and creating shareholder value.	To establish partnerships and collaborate with experts in various areas of expertise.	To maintain regular engagement within the bounds of good public administration principles. Public agencies make policy decisions on which our highly regulated business depends. They influence the regulatory risks to which we are exposed and are directly involved in granting the licenses and permits required for our business.	To demonstrate accountability and transparency toward our stakeholders and to manage our image and reputation.
How we engage	Meetings, letters, events, site visits, webinars, conferences, non-deal roadshows, ESG Portal, IR website and email, and engagement meetings with the IR team, executives, and the Board of Directors.	<ul style="list-style-type: none">• Meetings and events.• Questionnaires answers, clarification letters, and position statements.• Expert panels at the Vale Foundation and the Vale Cultural Institute.• Sounding Panel—a group of executives specialized in ESG who advise and influence the Company on its long-term strategy and performance.	<ul style="list-style-type: none">• Strategic, political-institutional, and technical meetings• Focus Groups and events and advocacy through trade associations.	Media outreach, responses to media queries and requests for interviews with Vale executives and information about our business and operations.
Key concerns and needs	<ul style="list-style-type: none">• Business performance.• Capital allocation.• Long-term strategy.• Iron ore, nickel, and copper markets.• Good corporate governance (independence and transparency), environmental (water and biodiversity impacts), and social (labor and community safety, human rights, and local community relations) practices.• Climate change and its impacts on our business model; application innovation and GHG emissions management.• Dam management.• Reparations in Brumadinho and Mariana.• Innovation (products, ore, and metal lifecycles, and post-mine-closure rehabilitation and reforestation methods) and eco-efficient production and distribution technology.	<ul style="list-style-type: none">• Cultural transformation and greater transparency around challenges affecting civil society.• Community matters, from community investment and human rights through impacts from dams and mine closure.• Innovation (ore and metal lifecycles and post-mine-closure rehabilitation and reforestation methods) and R&D investment.• Reparations in Brumadinho and Mariana.• Exploration in areas with high biodiversity value.	<ul style="list-style-type: none">• Compliance with social, environmental, and production requirements.• Reparations in Brumadinho and Mariana.• Dam management (risks, impacts, and opportunities);• Innovation (ore and metal lifecycles and post-mine-closure rehabilitation and reforestation methods) and R&D investment.• Topics currently on the agenda: mine waste, water, particulate matter emissions, conflicts with local communities, and mine closure.	<ul style="list-style-type: none">• Media relations are managed both reactively — in response to journalist inquiries on different topics related to the Company — and proactively, through media outreach.• Common reactive media topics include business matters, reparations, and dams.• Common proactive media topics include our sustainability agenda (Net Zero and biodiversity), culture, innovation, and Diversity, equity, and inclusion.
Reporting and grievance channels*	<ul style="list-style-type: none">• E-mail: vale.ri@vale.com• Vale IR Portal.			

*Learn more about our grievance channels at [Contact Us](#) 

GRI 2-12 | 2-25 | 3-1

Materiality

Over the past few years, we have refined our approach to topics that are material to our business. Our most recent review was at year-end 2022 and as no changes were identified in 2023, our focus was on deepening this understanding of the concept of the double materiality approach.

The double materiality method assesses both the external (economic, social, and environmental) and internal (financial) impacts of an organization's material topics. Assessing materiality from these two perspectives enables us to identify the risks and opportunities inherent in our business more accurately using internationally recognized criteria.

During the initial learning phase, we confirmed the relevant inputs to build our materiality, guidelines, assessment models, and other elements used to guide and measure business performance. We likewise confirmed the stakeholders and engagement channels

through which we will elicit external and internal perspectives on impacts and their significance. Our current materiality matrix was revised at the end of 2022 and there were no changes compared to the previous cycle. The current materiality matrix consists of 10 material topics that we will focus on. In addition to these, there are several other topics that we address systematically. Cutting across all material topics, innovation is a driver of value creation and enhances our ability to amplify positive impacts, seize opportunities, mitigate risks, and address negative impacts effectively.

The exercise of identifying material topics consisted of the following steps:

Step 1: Review of external reporting frameworks, reports, and trends in materiality assessments. In this step, the previous 10 material topics were maintained, accurately reflecting the relevant impacts, risks, and opportunities affecting our business and the broader industry.

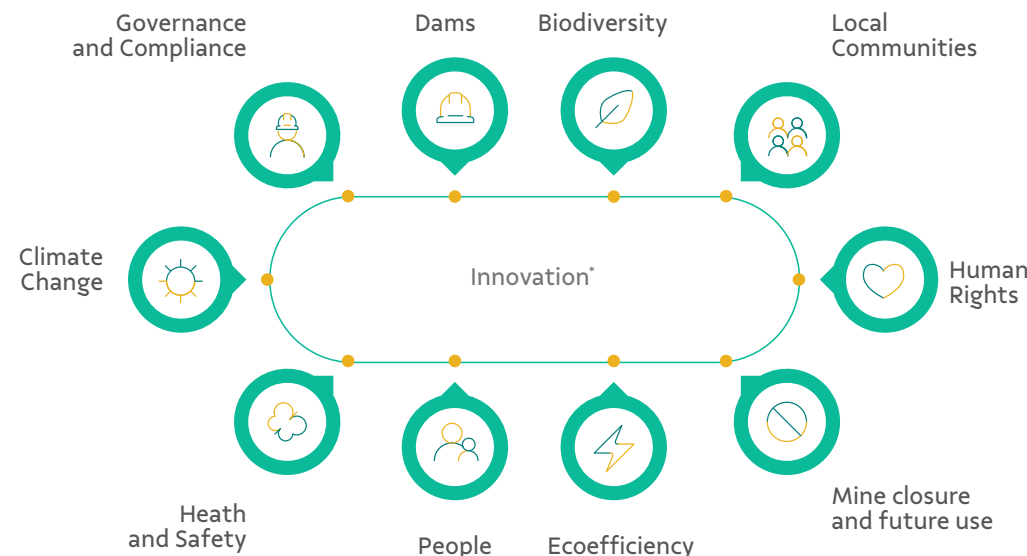
Step 2: Inputs incorporated from permanent stakeholder engagement and listening channels and publicly available information about Vale.

Step 3: A pilot to assess topics on financial materiality based on a review of publicly available disclosure and of the corporate risk management process, especially assessments on the magnitude of financial impacts from business risks.

Step 4: A round of 18 individual interviews with 13 senior executives and five subject-matter experts leaders on the relevant material topics in order to calibrate the results.

Step 5: Final consolidation and validation of results.

GRI 3-2 Material topics



* Crosscutting to all the material themes

See on next pages the relationship between the material topics, standards, frameworks, pillars, values, ambitions, risks, opportunities, advances and challenges.

As part of our commitment to understanding and capturing the perspectives of our stakeholders, we regularly conduct perception surveys regarding Vale's Sustainability performance. In 2023, we conducted 50 in-depth interviews and a quantitative survey involving over 190 representatives from diverse groups, including academics, clients, suppliers, multilaterals, and regulatory entities.

When compared to our industry peers, the general public perceives us to be on par with the sector's average. Conversely, among those subject to in-depth interviews, there is a more favorable perception of Vale's sustainability performance, with 50% considering it above average. However, this positive perception is not uniformly reflected in terms of trust in the company. When analysing the results of the general public's confidence, compared to 2021, there was a 9% increase

in perception in Brazil. Within this audience, 33% express a high level of trust, while 41% maintain a moderate level of trust. When asked, the primary drivers for a moderate level of trust mentioned were the company's response to the impacts of Brumadinho and Mariana, as well as the perception that the company does not consistently act in the best interest of society.

It is essential to highlight that stakeholders also recognize Vale's engagement efforts and demand for an increasingly closer relationship to strengthen communication and active listening. Among the identified opportunities is the necessity for more focused communication and a narrative directed towards the outcomes of our initiatives, along with the potential to demonstrate our role in forest restoration and protection, sustainable mining practices, and dam management.



Dams

GRI content and SASB indicators

GRI 3–3, MM3

SASB Tailings storage facility management (EMMM–540a.1, EM–MM–540a.2 e EMMM–540a.3, 540a.3, EM–MM–150a.5, EM–MM–150a.6, EM–MM–150a.9 e EMMM–150a.10) (EM–MM 210a.1, EM–MM–210a.2, EM–MM–210b.1, EM–MM–210b.2)

Capitals of Integrated Reporting

Natural, Social & Relationship

SDGs 3, 6, 9 and 12



Strategic pillars / Connection with our purpose

Sustainable mining

Value:

- Life matters most;
- Value the people who build our company;
- Make it happen.

Ambition:

- A benchmark in safety;
- Talent-driven organization;
- Leader in sustainable mining.

Risks

- Dam failure.
- Social and environmental impacts.
- Evacuation of areas.

Opportunities

- Technologies for reducing dependence on dams.
- Tailings byproducts.



Biodiversity

GRI content and SASB indicators

GRI 3–3, 203–1, 304, MM1, MM2

SASB Impacts on biodiversity (EM–MM–160a.1, EM–MM–160a.2 and EM–MM–160a.3)

Capitals of Integrated Reporting

Natural, Social & Relationship

SDGs 6, 12, 14 and 15



Strategic pillars / Connection with our purpose

Sustainable mining

Value: Respect our planet and communities.

Ambition:

- Leader in sustainable mining;
- Benchmark in creating and sharing value.

Risks

- Impacts on areas of high biodiversity value.

Opportunities

- Intensify our contribution to the Amazon biome.
- Investment in biodiversity research and conservation.
- Development of impact businesses for biome restoration.
- Development of new technologies that support the prevention of fires and other risks.



Local communities

GRI content and SASB indicators

GRI 3–3, 203, 411, 413, MM5, MM6, MM7, MM9

SASB Community Relations (EM–MM 210a.1, EM–MM–210a.2, EM–MM–210b.1, EM–MM–210b.2)

Capitals of Integrated Reporting

Social & Relationship

SDGs 1, 2, 3, 5, 7, 8, 9, 10, 11 and 17



Strategic pillars / Connection with our purpose

Sustainable mining

Value: Respect our planet and communities.

Ambition:

- Leader in sustainable mining;
- Benchmark in creating and sharing value

Risks

- Social and environmental impacts arising from the operation.
- Health and safety in the communities where we operate.
- Risk of involuntary resettlement and land use conflicts.
- Risk of conflicts with Indigenous Peoples and traditional communities.

Opportunities

- Maximizing value generation for communities.



Human rights

GRI content and SASB indicators

GRI 3–3, 406, 408–1, 409–1, 410–1 SASB Safety, Human Rights and Rights of Indigenous Peoples (EM–MM 210a.3)

Capitals of Integrated Reporting

Social & Relationship

SDGs 3, 8 and 16



Strategic pillars / Connection with our purpose

Sustainable mining

Value: Respect our planet and communities.

Ambition:

- Leader in sustainable mining;
- Benchmark in creating and sharing value.

Risks

- Risks of human rights violations at our operations, and along the value chain

Opportunities

- Advance the inclusion of human rights in all company processes and decision making.
- Contribute to promoting the human rights agenda in companies in the mining sector and in other sectors, in Joint Ventures and with customers.



Mine closure and future use

GRI content and SASB indicators

GRI 3–3, MM10

Capitals of Integrated Reporting

Social & Relationship; Natural

SDGs 1, 2, 6, 8 and 11



Strategic pillars / Connection with our purpose

Sustainable mining

Value: Respect our planet and communities.

Ambition:

- Leader in sustainable mining;
- Benchmark in creating and sharing value.

Risks

- Failure to achieve regulatory and legislative compliance.
- Non-recovery of biodiversity.
- Invasion and misuse of land.
- Limited economic diversification, maintaining local dependence on mining activities.

Opportunities

- Minimize risks in areas where we operate, and generate skills for future uses.
- Generation of value for the areas where we operate, economic diversification and deployment of new business.



Governance and Compliance

GRI content and SASB indicators

GRI 2–9 a 2–21 (General Disclosures – Governance), 2–27, 3–3, 201, 205 and 206

SASB Business Ethics & Transparency (EM–MM–510a.1, EM–MM–510a.2)

Capitals of Integrated Reporting

Social & Relationship; Financial; Manufactured

SDG 16



Strategic pillars / Connection with our purpose

Sustainable mining

Value: Act with integrity.

Ambition:

- Best-in-class reliable operator;
- Benchmark in creating and sharing value.

Behavior: Sense of ownership.

Risks

- Market risks.
- Operational risks.
- Legal and tax risks.
- Mergers, acquisitions and divestments.
- Abusive and discriminatory practices.
- Strategic, financial and cyber risks.
- Changing laws and regulations.

Opportunities

- Cultural Transformation.
- Innovation and new technologies.



Eco-efficiency

GRI content and SASB indicators

GRI 3–3, 303, 305

SASB Quality of Air (EM–MM–120a.1),

Water Management SASB EM–MM–140a.1 and SASB EM–MM–140a.2)

Capitals of Integrated Reporting

Natural, Social & Relationship

SDGs 3, 6, 12, 14 and 15



Strategic pillars / Connection with our purpose

Sustainable mining

Value: Respect our planet and communities.

Ambition:

- Leader in sustainable mining;
- Benchmark in creating and sharing value.

Risks

- Water crisis and unavailability of water.
- Compliance with ICMM quality standards for effluent discharge.
- Atmospheric emissions from operations.

Opportunities

- Expansion of the water monitoring network and identifying new technologies.
- Efficient use of water resources through dry processing.
- Global strategy for reducing atmospheric emissions.



Climate change

GRI content and SASB indicators

GRI 3–3, 201, 302, 305

SASB Greenhouse Gas Emissions (EM–MM–110a.1, EM–MM–110a.2), Energy Management (EM–MM–130.a.1)

Capitals of Integrated Reporting

Natural, Social & Relationship

SDGs 7 and 13



Strategic pillars / Connection with our purpose

Sustainable mining; Low-carbon solutions

Value: Respect our planet and communities.

Ambition:

- Leader in sustainable mining;
- Benchmark in creating and sharing value.

Risks

- **Transition risks:** changes in demand pattern, changes in public policies to restrict emissions, (including carbon taxation) and reputational risk, among others.
- **Physical risks:** increase in average temperature, extreme weather and sea conditions.

Opportunities

- Development of decarbonization solutions.
- Use of proprietary technology to offer more premium products.
- Increasing renewable energy representation in our energy matrix.
- Indicators and requirements for engaging with customers and suppliers.



People

GRI content and SASB indicators

GRI 2–7, 2–8, 3–3, 201, 401, 404, 405, 406, 407, MM4

SASB Labor Relations (EM–MM–310a.1, EM–MM–310a.2)

Capitals of Integrated Reporting

Human, Intellectual, Social & Relationship

SDGs 4, 5 and 8



Strategic pillars / Connection with our purpose

Sustainable mining

Value:

- Life matters most;
- Value the people who build our company;
- Make it happen.

Ambition:

- A benchmark in safety;
- Talent-driven organization;
- Leader in sustainable mining.

Risks

- Local labor laws.
- Hiring of outsourced labor.
- Leadership Succession Plan.

Opportunities

- Implement and accelerate a Technical Training Program for our employees.
- Training and engagement of operational leaders in Cultural transformation.



Health and safety

GRI content and SASB indicators

GRI 3–3,403

SASB Workforce health & safety (EM–MM–320a.1)

Capitals of Integrated Reporting

Human, Social & Relationship

SDG 3



Strategic pillars / Connection with our purpose

Sustainable mining

Value:

- Life matters most;
- Value the people who build our company;
- Make it happen.

Ambition:

- A benchmark in safety;
- Talent-driven organization;
- Leader in sustainable mining.

Risks

- Risks related to workplace accidents and fatalities.
- Risks related to employee health.
- Risk of process accidents or catastrophic events (Process Safety and Operational Risk management) in activities including open pit mining, underground mining, and metal refining and processing.

Opportunities

- Structuring critical control checks.
- Accelerate the use of technology to remove people from risk.

Innovation



Innovation is a key lever in building our future, supported by the company's ongoing cultural transformation.

We leverage four different innovation drivers in support of these efforts:

Research & Development (R&D): Developing advanced solutions to enhance operational efficiency and strengthen Vale's industry leadership in innovative technology.

Open Innovation: Building global partnerships to expand our vision and develop innovative solutions.

Studio: Using agile cycles to develop high-impact projects, collaborating closely with strategic leaders.

Vale Ventures: Catalyzing global innovation by investing in early-stage startups and venture capital aligned with our long-term ambitions to develop a portfolio of disruptive solutions addressing global industry challenges. In 2023, Vale Ventures invested USD 19 million in minority stakes in startups, including follow-on investments in the Boston Metal Series C Funding Round and investments in Allonnia's Series A Extension capital raise, and USD 3 million in venture capital funds, represented by Evok Fund II Limited Partnership and Cathay Innovation Global Fund III.

GRI 2-22

A culture of innovation

GRI 3-3 [Innovation]

Our internal innovation capabilities are supported by a set of key enablers.

Culture and Entrepreneurship, an enabler that enhances our culture of innovation, stood out by our Fluent Leaders program, which provided both theoretical and practical training to 79 leaders in the year.

Innovation Hubs, our "core" enablers, provide a physical and/or virtual environment to develop talents, capture critical and long-standing operational issues, test prototypes, and scale up solutions. In 2023, the network was expanded to include three new hubs, for a current total of 11 units. Sixteen solutions were developed in the year, many of them in collaboration with our external innovation ecosystem.

GRI MM4

Below are two examples:

Mobile temporary facilities – Constructing traditional temporary construction site facilities comprised of concrete foundations and containers is a time-consuming process that can delay construction projects and significantly escalate costs. A solution developed by the Brucutu innovation hub combines rental containers with self-contained truck trailers. This approach reduces site construction time by 75%, minimizes expenses on concrete bases, enhances sustainability by incorporating solar power and environmentally compliant water and sewage handling solutions, and minimizes the risks involved in container handling.

Shipping Platform – This digital transformation program was launched by our Shipping Hub to develop strategic solutions that can streamline Shipping processes. The program enables all parties—from Chartering to Back Office Operations—to manage end-to-end work streams more effectively. Approximately 1,000 voyages, 300 new contracts, and 10,000 transactions in the SAP operational management system per year worth USD 5 billion have now been digitized and automated to some degree on the Shipping Platform.

"We often think about innovation as something far removed from us. And indeed, it can be something entirely different, like a new technology or a new product. But sometimes, innovation lies in how we approach a problem, systematically bringing together different perspectives and insights to develop a process that adds value to our business. The Mundo PM magazine award illustrates how we are helping to shape the future of mining on various fronts within our company."

João Carlos Araujo, General Project Manager, Southeast System

Artificial Intelligence (AI) is reshaping how Vale manages its processes and resources.

For example, our use of AI-powered process control models in ore beneficiation plants has generated a 2% uplift in recovery. As another example, our product availability strategy has been leveraged based on Advanced Analytics solutions supporting our Global CMA strategy, leading to a consolidated gain of USD 214 million from a 2019 baseline. Integration of our Global CMA capacity models with demurrage models has enabled Vale to significantly cut costs, with savings of USD 11.6 million in 2023 through reduced chartering of spot ships.

We have also expanded our engagement with the external innovation ecosystem, particularly in the North through our Belém Digital initiative. Strategic sponsorships, such as Exposibram, Empreende Belém, and Amazônia Summit, are further examples of our commitment to nurturing talent and driving regional development.

In 2023, for the fourth consecutive year, we secured the top position in the mining category of business newspaper Valor Econômico's innovation awards, and seventh place overall. We also ranked among the top five in newspaper Estadão's innovation awards and were recognized as one of the top ten most innovative companies in the mining industry by 100 Open Startups.

1 Global CMA (Asset Monitoring Centre for the acronym in Portuguese) is an area that aims to guide decision-making in asset management and in the planning of the ferrous value chain through information on the health and performance of assets as well as the level of operational performance risk.

2 A contractual charge (\$/ton) calculated when a ship stays longer than the allotted time at a port awaiting loading.

Initiatives

World's first iron ore briquetting plant

In 2023, the world's first of two iron ore briquetting plants started operation at our Tubarão facility in Espírito Santo. As a result of R&D efforts, our innovative briquette product can reduce greenhouse gas emissions by up to 10% in our customer's steelmaking operations, supporting our decarbonization ambitions.

Learn more in [Iron ore initiatives](#).



Photo: Gabriel Lordello

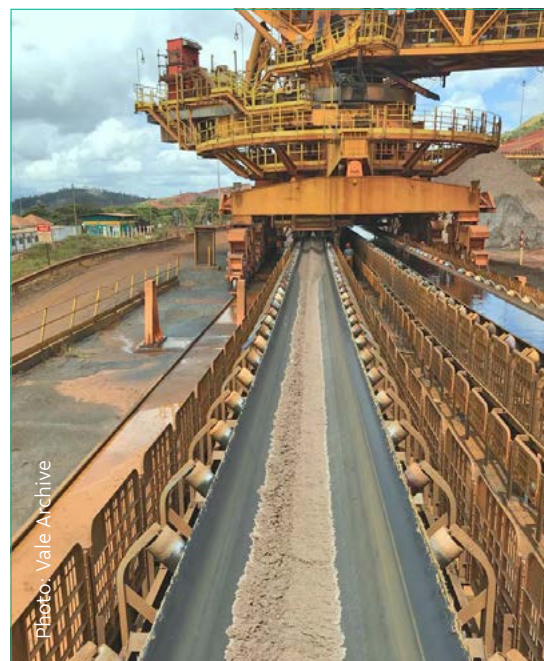


Photo: Vale Archive

Tailings to Resource

In October 2022, we founded Co-log Logística de Coprodutos S.A. (Agera), a startup controlled by Vale responsible for scaling up our sand sales. Agera is dedicated to developing innovative solutions, and marketing and distributing, expanding our sustainable sand business. Since operations began in 2021, a total of 1.7 million metric tons of aggregates have been sold, with expectations to reach 2.2 million metric tons by 2024.

Learn more in [Circular Mining and Mineral Waste](#).

Colabs

Launched in 2023, this initiative incubates and accelerates research, high-potential projects, and go-to-market tests at Vale Institute of Technology (ITV). Three Proofs of Concept (PoC) were developed in the year, including one for soil testing and carbon measurement, aiming to develop a data management platform to track soil quality over time.

Sustainable Dust Suppressor

Developed in a project accelerated by Studio, our new dust suppressor product is the result of 10 years of research and collaboration with the Federal University of Espírito Santo (UFES). PET bottles are used to create the product, which involves a chemical recycling process that turns the bottles into resin for application on iron ore and coal stockpiles. The initiative also promotes social impact, as it is connected to the Reciclo project, which benefits almost 600 recyclable material collectors and carries out actions to improve the physical structure, management, and commercialization of 12 associations.

Learn more in [eco-efficiency](#).

Sprinkling in the storage yard at the port of Tubarão.



Photo: Vitor Nogueira



Photo: Miguel Aun

Jose Bitencourt, ITV-DS researcher, using the Micro CT Scan microscope to analyse microorganisms responsible for photosynthesis and fertilisation of aquatic environments, for the project "Socio-environmental Diagnosis of São Marcos Bay", in Maranhão, Brazil.

Vale Institute of Technology

The Vale Institute of Technology (ITV) is a non-profit organization, founded in 2010, to advance science, technology, and research. The operation has separate chapters including ITV Sustainable Development (ITV DS) in Belém (PA) and ITV Mining (ITV MI), with units in Ouro Preto and Santa Luzia (MG) and Pará. Through ITV, Vale develops technological and scientific solutions that address challenges facing the mining industry and society, and that support social and environmental transformation, helping to build a more sustainable society. In 2023, 64 students graduated from ITV equipped to harness their newly acquired skills and knowledge in science, technology, and research focused on sustainable development.



Photo: Anderson Souza

Canaã dos Carajás, Pará, (PA), Brazil – Aerial view of Veredas dos Carajás Park.

1 Sustainable mining

In this chapter

People

Health & Safety

Human Rights

Territories and communities

Responsible sourcing

Tailings, dam management, and safety

Reparations

Nature

Circular mining and mineral waste

Mine closure and future use

Vale aspires to set the standard for sustainable mining by supplying resources to meet society's needs while striving to learn from the past to build a more sustainable present and future.

To achieve this, we are continuously evolving in our efforts to foster a people-driven culture and become a benchmark in safety; support social and economic development; create shared value; build trust-based relationships; and make a positive impact on the environment.

“Environmental sustainability, developing solutions to preserve biodiversity, and respecting and protecting local communities are values that are noticeably ingrained in Vale’s culture. Whether in office settings or in the field, all Vale employees I have encountered have demonstrated a commitment to these values with a sense of pride. Vale has also become a centerpiece in Amazon ecosystem monitoring. The company is keenly aware that the future of mining, the future of nature, and the well-being of people in the remote areas where it operates are intertwined. This is a significant step forward in the long journey ahead for the mining industry in Brazil.”

Marcos Caramuru de Paiva, a member of the International Advisory Board of the Brazilian Center for International Relations (CEBRI), and a member of Vale’s Sounding Panel.

People

GRI 3-3 [People]

One of the lessons learned from the tragedy in Brumadinho was the need for a culture change at Vale. Our organization will only evolve when our people think and act differently. And this requires changing our team’s entire mindset — that is why we invest so much in our journey of cultural transformation.

To achieve our purpose and ambitions, and to create real change at Vale, we need everyone to act according to our key values and behaviors, as part of a journey of continuous improvement, but one that has already delivered significant tangible results.

Organizational culture

In 2019, we launched an enterprise-wide transformation journey. We conducted our first global culture assessment and, based on the results, we initiated an activation exercise to increase awareness and compliance across all levels of leadership. We reformulated our Purpose Statement and created

a Cultural Narrative as a guide for our transformation journey. We have since run a series of training and development initiatives and campaigns to help build the Vale we want to be and put our cultural transformation into practice.

Measuring our progress on the cultural transformation journey is done in three ways: deliverables, impacts and results. As an example of impact, we can mention the measurement carried out through the Engagement Survey and, as a result, the advances in our Health and Safety indicators and our VPS management system.

Employee engagement

At Vale, we define engagement as the extent to which employees feel connected to the company and the level of energy they put into pursuing organizational goals. We believe that measuring and nurturing engagement is important in fostering behaviors that align with our culture, creating a healthy and safe work environment, upholding organizational practices that create a sense of belonging, and managing people in a human-centric manner that encourages continuous learning. We gauge engagement by assessing employees’ perceptions across five key pillars: culture, leadership, career development, well-being, and sense of belonging.

In 2023, we conducted our first-ever company-wide engagement survey since embarking on our cultural transformation journey. The response rate was exceptional, with 76% participation from across our workforce and an overall favorability rating of 82%, with significant improvement in the leadership and career development dimensions.

The survey results show important improvement. This inspires us to continue our transformation journey with a focused and purposeful approach, implementing actions that foster key behaviors such as open and transparent dialogue and empowerment with accountability.



Photo: Marcus Desimoni – Nitro

“I’ve been working in Maintenance for three years and, in this short time, the workplace environment for women at the Port has significantly improved. It is increasingly inclusive and more open to diversity, including women, especially in terms of work shifts, change rooms, etc. One improvement has been having more women in maintenance positions on the night shift. A year ago, there were very few women working the night shift. But conditions are now becoming more equal, and we’ve seen this improvement.”

Yonara Felix Emídio, a tire repair technician at the Port of Tubarão, Espírito Santo, Brazil.

Vale has implemented a range of initiatives in response to the engagement survey findings, including leadership development programs, a review of our VPS framework (specifically the culture and engagement dimensions), targeted communication campaigns for operational staff, and real-world transformation stories shared by employees as a source of learning and inspiration.

“We strive to learn together through respectful interaction, active listening, keen observation, and awareness of our role, both in the process of repairing damages and in the development of the people and communities around us. We are changing from the inside out, working today to build the company we want to be tomorrow. And in line with our purpose and values, we are shifting our company towards the Vale of the Future—a more sustainable, efficient, and innovative enterprise.”

Paula Salles, Culture and Engagement Manager.

2023's Engagement Survey

82%

Favorability rating

76%

Response rate
(38,355 respondents)

Evolution by pillar %

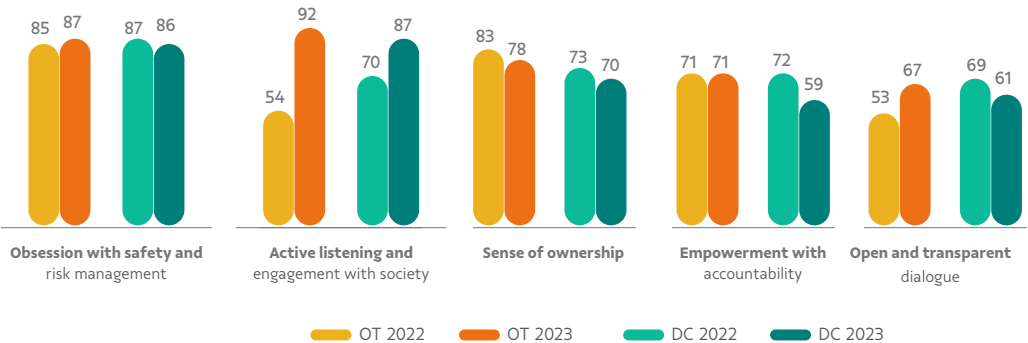
Operations technicians (OT)



Digitally connected (DC)



Evolution of key behaviour %



Workforce

GRI 2-7 | GRI 2-8

At yearend 2023 we had a workforce of

234,566 employees

66,807

employees

167,759

contractors

Year	Employees	Contractors	Total
2022	64,516	150,831	215,347
2023	66,807	167,759	234,566

Employees and contractors by country in 2023

Country	Employees	Contractors	Total
Brazil	55,247	152,977	208,224
Canada	6,810	1,946	8,756
Indonesia	3,166	10,639	13,805
Malaysia	377	964	1,341
Oman	594	1,016	1,610
Other	613	217	830
Total	66,807	167,759	234,566

Number and percentage of employees by work contract and by gender

2023

	Men	Women	Total
Employees	50,509 (75.6%)	16,298 (24.4%)	66,807
Indefinite term	50,304 (75.8%)	16,090 (24.2%)	66,394
Temporary	205 (49.6%)	208 (50.4%)	413

Contractors

	Total	%
Administrative and operational contractors	113,617	68%
Temporary	9,190	5%
Indefinite term	104,427	62%
Project-based contractors	54,142	32%
Temporary	3,949	2%
Indefinite term	50,193	30%
Total	167,759	100%

Number of employees self-identifying as black

Functional category	
Executive	28
General Managers	41
Managers	273
Coordinators	426
Supervisors	932
Technical Specialists	23
Administrative Staff	751
Operational Staff	28,927
Professional Technicians	5,021
Total	36,422

We have undertaken a commitment to ensure that

40% of our leadership positions (managers and above) in Brazil are filled by black employees by 2026.

In 2023, we achieved a representation of

34.9% an increase of 2.8% from 2022, and 6% above our 2021 baseline.

Diversity, Equity, and Inclusion

Our global, proactive approach to Diversity, Equity, and Inclusion builds on lessons learned throughout Vale’s transformation process. We recognize the importance of striving for a more diverse, equitable and inclusive workplace that mirrors the full spectrum of diversity in society. This not only creates competitive advantages but also enhances our role as a more socially responsible and sustainable mining company.

We are committed to creating a workplace environment where all individuals feel respected and where their voices and ideas are valued. Our [Diversity and Inclusion Policy](#) outlines six key commitments that guide Vale’s actions in this area ([learn more on our website](#)).

We have implemented a set of inclusive practices, policies, and processes, including professional training programs; career development initiatives; training on combating harassment, discrimination, and prejudice;

and inclusive recruitment practices. Furthermore, we have established significant partnerships with movements such as the Pact for Racial Equity, Mover and the LGBTI+ Business Forum. Partnerships that not only reflect our core values but also play a crucial role in supporting ongoing learning. These efforts, combined with ongoing progress assessments, are helping us move closer to building a more diverse, equitable and inclusive company.



“Looking a few years back, representation of black women was virtually non-existent. It simply wasn’t there. Since then, opportunities have been created for me to reach this position, and it’s now my turn to pave the way for others. That’s what I’m here to do. Today, as I walk through the corridors at Vale, I’m surrounded by others like myself. I see fellow black individuals, other women. I can relate to these people.”

Gesiany Santos, Occupational Safety Engineer, Serra Sul, Carajás/PA

Women by employee category



Gender equity

We continue to work toward our goal of doubling the share of women in the workforce by 2025; we closed 2023 with over 7,000 more women in our workforce compared to the 2019 baseline. The number of women in senior leadership positions increased by 120% compared to 2019.

People with disabilities

Vale works to advance the inclusion of people with disabilities (PwD) in the workplace and concluded 2023 with 2,935 employees with disabilities filling various roles within our organization. One of our focus areas is accessibility; we actively identify and address the barriers to an equitable work environment. We also support career development and seek to cultivate a workplace environment that is free from ableism.

Our Autonomous Program, which is gradually replacing manned equipment in Vale's operations, has created new opportunities for individuals with disabilities to fill roles that may have seemed unattainable in the past. To date, twenty employees with disabilities have been successfully integrated into this program and trained either to assume new roles or on new approaches to their existing roles. Leveraging technology, this initiative is not only enhancing efficiency but also improving safety and sustainability across our operations.

In 2023, we continued to advance our *Potencializando Talentos PcD* ("Supporting PwD Talent") program, which prepares employees with disabilities in senior positions to take on more complex roles. Also, we launched a second program, *Empoderando Talentos PcD* ("Empowering PwD Talent"), designed to accelerate the careers of employees in assistant, or early analyst career stages.

Anti-harassment initiatives	All employees – Global	In 2023, in compliance with Law no. 14,457, we launched an online training program titled "Speak Up – Combating Sexual Harassment in the Workplace." This training is mandatory for all Vale Brazil employees. We achieved 98.5% participation in 2023. We also ran communication campaigns across all regions where we operate, reiterating our zero-tolerance stance on any form of harassment. Our website's dedicated anti-harassment page is open to the public, with over 6.7 thousand views in 2023.
Action to combat violence against women	All employees – Brazil	We work to raise awareness about women's rights, violence against women beyond physical assault (such as psychological, sexual, financial, and emotional abuse), and available whistleblowing and help channels. In 2023, 720 individuals underwent training across 24 sessions. We also organized a Stop Violence Against Women Parade, an event that was streamed live to 6,277 viewers and was subsequently shared through our communication channels.
The role of men in championing gender equity	All employees – Brazil	We also work to address the impact of gender issues on men's lives. We encourage male employees to challenge traditional expectations of masculinity, consider their role in fostering harassment behaviors, and engage in conversations with other men about gender issues. Eighteen sessions were conducted, with a total of 540 participants.
Professional Training Program	Audience: Women from communities where Vale operates – Brazil	In partnership with the SENAI Trade School (Brazil), our Professional Training Program (PPF) offers technical-operational training in careers such as equipment operation, industrial mechanics, and electrical and electronic maintenance. In 2023, over 760 women were hired through the program.
Career Acceleration Program for Black Women	Audience: 50 black women from the job market – Brazil	In collaboration with career and racial equity experts, this initiative prepares black female employees to take on more strategic or leadership roles.
Women Talent Acceleration Program	Audience: 25 spots for female employees – Brazil	This program accelerates the development of skills and competencies among participants, increasing their readiness to assume more complex roles in the future.
PwD Talent Acceleration Program	Audience: 25 spots for non-leadership PwD employees, in a minimum position of Senior Staff	This program accelerates the development of skills and competencies among participants, increasing their readiness to assume more complex roles in the future.
PwD Talent Empowerment Program	Audience: 50 spots for Vale PwD employees up to university-level staff – Brazil	This program offers a journey of self-discovery, with a focus on skills building, personal development, and cultivating a new mindset and approach to career challenges.
Vale Pride Celebration	Audience: Vale Employees – Brazil	Since 2021, Vale has organized Vale Pride Celebrations, which bring together thousands of employees from across Brazil to reflect on respect and inclusion and to celebrate LGBTQIA+ pride.

Attracting and developing talent

GRI 2-24 | 3-3 [People] | 404-1

We strive to attract and retain the best professionals who align with our purpose and culture, and to achieve our ambition of becoming a talent-driven organization.

In Brazil, we use a strategic recruitment approach aligned with the Vale Production System (VPS). We focus on the candidate experience, with diversity being a foundational pillar of our strategy for attracting and selecting talent. We seek to increase the representation of different minority groups, using affirmative action as a tool for inclusive recruiting. In 2023, we hired 3,252 women, a 10.68% increase from 2022, and additionally hired 3,946 black people in Brazil, representing 67.8% of our hires in the country. We also increased our efforts to recruit local talent in the North of Brazil, resulting in 1,324 new hires from the region by year-end.

We know that professional development is especially critical to early career professionals. With this in mind, our entry-level programs offer training and education. These programs are also held in the communities where we operate to support local employment.

Vale’s “Six-hour Internship” program, one of our flagship gateway initiatives, attracted over 48,000 applications and recruited more than 700 people, with 59.4% identified as black and 52% as women. In Pará, our “Eight-hour Internship” program recruited 58 interns from throughout the state. These programs work with educational institutions in the region to cultivate young professionals.

Another initiative providing entry-level career opportunities is our trainee program, which, in 2023, recruited 37 recent graduates in engineering or geology for roles in Vale’s operations in Pará and Maranhão. Meanwhile, our professional training program welcomed over 1,000 operational trainees into our workforce, including 700 women. These figures underscore our commitment to the future of our organization, and our progress in 2023 toward our target to increase female representation.



Photo: Marcus Desimoni

“I always encourage my daughter to view the mining industry in a positive light, emphasizing its essential role in our lives beyond mere resource extraction and disturbed land. Having spent 18 years building my career here, I take great pride in being part of Vale. Perhaps my daughter will follow in my footsteps; she’s currently taking a course in railroad maintenance, which will also equip her for a potential career in mining, although her generation is more critical of the industry.”

Derilda Rocha, Affiliate Analyst at the Tubarão Pelletizing Plant and proud mother of Sofia, a railroad maintenance student at IFES.

Valer Learning Ecosystem

We believe that continuous learning is a competitive differentiator for any Organization. Always learning together means believing in the continuous improvement of people and also in being open to new things. It is based on this premise that our learning ecosystem – Valer – is based.

Valer is an interconnected system of internal and external partners, educational organizations, and technology platforms that supports employee development and the creation of shared value within communities. Vale’s learning solutions are designed in alignment with our strategic objectives and the unique needs of each audience, including both hard and soft skills.

Valer’s training programs are segmented into five primary audiences: all employees and communities, prospective hires, operations technicians, specialists, and leaders. For each audience, training solutions

extend beyond conventional training formats to include day-to-day skills, peer-to-peer learning, and hands-on activities. Valer not only addresses immediate development needs but also helps to build a future-ready workforce.

GRI 404-1 Training Hours

Functional Category	Average training hours
Director	9
Manager	23
General Manager	13
Coordinator	49
Supervisor	67
Technical Expert	13
Administrative Staff	51
Operational Staff	96
Professional Technician	43

Succession planning

GRI 404-2

Looking after the health of our talent pipeline is one of the main pillars that underpins our ambition to be a talent-driven company and makes our organizational longevity possible.

Vale’s Global Talent Review process tracks career progression, development, and readiness among potential successors for critical roles, 119 of which were identified in 2023.

Remuneration

GRI 202-1

Vale pays no less than the legal minimum wage, and there is no significant¹ difference in remuneration between men and women in the same roles, as established in our Human Resources Policy. Any differences in compensation relate to employees' varying seniority levels and maturity in their positions. [GRI 405-2](#)

We pay 100% of our employees a living wage², according to an external assessment carried out in 2022. Deductions or restrictions on remuneration that could result in the employee being indebted to the company are prohibited.

Union relations

AVale works to maintain positive relationships with labor unions in all the countries where we operate, seeking to resolve disputes through regular meetings and consultations with union representatives.

We uphold the principles of freedom of association, aligning our practices with the Vale Code of Conduct, local labor laws, the eight Fundamental Conventions of the International Labour Organization (ILO), and the guidelines of the Organization for Economic Co-operation and Development (OECD). Where local

legislation in a given country imposes restrictions on freedom of association, we work with equivalent labor organizations.

Collective bargaining

Collective bargaining is an ongoing practice in most of the countries where we operate, with 94% of employees covered by collective bargaining agreements.

GRI 2-30 | 407-1

Notably, there have been no employee strikes within our workforce in Brazil since 1989. During this period, we have pursued amicable negotiation and dispute resolution. This has been supported by dialogue with unions and training provided to leaders on labor relations matters. Labor disputes and litigation involving the company and unions have also decreased.

GRI MM4

The number of employees voluntarily affiliating with unions has increased. In Brazil, all employees are covered by collective bargaining, involving 12 unions, and more than 15,000 are voluntarily affiliated with the union entities that represent them.

GRI 2-30

Health & Safety

GRI 3-3 [Health and safety]

Our Health and Safety strategy is supported by the Vale Production System (VPS) and is guided by our core value of "Putting Life First," which permeates all our efforts and commitments to improve safety performance, in line with our [Sustainability Policy](#), [Human Rights Policy](#) and [Code of Conduct](#). This strategy is based on three pillars: preventing injuries and chronic illnesses, preventing fatalities, and preventing catastrophic events.

Integrating risk management into our planning has supported improved safety performance at Vale. Ensuring our leaders are committed to employee safety is equally essential to improving performance. That is why we introduced "Leading with Safety" (LWS) over a year ago, a behavioral development initiative for leaders that aims to embed safety and accident prevention into daily decisions. Throughout 2022 and 2023, approximately 900 people in leadership roles³, representing around 22.9% of Vale's leadership personnel, underwent training as part of the LWS program. The expected results of this initiative include heightened engagement and enhanced integration between production processes and safety protocols.

Risk assessments seek to identify and map out risks as well as appropriate controls, communication, and reporting flows for all levels of the organization. We conduct regular assessments against criteria established in the

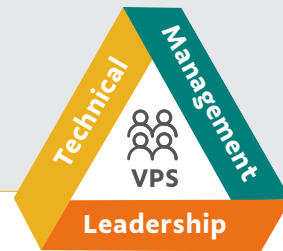
Vale Production System. These assessments seek to prevent and mitigate risks, support continuous improvement in occupational safety, and ensure the well-being of our employees.

Our key safety-related practices include:

- Process Safety Management (PSM);
- Asset Integrity Standards (PNR);
- Job Risk Assessments (ART);
- Permit to Work (PTW);
- Critical Task Requirements (CTRs);
- Health, Safety, and Environmental Management for Contractors;
- Corporate guidelines on implementing the Golden Rules;
- Encouragement for all employees and employees of contracted companies to report and deal with potential incidents that could cause fatalities;
- Health Risk Assessment (HRA);
- Health Risk Exposures (global corporate guidelines for managing occupational health programs);
- Disability Prevention (guidelines featuring tools for integrated management of individual and collective quality of life).

Safety Culture and the Vale Production System (VPS)

The Vale Production System (VPS) is the basis of our management model. It is designed for results, comprising a set of policies and practices to ensure safe, environmentally compliant operations while safeguarding asset integrity. The VPS has three core dimensions: leadership, technical, and management.



Technical

Policies, guidelines, and common technical process requirements for managing assets and addressing inherent business risks.

Leadership

Practices expected to reinforce key behaviors and shape organizational culture and discipline.

Management

Management routines, methodologies, and tools expected to sustain and improve results.

¹ The current difference is a maximum of 4 percentage points plus or minus.

² Pay a living wage means providing the means for an individual/family to purchase the goods and services necessary to attain a basic standard of living (food, housing, education, transportation, leisure, culture, etc.) aligned with the social and cultural expectations of the community and/or country in which the individual is located.

³ Leaders include the CEO, VPs, Directors, General Managers, Executive Managers, Managers and Coordinators.

⁴ More information about Health and Safety initiatives at the ESG Databook, tab "Social Data".

The VPS has three core dimensions—leadership, technical, and management. Each dimension has a set of related minimum requirements that are supported by a suite of policies, standards, and procedures to guide implementation and improvement in each process. Performance improvement is measured in annual cycles.

Implementation of the VPS is mandatory, and its principles are embedded in our employees’ day-to-day tasks, irrespective of their level or department, whether operational or administrative.

Using the PDCA (Plan, Do, Check, Act) improvement cycle, the VPS supports performance management through structured problem-solving, delivering sustainable outcomes end-to-end. The system covers requirements laid out by international standards such as ISO 9001 (Quality Management Systems), ISO 14001 (Environmental Management Systems), and ISO 45001 (Occupational Health and Safety Management Systems).

An important instrument for performance improvement and cultural transformation, the VPS promotes operational discipline, data-driven decision-making, best practices, and people development. It provides guidance on how processes are understood, structured, and improved to achieve sustainable outcomes and cultural transformation. Since implementing the VPS, we have seen consistent improvement in the safety and reliability of our operations.

Safety Transformation Program

Our Safety Transformation Program was created to accelerate health and safety outcomes by leveraging technology. It provides technological support to meet minimum safety requirements, with a focus on anti-collision and rollover protection for heavy mining vehicles and mobile equipment (CTRs 2 and 3), lockout-tagout and electrical safety (CTRs 4 and 10), and machine risk assessments (CTR 7). It also features remote operation and sensing solutions to reduce exposure to collective risks in tailings storage facilities and Self-Rescue Zones (SRZ).

Program outcomes in 2023 included:

- Implementation of a corporate solution for access control in all 24 SRZ areas with a high degree of risk (level-2 and level-3 dams) and structures subject to legal requirements;
- Implementation of 13 solutions aimed at removing and/or reducing the exposure of people to High-Consequence Risks, with the remotion of exposure of 129 employees from severe risks.
- Conduction of more than 800 risk assessments through the Proteger system (CTR 7);

- Around 250 personal voltage detectors – which warn of the existence of energised equipment –were deployed in response to CTR 10;
- Around 70 robots for inserting and extracting switchgear currently operational in electrical rooms in various operating regions.

In addition to these outcomes, in 2023, considerable effort was directed toward enhancing the maturity and controlling the efficiency of existing solutions through optimization and synergies, seeking to provide the best possible experience for employees. This included a reorganization of efforts and continuous improvement work focused on monitoring and sustaining safety technology solutions for safety, involving analysis of monitoring centers, standardization of working hours, actions to deal with deviations for detecting drowsiness and proximity alerts, and above all management of adoption and efficiency indicators, which were shared in routine meetings and behavioral dialogues. The investigation of safety events at Vale was also supported by the Safety Transformation Program.

The initiatives we have undertaken have already had a significant impact, including reductions in high-consequence events involving motor vehicles (CTR 2), mobile equipment (CTR 3), and energy lockout incidents (CTR 4) when compared to 2019; and mitigation of actual risks through adjustments to approximately 13,000 assets (CTRs 2, 3 – Proximity

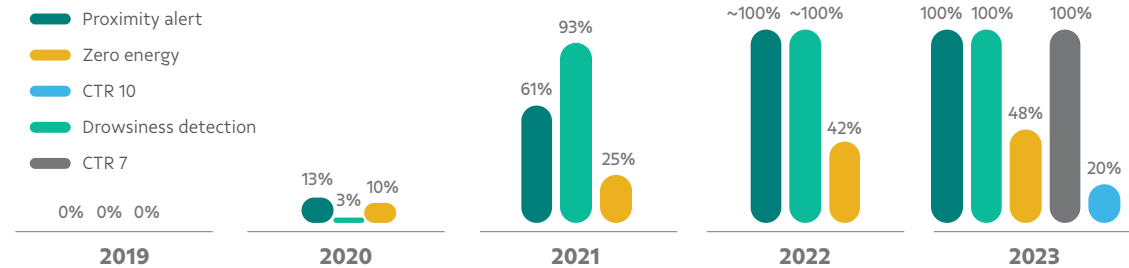
and Drowsiness Detection) and around 600 substations (CTRs 4 and 10 – Hazardous Energy and Electrical Safety).

Despite this significant progress, we know there is much work to be done. In 2024, we will continue to scrutinize our employee safety

practices, aiming to accelerate our CTR compliance, relocate 100% of fixed workstations outside SRZs, enhance solution efficiency and maturity, ensure 100% visibility of individuals in high-risk areas, and improve the efficiency of entry and exit controls at various sites.

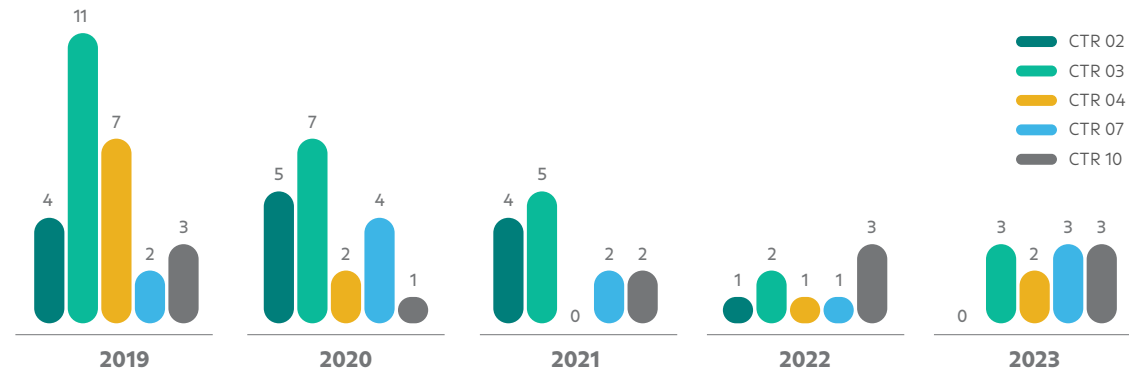
Safety Transformation Program

Accelerating CTR compliance



Total N2 per CTR at Vale Global since 2019

Impact: N2



1 N2 events, according to Vale terminology.

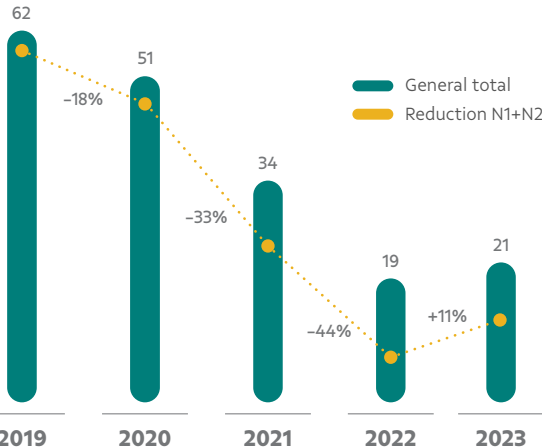
2 The data are for our Iron Ore operations only.

Health and Safety Targets

As part of our commitment to advancing sustainable mining, we work to continuously improve the health and safety of our employees and contractors. Our long-term goals are:

- I. Eliminate fatalities.
- II. Reduce events that generated injuries – absences, restrictions or medical treatment – of high potential (N2), having a reduction of 67% in 2023 when compared to 2019.
- III. Achieve a 50% reduction in exposure to key health-hazardous agents in the workplace from 2019 to 2025. In 2019, we recorded 23,000 incidents, and, in 2023, we reduced that figure to 10,700, a 53% reduction.
- IV. Eliminate all “very high” risks to health, safety, the environment, and communities.

Historical N1+N2



Injuries and fatalities

GRI 403-9 | GRI 403-10

In 2023, the number of fatal incidents (N1) and high-consequence recordable injuries (N2) decreased by approximately 66% (from 62 to 21) from a 2019 baseline, and the total recordable injury frequency rate (TRIFR) decreased by approximately 70% (from 3.48 to 1.06), making it the lowest among the world's major mining companies. These results are directly linked to our leadership's improved performance and reflect Vale's learning journey following the Brumadinho tragedy. Despite this progress, we recognize there is still much to be done to fully eliminate fatalities.

Historically, activities related to working at height, motor vehicles, mobile equipment, blocking energy sources and lifting loads have proved to be the main causes of high potential events (N1 and N2) associated with [Critical Activity Requirements \(CTRs\)](#). In the last three years, these CTRs accounted for 67% of N1 and N2 events. Hence, our Safety Transformation Program is focused on the basics, prioritizing the requirements for CTR 2 (light motor vehicles), CTR 3 (mobile equipment operation), and CTR 4 (lockout-tagout) in our operations.

In 2023, approximately 81% of N1 + N2 events were linked to CTRs; in other words, they were related to known risks. Consequently, our strategy to prevent fatalities is focused on enhancing compliance with related CTRs. In addition, critical risk scenarios

or Material Unwanted Events (MUEs) are assessed using Hazard Identification and Risk Assessment (HIRA), a methodology to evaluate high-severity or high-magnitude operational safety risks across Vale's operations.

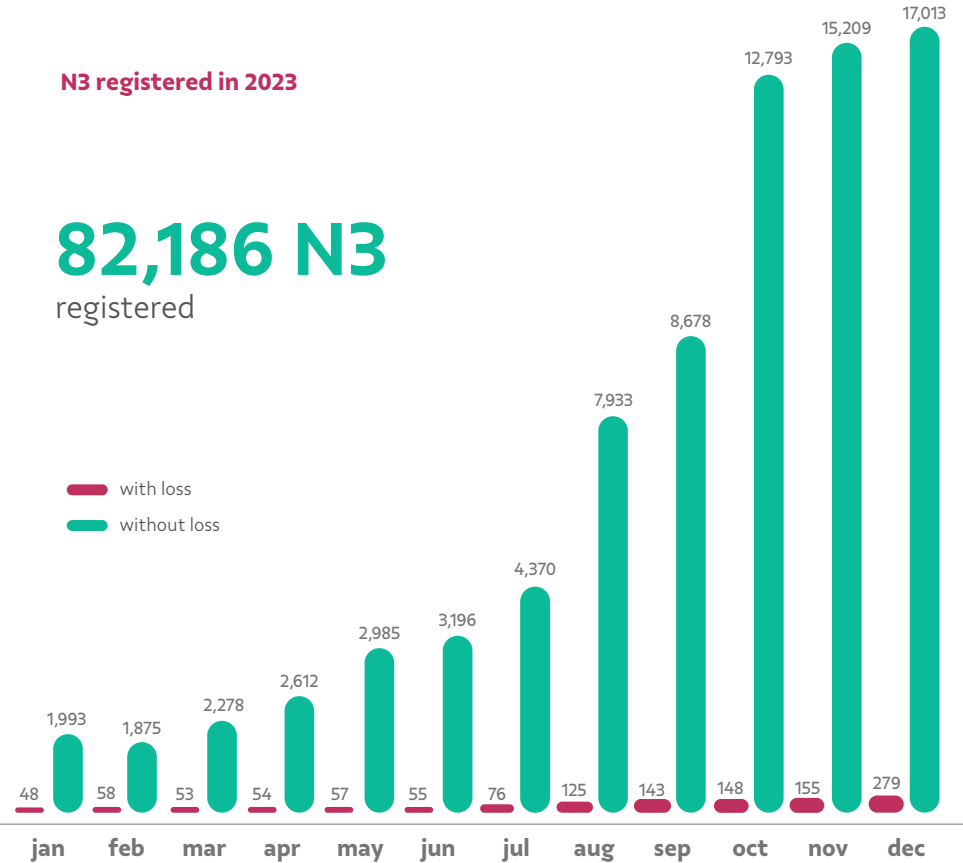
In 2019, we committed to achieving a 50% reduction in exposure to key health-hazardous agents in the workplace by 2025. From 2019 to year-end 2023, we achieved a 53% reduction in exposure through engineering projects, management initiatives, and position sanitation assessments, as well as department restructuring.

Additionally, there was an increase in reporting high-consequence near misses (N3). Employees' engagement in reporting N3 cases enabled us to identify the root causes of potentially fatal incidents and address them proactively.

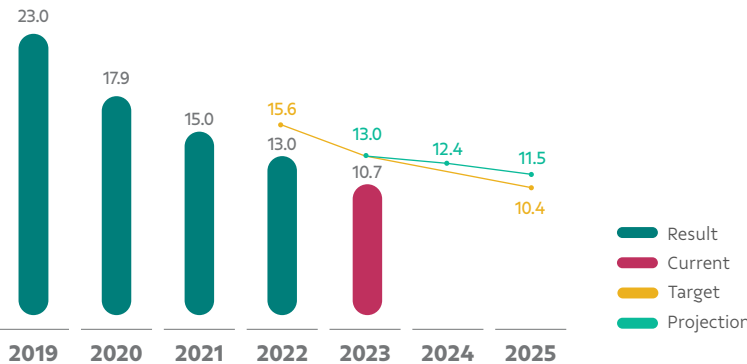
We are working to align our occupational health and safety targets with international standards so we are able to monitor progress on our strategy and continually improve practices and outcomes. Our overarching goal is to keep people at the center of our decisions by safeguarding the physical and mental well-being of employees and the [communities](#) where we operate while maintaining a healthy environment that is conducive to the development of the business.

N3 registered in 2023

82,186 N3 registered



Target for reducing exposures over the years (in thousands)



Human Rights

GRI 3-3 [Human Rights]

We are consistently improving our approach to managing human rights across our operations and throughout our value chain by incorporating lessons learned and staying up to date with best practices.

We engage with communities on an ongoing basis to address grievances and center the voices of those most impacted by our operations in our human rights strategy. Respect for human rights is non-negotiable and forms the foundation of Vale's approach.

Our commitment to human rights is reflected in our Ethics & Compliance Program and our cultural transformation journey. Our approach draws on international standards such as the UN Guiding Principles on Business and Human Rights, the UN Global Compact, the Universal Declaration of Human Rights, and the principles and guidelines issued by the International Council on Mining and Metals (ICMM).

A set of policies and training programs guide our approach to managing salient human rights issues. These include diversity; ensuring political freedom and freedom of association; raising awareness about workplace and sexual harassment; combating the sexual exploitation of children and adolescents; fighting discrimination; combating child and forced labor; corporate security

practices; community engagement (including Indigenous and traditional communities); involuntary resettlement; mechanisms for raising concerns and complaints; and our Whistleblowing Channel.

Our approach to human rights is incorporated into the policies and decision-making processes of critical business functions, such as risks, procurement, corporate security, human resources, facilities, and health and safety.

Training and education programs

Vale provides regular human rights training, educational content, and awareness campaigns for our workforce. Training is mandatory for both employees and contractors and is delivered in the local language. At year-end 2023, 96% of our employees had received human rights training. For contractors, a human rights training video is available in all local languages.

Enhanced training is provided to critical functions. For the corporate security function, for instance, we provide training in line with the Voluntary Principles on Security and Human Rights, of which Vale is a signatory. At year-end 2023, 99.1% of our Corporate Security employees and 99.8% of contractors had been trained in human rights. **GRI 410-1**



Our initiatives to raise awareness about critical human rights issues extend to employees, suppliers, joint ventures, and customers, all of whom receive content via email, guides, notice boards, and Vale TV, covering the following topics:

- Indigenous culture and way of life;
- Gender relations;
- Forced and child labor;
- Sexual exploitation of children and adolescents;
- Collective bargaining and freedom of association;
- Diversity and inclusion.

Decent Work Tour

We engaged over 1,000 people — including suppliers and employees in contract manager and inspector roles — in the Brazilian municipalities in the states of Pará, Maranhão, Minas Gerais, and Espírito Santo. Twelve sessions were held, covering topics such as ensuring a dignified work environment and combating slave or forced labor practices and the sexual exploitation of children and adolescents. This training underscored the importance of observing ethics policies and the role of each individual in reducing and

preventing human rights violations, labor and union disputes, and in fostering closer relationships with unions, trade associations, and public authorities.

Na Mão Certa Program

GRI 203-1

Na Mão Certa is a program from the Childhood Brazil organization and works to prevent and address roadside sexual exploitation of children and adolescents in Brazil by raising awareness among truck drivers and encouraging them to act as protectors.

"In 2023, Vale made an exceptional effort to engage its supply chain as part of the Na Mão Certa program, helping to prevent and combat sexual exploitation of children and adolescents both in trucking and construction. Raising awareness among suppliers by providing information and guidance on suppliers' role and best practices in preventing and mitigating sexual exploitation of children in operations, and adopting this commitment as a core value in supplier management is a crucial step for a company that is deeply committed to human rights and sustainability."

Eva Dengler, Programs and Corporate Relations Manager, Childhood Brazil.



Photo: Vale Archive

Decent Work Caravan held in São Luís, Maranhão.

Assessment of human rights risks and impacts

GRI 408-1 | 409-1

Human rights risk assessments are conducted across all of our operations and critical projects. For each identified risk, controls are defined and implemented within our processes. We also conduct in-house human rights assessments or external due diligence, which includes our suppliers.

Human rights due diligence (HRDD) is an in-depth assessment of actual and potential impacts conducted by independent external experts across all operations and critical projects in cycles of three to five years. HRDD findings are acted upon through corrective actions within operations, along with monitoring and reporting on actions taken to address identified risks and impacts.

In 2023, HRDD was completed across 100% of our operations in Brazil (including active, curtailed, and decommissioned assets), and in our iron ore operation in Malaysia. Our HRDD conducted in Brazil identified

challenges related to contractor working conditions, infrastructure and facility management, property security, workplace and sexual harassment, discrimination, and diversity and inclusion. HRDD has action and mitigation plans that are continuously monitored by the company.

Throughout the year, we also conducted HRDD in 48 extreme or very high-consequence tailings storage facilities globally, as classified based on the criteria outlined in the [Global Industry Standard on Tailings Management \(GISTM\)](#). The key

findings for tailings storage facilities in our iron ore operations indicate potential and actual impacts relating to the right to information, the right to livelihoods, the right to housing, the right to life, and the effectiveness of grievance mechanisms.

Mergers and acquisitions, joint ventures and accommodations also undergo [due diligence](#), using case-specific methodologies and procedures. In addition, since 2019, we have enhanced human rights risk assessments of suppliers within our [Responsible Procurement processes](#) through self-assessment questionnaires, structured engagement and communication, desktop assessments and field inspections, and joint follow-up on action plans.

Territories and communities GRI 2-23

Learning from our mistakes and finding ways to a healthy relationship by building and maintaining respect and trust is an essential part of our business model. Our learning journey is connected to our ability to listen to and engage with local communities in our geographies.

Our relationships aim to comply with major international standards, such as the UN Declaration on the Rights of Indigenous Peoples, as well as the Human Rights principles previously mentioned. We also take into account the International Council on Mining and Metals' stance on Mining and Indigenous Peoples, the International Labour Organization's Convention No. 169, among others, and regulations in the countries where we operate.

We understand that we are part of and can contribute to our geographies. We built our social ambition with this in mind, highlighting Vale's goal to support the development of autonomous communities. In this, we are engaged with issues of relevance to humanity and are committed to sustainable mining.

In 2023, we began implementing a new integrated model to improve local performance with communities, municipal governments, regulators, and other stakeholders in Brazil. This process entails pinpointing and reducing the risks and impacts of our operations, evaluating the needs of communities in our geographies, and determining how we can aid the development of these regions. We are challenged with integrating the agendas of these territories and stakeholders while implementing our operating strategy. This includes territorial development programs designed to enhance local capabilities and foster the growth of these communities in collaboration with the government and partners.

Learn more about our [Social Performance](#)

In 2023, we:

GRI 203-1

Engaged with 1,574 local communities in the countries where we operate and 88% of priority communities were covered by Relationship Plans.

Implemented a methodology pilot involving 30,000 people connected to the long-term goal to tackle extreme poverty, mainly in the states of Pará and Maranhão.

Received 4,311 community complaints (access, dust, noise/vibration, pruning and weeding, mobility, among others), 83.3% were responded.

Facilitated the signing of agreements for the development of the Consultation Protocols or Territorial and Environmental Management Plans or Life Plans in three Indigenous Peoples' communities neighboring Vale's operations in Brazil: the Kayapó People, in Pará, and the Ka'apor and Guajajara people from the Caru Indigenous Land in Maranhão.

Signed a new Technical Cooperation Agreement with the Krenak People in Minas Gerais to support initiatives focusing on ethnodevelopment and ethnoeducation, in addition to agreements with 10 Peoples in force in Brazil.

Engaged with residents of 22 municipalities in Minas Gerais, living in Self-Rescue Zones. They took part in the emergency drills of the Emergency Action Plans for Mining Dams (PAEBM), conducted by the Civil Defence, in partnership with Vale and other institutions, [see more at PAEBM](#).

Resolution of human rights complaints and reports

Addressing grievances is a key aspect of our relationship with communities and is supported by reporting and grievance and [feedback mechanisms](#). We are committed to responding to 100% of human rights complaints received by the Business &

Human Rights Resource Center (BHRRC). In 2023, three allegations were received and clarified on the BHRRC platform, regarding socio-environmental impacts and working conditions in Indonesia, and compensation from the Renova Foundation.

1 EARs (tailings storage structures) consider sediment, water and tailings dams, drained piles, and saddle and internal dikes (tailings dams can also be grouped into dam systems).

Local Communities

GRI 3-3 (Local Communities) | 413-1 | 413-2

Due to the fixed location of mineral resources, mining operations have limited geographic flexibility, requiring studies and community engagement to ensure projects have minimal impacts on and risks to people and the environment. We recognize that our operations significantly impact the territories where they are located, and coexisting with a diverse range of affected neighbors is always a challenge. For us, engaging with communities is a priority.

Key topics in community relations include Vale’s current and potential activities and ventures, the potential risks and impacts of these ventures, and measures taken to prevent, reduce, or compensate for our impacts. Understanding and addressing community concerns and including them in the company’s decision-making is an ongoing challenge, and we recognize that there is always room for improvement.

The community engagement process includes identifying and characterizing communities and stakeholders; managing grievances; implementing engagement plans and channels for dialogue with communities; and managing potential conflicts and critical issues. Currently, 97% of our operations have established local community engagement processes.

Engagement is conducted by specialized teams. In 2023, we engaged with 1,574 local communities in the countries where we have operations. Throughout the period, a total of 452 Local Community Engagement Plans were implemented, 385 of which were in Brazil. Additionally, in Brazil, 88% of the 177 priority communities were covered by Engagement Plans. Vale is committed to covering 100% of priority communities with such plans by 2026.

Find out more about the methodology for prioritizing communities



In the picture, a cook from the school kitchen serving lunch at the Ipê Amarelo Central Market, a community market for producers from Córrego do Feijão, in Brumadinho, Minas Gerais. In the photo, Renata Marley do Nascimento and Neide Florencio de Souza.

Vale complies with all engagement standards during the environmental licensing phase for projects, ensuring required information related to each venture is disclosed. Whenever possible, we facilitate forums to understand and incorporate the views of the community and other stakeholders.

Our transformation journey includes active listening as a key conduct. We have learned that it is not enough to dialog and address grievances; we must also intentionally implement quantitative research to measure the perception of the effectiveness of our engagement efforts.

With this in mind, we conducted our first Community Perception Survey across Brazil. A total of 5,105 people were interviewed across five states (Espírito Santo, Rio de Janeiro, Minas Gerais, Maranhão, and Pará), spanning 44 municipalities and 165 communities. The results were used to gain a deeper understanding of the level of

Relationship with communities

Indicator/Country	Total		Brazil		(Peru and Chile)		Oman	
	2022	2023	2022	2023	2022	2023	2022	2023
Local Communities	1,532	1,574	1,156	1,106	52	53	28	33
Indigenous Peoples	28	30	13	13	6	7	–	–
Traditional Communities	47	53	47	53	–	–	–	–
Local Community Engagement Plans	455	452	431	385	3	5	3	3

trust and expectations of neighboring communities. The survey shows progress but also highlights areas for improvement and learning. In 2023, we began to implement action plans for improvements in engagement with these communities, and social strategies related to themes of greatest impact and relevance are being built. Some of the survey results include:

- **The communities closest to the company’s operations are the most vulnerable**, and the most favorably disposed towards Vale. Residents see mining as a “necessary evil” and recognize the activity as one of the main drivers of the local economy. The company’s legacy is seen as positive, especially in the states of Pará and Maranhão;
- **The main problems faced by the communities are safety, health and unemployment.** Communities are aware of the role of the company versus that of the state, and Vale is seen as particularly responsible for resolving local environmental and infrastructure issues;

Indicator/Country	Indonesia		Canada		Malaysia		Wales	
	2022	2023	2022	2023	2022	2023	2022	2023
Local Communities	206	292	82	82	6	6	2	2
Indigenous Peoples	–	–	9	10	–	–	–	–
Traditional Communities	–	–	–	–	–	–	–	–
Local Community Engagement Plans	16	46	–	1	2	12	–	–

Note: GRI 2-4: Due to a data adjustment, the number of Indigenous Peoples in Canada with whom Vale has a relationship in 2022 has changed from 7 to 9.

- **Communities consider the following to be priority activities for local social development:** generating employment and income, health and education. Only 18% recognize the existence of social performance carried out by Vale in their community and/or region;
- **Regarding engagement with Vale, the communities resent the lack of dialogue, although they recognize that there is a trend towards greater closeness.** Interaction with Vale is seen as “on track” by 57% of those interviewed;
- **Vale has good reputational capital in the community, which indicates a positive attitude towards the company.** 81% of those interviewed agreed with the phrase “Vale is a trustworthy company”, while 5% did not agree. Neutrals and those who didn’t know/didn’t answer totaled 14%. The re-establishment of trust is associated with the conclusion of reparations for the impacts of the Brumadinho and Mariana tragedies, increased transparency (especially in relation to the dams) and the strengthening of dialogue;
- **Regarding the company’s communication, although 85% of people consider the messages the company puts out to be clear and effective,** they have never heard of the channels available. The best known and most accessed channel by those interviewed is “Alô Ferrovias”, and the best rated channels among those accessed are “Contact Us” and “Alô Ferrovias”.

Serrinha Mine, Serra da Moeda

GRI 203-1

Starting the removal of the existing waste rock piles at the Serrinha Mine, in Minas Gerais, was a major challenge because it is an area of interest for environmental conservation in the Serra da Moeda and because it is a region of interest for the surrounding communities. It was only possible to start removing the piles in August 2023 by adopting an approach with sensitive interfaces and views of the region, stakeholders and local communities.

The operation requires the daily traffic of 34 carts transporting the ore, sharing the use of the same access with the communities of Piedade do Paraopeba, Suzana, Palhano, Marques, Campinho and Córrego Ferreira, as well as being a tourist attraction in the region. Vale maintains an interface with all these communities through dialogue channels and is attentive to the complaints and demands of its neighbours. Among the existing demands, most are related to the maintenance of access roads, including:

- advance notice and signposting of roads in the event of works;
- paving stretches of road in order to mitigate the impact of particulate emissions;
- raising awareness of lorry drivers to safety issues;
- answering any questions about the material being transported; and
- an open channel for dialogue on an ongoing basis.

Expansion of 4G on the Carajás Railroad (EFC)

GRI 203-1

In partnership with the telephone operator Vivo, we have made progress in implementing an unprecedented infrastructure to expand coverage and extend the reach of the mobile internet signal along the Carajás Railroad (EFC), which connects the states of Maranhão and Pará, travelling through 28 municipalities. The Vale Conecta project includes the installation of 49 new telephone towers and signal activation on another 27 towers already installed, as well as the acquisition and installation of new, modern equipment.

The investment is worth around USD 48 million and the initiative is expected to be completed by 2026. Vale Conecta will benefit around 230 locations adjacent to the railroad and enhance railroad operations, improving connectivity and the quality of the service offered to passenger train users.

In addition, by the end of 2024, all 15 passenger stations along the EFC will have a free internet signal for users. In the initial phase, the priority stations include São Luís, Vitória do Mearim, Santa Inês and Açailândia (MA); and Marabá and Parauapebas (PA).

The new network infrastructure will also bring greater security and efficiency to the EFC's operation, as all the railroads communication will become digital, speeding up access to data generated by the trains and making it possible to implement even more innovative systems in the future. The new technology will give drivers greater visibility of what is happening on all sections of the railroad. Information generated by telemetry on the train's performance will also be available in real time along the entire length of the railroad. In addition, mobile phone communication between employees will be more stable.

Partnerships for training in mining topics

"Our partnership with Vale goes back a long time. The Cariacica campus was founded in partnership with Vale, and we have always conducted technical visits to the complex. For us teachers, it is very interesting because we have the opportunity to make students see in practice what they learn at the Institute, in addition to talking to professionals in the field. Given the dimensions of a railroad we cannot have a railway laboratory, so these technical visits always build on what we discuss in the classroom."

Michel Bruno Taffner, one of the founders of the Campus and the railway course at Instituto Federal do Espírito Santo (IFES).

Supporting small and medium-sized businesses in Malaysia

GRI 203-1

To boost the socio-economic development of the Manjung district in Malaysia, Vale launched the "Cetusan Ekonomi Digital Vale", or PACE Vale, programme in 2023, with a total investment of USD 110,000 until 2025. Small and medium-sized businesses in areas such as cottage industry, tourism, food and beverages contributes significantly to Manjung's socioeconomic development. These sectors were significantly impacted during the pandemic, but have shown a degree of resilience. Overall, the SME sector has been identified as a strong catalyst for Malaysia's post-pandemic economic recovery, accounting for 38.2% of the country's GDP and generating 7.3 million jobs.

In the pilot phase of the project, 40 entrepreneurs received a training on the digital economy in a two-day course, exploring topics such as e-commerce and social media marketing and how the growing influence of these platforms provides an opportunity for these businesses to expand their customer base beyond Manjung. The program is a part of Vale's Community Development Plan 2.0 in Malaysia, which establishes partnerships with local entities and civil society to create sustainable value for various communities in Manjung.

2023 Vale Run Circuit – Together for Change:

With the goal of "improving life and transforming the future, together", Vale Run Circuits help raise awareness about physical and mental health and provide an opportunity for relationship building with the communities where we operate. The 2023 Vale Run Circuit was open to the general public and was designed to connect different people around these goals through activities promoting well-being, good neighborhood, and healthy habits. In 2023, run events were organized in four cities: Belo Horizonte (MG), Parauapebas (PA), São Luís (MA), and Vitória (ES). In addition to walking (3 km) and running (5 km and 10 km) events, the program also featured recreational and awareness-building activities. **GRI 203-1**



Photo: Marcus Desimoni - Nitro

Free Movement Programme

"I arrived with many joint problems, arthritis, and arthrosis, and the activities provided here at [Vitória Botanical] Park were a turning point. I was a completely different person before I started participating in the program's activities. It improved my hypertension, and increased my exposure to the outdoors. I bring my grandchildren on the weekend, and the Botanical Park is wonderful".

Wilma Rodrigues de Freitas, resident of Jardim Camburi, Espírito Santo state, Brazil.

Indigenous Peoples and Traditional Communities

GRI G4 MM5

“A relationship of trust is also a relationship of reciprocity. That is, trust presupposes the existence of listening, dialogue, communication, and shared thinking and action. This relationship should be guided by respect for the rights and dignity of different peoples and their communities so that, in this way, it is possible to build truly sustainable actions, concerned with the conditions of existence, survival, and well-being not only of these peoples but of the entire planet”.

Prof. Rita Gomes do Nascimento (Rita Potyguara), director of the Latin American Faculty of Social Sciences (FLACSO) in Brazil.

In Brazil, the engagement strategy with Indigenous Peoples and Traditional Communities is underpinned by both the management of risks and impacts of our operations and by respect for the rights of these populations, recognizing their cultural diversity and their unique relationship with the territory. Our engagement focuses on building and maintaining trust, supporting autonomy and resilience, contributing to mutual benefits, and promoting ethnodevelopment.

Our approach is carried out by dedicated professionals with multidisciplinary experience and training in the field. These professionals are responsible for interfacing with Peoples and communities and for guiding business practices to ensure compliance with Vale’s formalized commitments to these Peoples and communities.

Today, we are engaging with 30 Indigenous Peoples in Brazil, Canada, Peru and Chile and some self-declared indigenous communities in Indonesia besides 53 Traditional Communities. In the Brazilian territory, where most of our activities are located, we are engaging with 13 Indigenous Peoples, 31 quilombola communities, and 22 other traditional communities, such as coconut breakers and artisanal fishermen. This relationship

prioritizes the management of risks and impacts of our activities, a better neighborly relationship between the company’s operations and these communities, in addition to shared social value. We are committed, through our Social Ambition, to support all Indigenous communities neighboring the company’s operations in the development and execution of their plans, based on standards of the United Nations Declaration on the Rights of Indigenous Peoples.

In recent years, we established agreements with Indigenous Peoples and resolved significant legal issues and controversies – in addition to continuing initiatives outlined in Basic Environmental Plans and voluntary initiatives with these communities.

In Pará, the initiatives outlined in agreements, environmental conditions, and projects with the Xikrin do Cateté, Kayapó, and Gavião (Parkatêjê, Kyikatêjê, and Akrãtikatêjê) People are ongoing.

In Minas Gerais, in 2023, we entered into a Technical Cooperation Agreement with the Krenak People to establish new support lines aimed at encouraging the diversification of their productive activities and access to and permanence in the university. Also, we conducted studies to identify and manage the risks and impacts of our activities on quilombola communities neighboring our operations in the state and continued to provide [reparations for the Brumadinho dam breach](#) to the Pataxó and Pataxó Hã-Hã-Hãe peoples and the quilombola communities affected by the tragedy.

In Maranhão, we maintained our relationship with the Awá, Guajajara, and Ka’apor peoples, continuing the commitments made with these



Photo: Rafael Scherer

communities, either through agreements or programs outlined in environmental licensing. Throughout the year, initiatives included promoting housing improvement and access in villages, funding university scholarships for Indigenous people, and holding workshops on productive activities and entrepreneurship. We also implemented risk and impact management programs for our operations with quilombola and coconut crusher communities in the region, focusing on the development of productive activities and cultural strengthening.

In Espírito Santo, we continued implementing management, mitigation, and compensation programs for impacts with the Tupiniquim and Guarani Peoples. These programs include initiatives for institutional and cultural

strengthening; ethnodevelopment and management, such as project management courses; entrepreneurship, biofertilizers, coffee cultivation, and tourism management workshops, among others.

In Canada, partnerships in Vale Base Metals operations involve the inclusion of suppliers from Indigenous communities. We also support Canada’s “Truth and Reconciliation” journey with a strategic action plan to develop agreements with Indigenous communities and raise awareness among employees and other stakeholders.

Learn more at the [ESG Portal](#)



Photo: Vale Archive

Employees of the Sagamok Anishnawbek First Nation's Z'gamok Construction Company at the Totten mine in Canada. From left to right: Jamie Steinke, Clinton Tooley, Andrew Bouchard, Zac Pregent, Kevin Sanderson, and Dejay Southwind.

“Mining companies can play a significant role in the economic development of the Indigenous communities where they operate. In Canada, over ten years ago, the Sagamok Anishnawbek First Nation signed an agreement for a new mine in Sudbury, Ontario. Since then, we have developed a partnership and a positive relationship with Vale, which has created new economic opportunities for our community. Ten years later, we are meeting 20% of the mine’s commercial needs and employing more than 150 people through our own businesses and direct jobs at the mine. We continue to grow and expand our economic interests and look forward to doing more business with Vale Base Metals in the future.”

Chief Angus Toulouse, Sagamok Anishnawbek First Nation

Course on Indigenous rights

GRI 203-1

In 2023, we launched the Course on Indigenous Rights in Brazil, with teaching materials prepared by internationally recognized Indigenous people and Indigenous activists, such as professors Gersem Baniwa and Paulo Pankararu, the first anthropologist and the first Indigenous lawyer in Brazil, respectively. The course was presented to the Guajajara People of the Caru Indigenous Land and the Ka’apor People of the Alto Turiaçu Indigenous Land in the state of Maranhão.

After training, the initiatives outlined in the commitment between Vale and Indigenous peoples will be developed, which may include the drafting of Consultation Protocols, Environmental and Territorial Management Plans, or Life Plans. This process will have the support of anthropological consultancy and specialized technical advice from the Latin American Faculty of Social Sciences (FLACSO). This initiative began by assisting the Kayapó People in developing their Consultation Protocol (which started in 2023 and is ongoing). These actions are part of our Social Ambition.



Photo: Vale Archive

Support for university education

GRI 203-1

The Indigenous Program for University Persistence and Opportunities (PIPOU) is an initiative that we promote in partnership with Instituto Sociedade, População e Natureza (ISPNU), specialists in higher Indigenous education, and representatives of the Indigenous social movement. In 2023, PIPOU supported 100 Indigenous students from 40 Indigenous Lands and 32 Peoples. The group is present in 21 higher education institutions across Brazil, with the largest number of grant recipients being at the University of Maranhão (UEMA), the Federal University of Southern and Southeastern Pará (Unifesspa), and the University of Brasília (UnB). The main courses chosen include medicine, nursing, and social sciences. Since the beginning of PIPOU, in 2021, 11 students have graduated.



Photo: Vale Cultural Institute

Valuing Indigenous Culture

Through the **Vale Cultural Institute**, we contributed to projects that value Indigenous culture, such as Vidas Indígenas, in partnership with Museu da Pessoa, which documents the memories of the Guajajara, Ka’apor, and Awá peoples. The collection was also part of an exhibition at Centro Cultural Vale Maranhão, which involved 17 Indigenous peoples from the state. The Cultura na Praça project brought audiovisual training to quilombolas and Indigenous communities from 11 municipalities in the states of Pará and Maranhão. Also, in São Paulo, the exhibition of Indigenous languages, “Nhe’e Porã – Memory and Transformation,” welcomed about 180,000 visitors. The exhibition continues in 2024 with events in Pará, Maranhão, and the UNESCO headquarters in Paris. **GRI 203-1**

Memory of the Xikrin do Cateté

GRI 203-1

The Xikrin do Cateté Memory Project is a partnership between Vale and Instituto Indígena Botiê Xikrin (IBX). Since 2019, the project has contributed to recording the history of the Xikrin via publications, videos, old audio recordings, and an “Online Xikrin do Cateté Archive” platform exclusively accessible by the Xikrin.

The “Illustrated Xikrin-Portuguese Dictionary” will consist of four books with an average of 400 bilingual entries to meet the need for teaching materials about, and encourage research into the written Xikrin language in Indigenous schools. In 2023, two volumes were developed: Mē i kaben kam ‘ā mýja karō te amījakre Xikrin kôt nē Português kôt; the first focused on birds, fish, and other animals and, the second, on plants. The dictionary’s compilation involved the General Chief Karangre Xikrin, Instituto Indígena Botiê Xikrin, the transmission of knowledge from elders to young Xikrin researchers, and professionals in the social, linguistic, and graphic design areas.

The Xikrin do Cateté Memory Project supports the rights outlined in the United Nations Declaration on

the Rights of Indigenous Peoples. It highlights the right to develop, revitalize and pass on their histories, languages, oral traditions, philosophies, writing systems, and literature; define educational systems, offering education in their native languages, in line with their cultural teaching and learning methods; ensure equality and recognize the participation of women, men, youth, and elders in preserving culture, education, and social mobilization.

Furthermore, considering the right to self-determination and autonomy, it was agreed among the project’s involved parties that any produced material could only be disclosed with the prior consultation and consent of the Xikrin People, represented by the IBX.



Workshops to produce the Illustrated Dictionary Xikrin-Portuguese was one of the project’s actions.

Photo: IBX

Preservation and promotion of quilombola identity

Along the Carajás Railroad (EFC) in Maranhão state, we implemented the Basic Environmental Plan Quilombola Component (PBACQ), developed through participatory dialogue with 15 neighboring quilombola communities.

After diagnosing local potential, needs, and vocations, one of the defined actions was to develop the “My Quilombo, my History” museum. Located in the Canta Galo community, in Itapecuru-Mirim, it is a space for collective memory. The museum has contributed to the social and historical education of residents, preserving objects and local references that tell the history of these communities and is part of the quilombola community-based tourism route. The Quilombola Orchestra of Berimbaus engages approximately 100 children and teenagers, embodying a powerful initiative against racism and the promotion and strengthening of black culture. We also support the Rota dos Quilombos initiative, a community-based tourism project that aims to promote tourism in quilombola community areas, while valuing local culture. The route includes visits to cassava mills, backyards with famous “baths” – rivers and resorts where visitors can dive – as well as hammock areas, vernacular houses, restaurants, community cafes, and other attractions. **GRI 203-1**

“Everyone here inside preserves our quilombo. We feel valued. Before, we didn’t even know what a company was. Today, we know and understand the role of the company in the development of the community. Through projects that we access, aimed at rural workers from traditional and black communities, we sell and set the price we want. Another example was honoring the occupation of coconut crushers, an integral part of the quilombola culture of babassu. Today, women are proud to say they are coconut crushers because babaçu is a source of income and traditional food, which is also medicinal and has raised many families. This is autonomy — a conquest of ours.”

Dona Terezinha, female leader of the quilombola community Canta Galo, in Itapecuru-Mirim (MA).



Photo: INSPOSUMA

Risk and Impact Management

GRI 203-1 | MM5



Community safety

“I’ve known this train line side since it was just a track. Initially, we didn’t want the wall. Now, after deep dialogue, we see that it’s important and that we could have negotiated this sooner. Vale surprised me with this improvement for us residents and there’s still room for improvement. In terms of safety, it will get better after paving the road, as there are still unsafe crossings, which should improve with urban mobility works.”

D. Isaura Lousada da Silva, a resident of Barra do Manhuaçu, Aimorés/MG, where a fence wall was built along the railroad to increase the safety of neighboring communities.

In its cultural transformation, Vale is continuously reviewing how its operations can affect society. One of its drivers is Community Safety, understood as the risk to the physical integrity of people amplified by the presence of our operations.

Community accidents are those events resulting in injury to non-employees and take place within areas under Vale’s purview or external locations (provided they occur during operational activities or processes supporting production). With a highly diverse profile, they range from collisions between Vale service vehicles and community motorcyclists, to railroad runovers.

To improve our safety approach, we extend the management of occupational, environmental, and process risks and impacts to communities with the same seriousness as if they were our own employees. This means recording and reporting accidents and involving communities and other external agents in the discussion on implementing initiatives to mitigate the risk of recurrence.

In 2022, Vale committed to reducing community member accidents by 40% by 2027. In 2022 and 2023, the annual reduction of accidents was also a variable compensation goal for the company’s leadership. By year-end 2023, a total of 21 Integrated Community Safety Plans had

Community safety event records¹

Year	2021	2022	2023	% Change (2022/2023)
Fatal injuries	25	16	11	–31
Non-fatal injuries	98	80	115	44
Total events with community member injuries	104	89	105	18

been completed. These plans, defined by territorial criteria, take a preventive approach to risk management for accidents involving communities and cover Vale’s operational territory in Brazil. Of the existing 21 plans, eight were completed in 2022, and 13 in 2023.

In 2023, there were 105 accidents involving community members, resulting in 11 fatalities, 31% less compared to 2022, and 115 non-fatal injuries. It is crucial to emphasize that this record does not determine the fault or assign liability for the cause of the accident, and these accidents are not considered occupational accidents. However, from 2022 to 2023 there was an 18% increase in the overall number, counting the total number of events with injuries. Reasons for this increase may include greater record-making, the company’s maturity in recording and investigating events, and the increase in the number of projects and activities conducted by the company.

Involuntary Resettlement

GRI G4 MM9

Although we strive to prevent it, involuntary resettlement is meticulously planned and executed when the potential for involuntary displacement arises, either due to the need to access third-party areas or to mitigate health and safety risks to families and communities. In the case of emergency evacuation from risk areas, involuntary resettlement is carried out.

The care measures are established and executed based on an assessment of the actual situation and the involvement of stakeholders. These measures aim to restore livelihoods to conditions equivalent to or better than those before the individuals’ displacement.

In 2023, 1,018 families were involved in involuntary resettlement processes in Brazil. Of this total, 171 received definitive care and another 274 are in provisional care, with their rights to adequate housing and a source of income protected by Vale. A total of 573 families were mapped through preliminary socioeconomic surveys to support alternatives that seek to minimize and avoid involuntary resettlement.

“In 1979, we arrived in the Bela Vista neighborhood, where we bought a small house and then the lot next door to make my plantations. I worked at Vale for 27 years and did not expect to go through this process. I don’t think much about the future, just about well-being and quality of life. With the process being so slow, I felt a certain anxiety. Even so, I always tried to understand and manage this new phase of my family’s life in the best way possible.”

Dilson Alexandre Vieira – Person affected by the Involuntary Resettlement Process – Itabira/MG.

¹ GRI 2–4 Due to adjustments in the calculation methodology used in the 2022 Integrated Report, events that occurred during activities not controlled by Vale were excluded. These include activities where Vale does not have formal rights and responsibility to ensure that its health and safety requirements are implemented and complied with.

In Indonesia, 55 families encroached on a protected forest under the responsibility of PT Vale Indonesia (PTVI) and received financial compensation to vacate it. However, these families raise issues regarding the restoration of their livelihoods. PTVI is committed to finding a peaceful solution.

In São Luís, Brazil, in Maranhão state, the findings of a socioeconomic assessment involving 52 families from the Praia do Boqueirão community were disclosed. In Ourilândia do Norte, Pará state, an agreement was reached with 35 families from the Madalena community to avoid resettlement. Also in Pará, in the municipality of Marabá, we provided care for 56 families living in the area necessary for the Tocantins Bridge Duplication Project. On the Vitória-to-Minas Railroad, the number of families impacted by the duplication project between Sabará and Capitão Eduardo was reduced from 70 to 39. On the same railroad, within the municipalities of Antônio Dias and Nova Era, the progression of negotiations for family support has been put on hold until government agencies approve the new right-of-way.

With initiatives like these, Vale seeks to mitigate the risks of major conflicts with communities and the aggravation of tensions, which could result in new controversies.

Total number of families involved in involuntary resettlement processes:

GRI G4 MM9

Region	Triggered by	Total	Under assessment	Provisional Care	Permanent Care	Description
Brazil/ Minas Gerais	Brumadinho Dam Breach	42	0	34	8	Families involved in the forced relocation process due to the B1 Dam breach in Córrego de Feijão.
	Dam Decommissioning	326	30	198	98	Dam decommissioning projects require vacating areas downstream of these structures to ensure the safety of families and communities. Out of a total of 326 families, 296 are receiving care due to emergency evacuations. In Itabira/MG, nine out of 39 registered families for the Pontal System decommissioning have been definitively attended to.
	Project Impacts	140	92	39	9	Families requiring forced relocation to facilitate the installation and expansion of ventures. Out of the total of 140 families, 46 are receiving care due to the installation of repair projects in the Paraopeba basin.
	Land Regularization	2	0	2	0	Families involved in the demobilization of consolidated irregular occupations on properties or areas under Vale's domain in Nova Era/MG.
	Structural Instability	2	0	1	1	Care provided to families occupying a risk area due to slope instability at the Olhos D'Água Terminal in Belo Horizonte/MG.
Brazil/ Espírito Santo	Project Impacts	451	451	0	0	Preliminary total of 451 families mapped for the future installation of the Ramal Anchieta railroad project. Vale is seeking alternatives to minimize the number of impacted families.
Indonesia	Project Impacts	55	0	0	55	A total of 55 families helped to clear the area needed to set up the Lembo South Project.
Total		1,018	573	274	171	

Land disputes

GRI 203-1 | G4 MM6 | G4 MM7

The primary instances of land disputes involve third parties, Indigenous Peoples, and local communities. These groups are dependent on the land for shelter and livelihood. Vale strives to resolve conflicts amicably, prioritizing dialogue as a fundamental approach.

In Brazil, in the state of Pará, in Canaã dos Carajás, negotiations are ongoing with 544 families occupying company land dedicated to the Cristalino Project, in accordance with agreements approved by judges and the Public Ministry of Pará. In 2023, 124 extrajudicial settlements were formalized, 114 were ratified, and 85 lots were vacated.

In Minas Gerais, in 2022, the Xukuru-Kariri Indigenous People occupied a company property, Bruma Farm, in Brumadinho. Currently, sixteen families live there, and the farm was acquired for environmental compensation purposes and to fulfill the obligation of using the main pond, which requires daily maintenance and monitoring by the State Forestry Institute (IEF) and Aecom (an independent external audit in the socio-environmental recovery process). Another Vale property in Brumadinho, Fazenda Córrego de Areia, also earmarked for environmental compensation, was occupied in 2021 by Kamakã Mongoió Indigenous People from the south of Bahia. Both properties were acquired free and clear of any occupation or claims by indigenous or traditional communities. Legal proceedings for repossession are underway. Vale has been acting in compliance with the law and respecting the rights involved in both cases.

“The new concept of the Apolo Project is extremely relevant to environmental and community issues. One of the main points is the reduction of water consumption, which was and still is a concern for the community, and another point is the non-use of dams. Moreover, the new project has been significantly reduced in size, so it does not encroach on the boundaries of the Serra do Gandarela National Park. These are extremely relevant solutions, but I hope that such solutions and innovations are applied throughout the entire process, from implementation to after mining. I also hope that the community of the Morro Vermelho district can reap the benefits of this project in terms of health, housing, basic sanitation, education, sports, leisure and employment, among other benefits.”

Misael Ferreira Torres França Moraes
– President of the Community Association of Morro Vermelho Residents

Listening and response

GRI 2-16 | 2-25

In order to help communities hear about our actions in the territories, Vale has a global management model for community grievances – the Listening and Response Mechanism – consisting of channels that can be accessed by any stakeholder. The mechanism is based on the UN Guiding Principles on Business and Human Rights, which state that grievance channels must be legitimate, accessible, predictable, equitable, and transparent.

In this way, we are able to work to reduce the disruption generated and minimize the risks associated with our activities. Through this listening, we improve operational and project routines to avoid the recurrence of complaints and enhance positive impacts.

In 2023, 9,911 community grievances were registered. Of these, 4,311 were complaints, 20.6% of which were related to issues of improving access, roads and streets, 9.1% to dust control and 7.6% to requests for weeding and pruning. Of the total number of complaints, 83.3% were resolved, 6.3% are pending resolution and the reminder are under analysis or were assessed as not eligible for assistance.

For issues related to the Brumadinho dam breach, Vale has a specific listening channel: [Reparation Service Center](#). [Learn more.](#)

Capturing all stakeholder complaints has been a journey, and we still need to move forward so that our channels are widely known and accessed in order for Vale to evolve our listening process.

As part of the Community Relations process, Vale also monitors interdictions of the company’s activities for social reasons (such as railroads and access to its operations). Thus, in 2023 there were 12 interdictions, of which six (50%) were motivated by claims related to the Fundão Dam collapse in Mariana-MG; four interdictions related to the presentation of demands to public authorities; and two were directly linked to Vale’s activities, one requesting a review of compensation for the Córrego do Feijão Dam collapse and the other requesting the creation of a level crossing on the Carajás Railroad (EFC) in Buriticupu-MA.

83.3%

of total number of complaints were resolved.

6.3% are pending resolution and the reminder are under analysis or were assessed as not eligible for assistance.

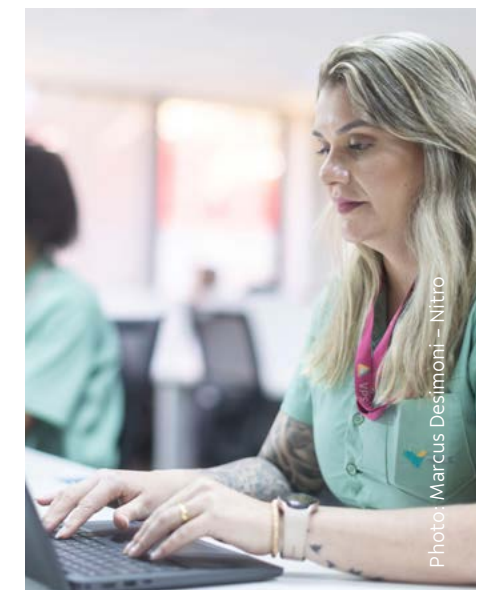


Photo: Marcus Desimoni – Nitro

Grievance mechanisms

Indicator/Country	Total		Brazil		Andean America		Oman	
	2022	2023	2022	2023	2022	2023	2022	2023
Community Demands	11,085	9,911	9,779	8,550	56	70	67	84
Brumadinho Humanitarian Aid Demands	19,786	12,132	–	–	–	–	–	–

Indicator/Country	Indonesia		Canada		Malaysia		Wales	
	2022	2023	2022	2023	2022	2023	2022	2023
Local Community Engagement Plans	16	46	–	1	2	12	–	–
Community Demands	975	1,057	172	110	30	33	6	7

Support for Territorial Development

GRI 203-1

Driven by our mission to “improve life and change the future, together”, we strive to create a legacy in which the company transcends merely mitigating the impacts of its operations. Our goal is to pursue comprehensive territorial development that encompasses economic, environmental, and social dimensions, working hand in hand with the communities around us.

In this context, private social investment has emerged as a potent mechanism for achieving these targets. This is why Vale actively engages in territorial development, both directly through teams dedicated to relationships and territorial development, and indirectly through non-profit organizations, to leverage agendas, particularly within the regions where we operate. These investments are

designed to foster territorial development and significantly broaden the scope of the company’s positive influence.

In recent years, Vale has sought to deepen a systemic approach that sees social and environmental fields as structurally inseparable. People’s health, quality education, productive inclusion, and nature preservation, for example, can no longer be treated as isolated topics. The consolidation of the company’s social ambition also requires a deeper understanding of extreme poverty and the vulnerabilities of territories.

The magnitude of the social challenges faced by territories where we operate has required Vale to extend the boundaries of our social engagement and heighten the importance of forming partnerships with

the public sector, private entities, and civil society organizations.

For over 50 years, Vale has run a Foundation dedicated to partnering with municipalities to strengthen public policies in education, health, and income generation. The Vale Foundation supports the company’s social ambition by focusing on fundamental rights while supporting the development of autonomous communities, especially in education, health, and income generation. The Foundation’s strategy includes promoting cross-cutting coordination and supporting public management in partnership with municipal departments, social institutions, and partner investors.

In 2023, the Vale Foundation was present in 50 municipalities where Vale operates in Brazil, reaching 1.81 million people.

Health, Education, and Income Generation



Health

Vale’s health actions are guided by the United Nations Sustainable Development Goal (SDG) 3: Ensure healthy lives and promote well-being for all at all ages.

The main goal is strengthening primary health care and social welfare, known as the “doorway” for SUS (Unified Health System) and SUAS (Unified Social Assistance System) users. Through the Vale Foundation, we work on health promotion in partnership with health and social welfare departments, and with social organizations through technical cooperation, and equipping units used by the population.

The Ciclo Saúde Proteção Social Program seeks to improve the physical conditions of UBSs (Primary Care Units) and CRASs (Social Assistance Reference Centers), support the continuous education of

professionals working in these locations, and strengthen the use of technology to improve health and social assistance data management, thus enhancing the quality of services offered to the population.

Currently, the program is present in 38 municipalities where Vale operates and has trained over 4,400 health professionals in 2023. About 6,500 items were donated to primary care units and social assistance reference centers. The project also seeks to improve the indicators of the Previne Brasil Program. All 13 municipalities monitored in 2023 showed improvements in the average of Previne Brasil’s four-monthly indicators in 2023, when compared to 2022. Another 25 municipalities have joined the project over the last year and are being monitored.

Education

Vale's actions in education focus mainly on community engagement and medium- and long-term structural and strategic initiatives. These actions are guided by United Nations SDG 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Education investments in 2023 aimed mainly at improving children's literacy levels; combating school exclusion; offering comprehensive education that expands the availability of cultural, sports, and educational activities outside school hours; and advocacy in public policies through organizations specialized and recognized in the topic, such as Todos pela Educação, FGV, and UNICEF, among others.

Lacking full literacy during early schooling years causes long-term educational challenges for children, in different areas of knowledge. This may lead to an increase in grade retention, loss of interest in school, and dropping out, reinforcing educational and socioeconomic inequalities.

To address this issue, Vale introduced the Literacy Tracks project to 36 municipalities. The project brings together city halls, governments, and leading institutions to develop initiatives contributing to the improvement of literacy and education in an enduring and sustainable way. The project includes educator training, support for public management, and the production and distribution of teaching materials.

Throughout 2023, more than 4,300 education professionals were trained. In total, over 197,000 students from 2,300 schools benefited, mainly in the states of Pará and Maranhão.

Regarding our fight against school exclusion, the Território em Rede project identified approximately 6,400 children and adolescents either not attending school or at risk of dropping out across 14 municipalities where Vale was active in 2023. Remarkably, 6,264 of these individuals were successfully reintegrated into schools.

Income Generation

Vale carries out various income generation and socio-productive inclusion initiatives with communities.

[Learn more by clicking here](#)



Women of Maranhão Network

The Women of Maranhão Network includes more than 220 people, mostly women from Maranhão. Founded to serve the so-called "bandequeiras", women who sold meals through the windows of passenger trains on the Carajás Railroad (EFC), the network is now a cooperative made up of 15 social businesses and four groups of babaçu coconut crushers who found in collective work their source of income in eight municipalities along the railroad.

In February 2023, in Manaus, this network was one of the six winners of United Earth Amazônia for its contribution to social inclusion and forest preservation.

The Women of Maranhão Network was recognized for promoting social and economic inclusion through empowering women to become entrepreneurs in sustainable extractives. The Network also acts as an important link of identities and re-significations, seeking to articulate and strengthen cultural manifestations in the region.



Photo: Alexandre Rezende - Nitro

Joanildes Ferreira, Community Relations analyst, and Adão Francisco de Carvalho, president of COASP (Serra Pelada Cooperative), in the hydroponics project supported by the Community Relations Plan in Serra Pelada. The cooperative is a local supplier for Vale in Salobo.

Community Engagement Plans

In 2023, Vale had 385 relationship plans with local communities in Brazil, with 374 projects and/or initiatives underway in the last two years. Around 48% of these projects and initiatives were aimed at job and income generation programs. Below are some examples of plans implemented in Pará state, Brazil.

"It's been four years since we started the hydroponics project with Vale's support; I used to work as a foreman. We started with a thousand lettuce plants, and now we have a monthly average production of 8,000 lettuce plants and 15,000 bunches of parsley, along with kale, chayote, and peppers, totaling about 50 vegetable rows. It generates much more income for me than being a foreman. I learned about the project through the local community association, which Vale engages with through local engagement plans. The association selects the people and families to benefit."

Werbert Souza Silva, Nova Esperança 2 Community, Parauapebas, Pará state, Brazil.



Photo: Alexandre Rezende - Nitro

“Since 2017, we have had the partnership of family farming between the Association and Vale. After the partnership with Vale, we have a complete patrol for corn production. Today we have 120 bags per hectare, before it was 40 per hectare. Our production has more than tripled. We are 53 rural producers, and about 250 to 300 people depend on the income from this production.”

Givaldo Barbosa Silva, participant in the field mechanization program, one of the community engagement plans carried out by Vale in Vila Ouro Verde, Canaã dos Carajás, Pará state.



Photo: Alexandre Rezende - Nitro

“We started in 2015 with 18 machines, and we trained these women and men from the association with sewing and entrepreneurship classes, all in partnership with Vale. And I had a big dream, which was the construction of the association headquarters, and now, in 2023, we received this building built by Vale. After much struggle, after many places we went through (there were 25 in total), we settled in this headquarters now. Sixty families benefit from the project, in activities such as crochet, handicrafts, food, family farming, and cassava mills, among others. The most sought after activities are sewing and food.”

Maria Juciara de Souza Neto, coordinator of the Associação de Artesãs e Artesãos Solidários de Canaã.



Photo: Alexandre Rezende - Nitro

“I’ve been working in beekeeping for 10 years. We started with eight families, and today we are 23 families working together. I started with two hives, and now there are almost 50. We work with native stingless bees, accessible for any family to raise. We rescued a swarm in the nearby forest of Cedere and multiplied the bees. Vale has supported the project since 2017, with equipment, hives, and PPE. In 2023, we closed production at 480 kilograms of honey. Beekeeping is not only a source of income for us; it’s therapy.”

Ana Alice de Queiroz, beneficiary of the Community Engagement Plan implemented in Cedere 1, Parauapebas, alongside association Filhas do Mel da Amazônia.

Photo: Alexandre Rezende - Nitro



"I started producing milk here in 2012, and today I have about sixty cows. We received seven heifers in the last stage of the Sustainable Dairy Cattle project, supported by Vale, which involves providing dairy cows to 15 families in the region. The goal is to increase milk production on these properties. The expectation is to generate a gross monthly income of USD 1,200 per family. I currently sell 100 liters of milk per month at USD 0.40 per liter. Some producers, like me, sell the milk they produce to local dairies."

Getúlio Balbino Neves of the Palmares II community, Parauapebas, Pará state.

"Vale's Social Ambition strategy demonstrates a strong commitment to understanding and addressing the complex issue of poverty in its communities. By focusing on multidimensional poverty measurement, data-driven decision-making, and stakeholder engagement, Vale has the potential to become the leader in responsible mining and development. However, addressing the challenges in data management, analysis, and action, will be crucial for success."

Jamie Coats, CEO of Wise Responder, an institution that performs external accreditation of the Oxford program.

Fighting extreme poverty – Leaving no one behind

GRI 203-1

In 2021, Vale committed to helping lift half a million people out of extreme poverty by 2030 – an initiative connected with SDG 1, Eradicating Poverty, mainly carried out in partnership with civil society organizations, governments and other companies.

Since then, an adaptive methodology has been established, based on an extensive process of listening and research. This proposal has been constantly improved through dialogue with governments, corporations, and civil society.

Understanding poverty as a multidimensional phenomenon, Vale has adopted an approach centered on Multidimensional Family

Monitoring (MFM¹), focusing on five dimensions: education, income, health, nutrition, and infrastructure. The attention is placed on referring families to existing social services in each area.

In 2023, the implementation of the methodology involving 30,000 people was initiated, mainly in Pará and Maranhão states. The goal of the concept tests² is to accelerate learning at scale and expand partnerships to achieve the target by 2030. The use of the Multidimensional Poverty Index, created at the University of Oxford, aims to obtain common bases with global reference institutions. The methodology also seeks and values local solutions considering urban, rural, and forested areas.

[Learn more at the ESG Site.](#)

¹ Methodologically, we have adopted a concept of poverty as a multidimensional phenomenon and an approach based on Multidimensional Family Support (MFM). Consequently, the emphasis is on families, overseeing and referring them towards the public policies and social programs available in each area, while assessing their effects on everyday life and addressing the vulnerabilities identified. Currently, concept tests are taking place in the following locations: Pará (Canaã dos Carajás, Marabá, Serra Pelada/Curionópolis, Belém, Ilha de Marajó and Parauapebas); Maranhão (Itaqui-Bacanga/São Luis, Arari, Vitória do Mearim, Igarapé do Meio and the Vale do Pindaré region); Rio de Janeiro (capital and Itaguaí); and Espírito Santo (Serra).

² The implementation of concept tests in the field indicated the need for methodological improvements, such as in the composition of the dimensions and indicators of multidimensional poverty that were originally designed. Considering the high incidence of people in situations of moderate or severe food insecurity, we promote nutrition as a dimension, adopting five dimensions of multidimensional poverty (education, income, health, nutrition, and infrastructure).



Photo: ICAD

"In 2022, we completed a Census in Serra Pelada, which identified a total of 37% of families in extreme poverty."

Based on the lessons learnt from the Census, a project was developed to create memories with the aim of thinking about possible futures.

Through creative and entrepreneurial production with groups of women, young people and children, memories of the region have been created through embroidery, oral history and tile-making processes. This initiative will be part of Vale's program to fight extreme poverty.

Participants will also receive Multidimensional Family Support – an adaptive methodology adopted by the company to support the lifting of 500,000 families out of poverty by 2030. Networking, mobilizing partners and its own resources and those encouraged by the Federal Culture Incentive Law, contributes to articulating the potential of the Serra Pelada territory."

Delza da Silva, participant in the Bordando a Paz project in Serra Pelada

Volunteering

GRI 203-1

Employee volunteering activities are organized by the Vale Volunteer Network, which had 7,780 member volunteers at year-end 2023. Throughout the year, around 250 volunteering initiatives were organized, benefiting over 113,000 people in the areas where we operate. Vale employees, their families, suppliers, and other volunteers helped to collect various items for donation, such as school supplies, toys, grocery kits, cleaning products, and hygiene kits. They also engaged in recreational activities with children, health and entertainment activities for the elderly, and blood drives.

One of the noteworthy initiatives in 2023 was the Solidarity Olympics organized in Brumadinho, which collected 27 metric tons of food and benefited five schools, two shelters, and two NGOs in four municipalities surrounding Vale's operations: Brumadinho, Crucilândia, Bonfim, and Piedade Gerais. In the Vale Learn English Project, 40 young people took language classes at the Usina da Paz project in Parauapebas, all of them taught and monitored by volunteers from the Network, with teaching materials purchased and provided by the volunteer network. In December, the Vale Volunteer Network participated in another edition of the Christmas Without Hunger campaign, collecting total donations of USD 20,000, with Vale matching USD 2 for every USD 0,20 donated, resulting in a total of USD 220,000 in donations. The funds were used to purchase and distribute over 19,300 complete grocery packages.

Learn more about our volunteering initiatives on the [Vale Volunteer Network page](#)

Tax-deducted funds

GRI 203-1

In 2023, Vale allocated USD 83.8 million in tax-deducted funds through contributions to rights funds and support for projects by civil society organizations. In total, 439 initiatives and funds benefited from five tax incentive laws: the Fund for Children and Adolescents, the Elderly Fund, Pronon and Pronas/PCD, the Federal Law for Sports Incentive, and the Federal Law for Cultural Incentive.

Funds allocated to Funds are managed by rights councils to strengthen municipal public policies for children, adolescents, and the elderly. Transfers to municipal funds previously resulted in over 800 initiatives and campaigns, benefiting around 450,000 people in 2023, according to information from municipal committees. The sports projects sponsored by Vale served approximately 70,000 people throughout 2023, mostly children and youth.

"My journey with music began at a very young age, being always encouraged by my mother, and I joke that the clarinet found me. I joined Vale Música in 2012 and spent a year as a music intern. I was hired as a clarinet teacher and in May 2023, I had the opportunity to take over the Intermediate Symphonic Band of the project. At the beginning of my career in conducting, I was invited by the Nova Orquestra, at The Town festival, alongside singer Pitty and an audience of 100,000 people. On New Year's Eve in Copacabana, there were over 2 million. It was through Vale Música that I met the Nova Orquestra and with its visionary directors, these incredible opportunities have been happening."

Ludhymila Bruzzi, 31 years old, teacher at Vale Música in Vitória (ES), chosen as conductor for the Copacabana New Year's Eve 2023-2024.

Culture

GRI 203-1

In 2023, the Vale Cultural Institute collaborated with governments, public and private institutions, educators and students, artists and culture makers, communities, and different audiences who co-created cultural initiatives throughout Brazil. A total of 346 projects were carried out in 25 states and the Federal District, in addition to managing four cultural spaces with free access in the states of Pará, Maranhão, Minas Gerais, and Espírito Santo, which received over 444,000 visitors and held over 700 programs. Highlights included the Vale Música program, which served children and youth in four states, supported and promoted exchanges with five major orchestras, and large exhibitions. In 2023, the Institute, through its own sponsorship or via the Federal Culture Incentive Law, contributed USD 50 million for articulating and carrying out cultural initiatives throughout Brazil.

With a focus on local development supporting local culture, the Vale Cultural Institute launched eight calls for proposals, one of which was national (Chamada Vale), allocating USD 6 million to 45 projects in 25 states. In an unprecedented effort to ensure the decentralization of incentive funds for cultural projects, the Institute also launched the Rouanet Program in the favelas in partnership with the Ministry of Culture (MinC) and Central Única das Favelas (CUFA). The initiative will invest USD 1 million in 2024, through the Rouanet Law, in the states of Pará, Maranhão, Ceará, Bahia, and Goiás.



Students from Vale's Learning English project, in Parauapebas, Pará, visiting BioParque Vale, located in the Carajás National Forest in the Amazon.

Photo: Vale Archive

Education and Socioeconomic Development

The Vale Cultural Institute also offers dance, theater, and music classes, and arts workshops after school. We offer these activities at the Vale Maranhão Cultural Center (MA), the Casa da Cultura in Canaã dos Carajás (PA), the Memorial Minas Gerais Vale (MG), in extramural actions of the Vale Museum (ES), in the five Knowledge Stations managed by the Vale Foundation, and in partnership in centers in our geographies.

We invest in the artistic production network and expand access to financing mechanisms, aiming to contribute to the development of new cultural agents.

Partnership with Inhotim

Vale and the Vale Cultural Institute entered into an innovative and long-term partnership with Inhotim, the largest open-air museum in Brazil and one of the most important in the world. USD 80 million will be invested over the next 10 years – 50% of which will come from Vale's own resources and 50% from incentive funds¹. As a result, free admission has been extended (in 2023, there were 158,000 free visitors, 512% more than in 2022), educational projects expanded, and socioeconomic development of the tourism in the Brumadinho region have gained momentum.

Anti-Racist Efforts

Throughout the year, the Vale Cultural Institute promoted anti-racist practices through exhibitions ("Funk: A cry of boldness and freedom"), the training of students and artists from the Black or Indigenous Northeast, the holding of festivals (Back2Black), and the inauguration of the Memorial of the African Diaspora in Maranhão, featuring works by contemporary Black artists.

¹ Incentivized resources come from tax waivers, where the government waives its right to receive the resource as a tax payment and allows companies to direct it to projects for public benefit, through Incentive Laws such as the Federal Law on Cultural Incentives (used in this case).

Heritage

Preserving historical heritage, through initiatives such as the ongoing reconstruction of the National Museum, is a part of the Institute's mission. In 2023, work was completed on the restoration of the Church of São Francisco and the construction of the Mariana Museum (MG), along with the renovation of the Atiaia Theater in Governador Valadares (MG). Additionally, a partnership was announced for the restoration of the Mercedarians Convent and the Olympia Movie Theater, both in Belém (PA).

² The assessment was limited to suppliers with active contracts in Brazil (around 5,000 suppliers and about 17,000 contracts), which represent approximately 60 percent of our global supplier base with active contracts.

Responsible sourcing

GRI 2-6

Our suppliers' practices directly influence the impacts we have on nature, communities, and the economy. Managing risks and opportunities in the supply chain and aiming to ensure our suppliers adopt responsible practices is crucial to the continuity and competitiveness of our business. Suppliers are also critical for our business success in that we rely on them for timely delivery of high-quality materials and services. Procurement can also offer opportunities to increase benefits for local communities.

Our Responsible Procurement Program, launched in 2022, aims to enhance our approach to environmental, social, and economic aspects in supplier management. An ESG Criticality Matrix¹⁹ is used to rate procurement categories on environmental, social, and governance risks in line with ISO 20400 – *Sustainable Procurement*, classifying suppliers according to their level of impact and exposure to these risks.

In addition to 100% of suppliers undergoing environmental and social due diligence in the register, in 2023, 28% of the suppliers assessed in the matrix were classified in the high or very high ESG risk categories. Of these, 42% were prioritized for financial, health and safety, and human rights analyses, totaling 620 assessed. Of these assessments, 35% resulted in action plans to adapt these suppliers to our practices.

Local procurement is among the pillars of our Responsible Procurement agenda and is an important tool in advancing the development of the communities where we operate. We continuously track the share of local spending and the supplier default, and work closely with federations and associations who support local businesses in identifying opportunities and providing training to qualify as suppliers.

"Today, we have approximately eight families benefiting from agroforestry and hydroponics. We grow about 2,000 lettuce plants per month, and our produce is sold within the local village and to Sodexo, Vale's catering supplier in Salobo. Family income has improved significantly and, with the support from Vale, our resources and infrastructure as well. Vale asks us: How can we help you grow? Sometimes we don't know how to ask, but we are receiving training on fundraising and managing donated funds."

Adão Francisco de Carvalho, president of the Family Agriculture Cooperative of Serra Pelada, Curionópolis/PA.

Another pillar of the Responsible Purchasing agenda is engagement with carbon reduction. For the fourth year running, Vale's suppliers were invited to answer the CDP Supply Chain Program questionnaire. In 2023, we only reported the most high-risk suppliers, according to our risk matrix; we selected 168 suppliers and received our highest response rate since the beginning of the program (164 suppliers). This will allow us to act with more focus on the evolution of our value chain in best practices on the subject of climate change. Of the respondents, 132 have taken part in all four cycles of the CDP program, demonstrating our ongoing commitment to managing the issue.

In 2020, the Partilhar program was launched with the aim of promoting greater socio-economic development in the regions where Vale operates, joining forces with the supply chain. Its methodology and concepts were incorporated into Vale's supplier contracting process, in addition to the technical, commercial and safety aspects. As a result of the program, in 2023, the participating suppliers made around USD 5,7 million in local social investments, which benefited the territories where Vale operates.

Transparency and monitoring

Vale’s approach to supplier management draws on standards encompassing health, safety, social, environmental, ethical, integrity, and human rights aspects. This approach draws on risk management and mitigation policies and processes within the [Vale Production System \(VPS\)](#).

Before entering a business relationship with Vale, all of our global suppliers undergo due diligence based on publicly available information, consistent with their scope of supply and in line with our ESG strategy. We seek to do business with suppliers that are committed to doing business responsibly and ethically.

Vale’s Third-Party Code of Conduct helps us share our values and ethical principles with suppliers and other third parties, with which we do business. Additionally, we provide our suppliers with anti-corruption guidance

through our Anti-Corruption Handbook, tailored for suppliers and other third parties. [These documents can be accessed here](#).

This process is a component of our Ethics & Compliance Program, which includes a Whistleblower Channel that is accessible to anyone wishing to report suspected or observed violations of our Code of Conduct. [To learn more about these practices, see our Ethics & Compliance page](#).

During the contractual period we monitor suppliers in Brazil on labor-related matters throughout their contracts in order to minimize exposure to risks involving safety, overwork, and labor claims.

Supplier audits and assessments

Upon onboarding, suppliers commit to providing dignified working conditions, combating child labor and child sexual exploitation, respecting freedom of association and collective bargaining in accordance with Vale’s Principles of Conduct for Third Parties, and adhering to our anti-corruption and health and safety requirements. Vale also requires suppliers to adopt best practices under contractual clauses, such as implementing greenhouse gas inventory programs and disseminating our own guidelines in their supply chains.

Supplier performance is evaluated throughout the entire contract, and we periodically assess suppliers on sustainability (including human rights, social and environmental compliance), performance, and government relations.

Building on contractor assessments, in 2023, we held our first Safer Partnership event to recognize suppliers for outstanding health and safety performance, marking the launch of a new supplier recognition program.



Vale is a member of the [Extractive Industries Transparency Initiative \(EITI\)](#) and is committed to disclosing its due diligence processes in its EITI reports. We also disclose information on payments made to governments in line with the EITI criteria and principles. We are committed to continuously improving our responsible sourcing practices and maintaining transparency in due diligence matters in our operations.

Suppliers and critical themes

Ethics & Compliance: We seek to work with suppliers who are committed to operating their businesses in a responsible and ethical manner in compliance with our anti-corruption rules. The [Principles of Conduct for Third Parties](#) document, published in 2022, allows us to share our values and ethical principles with suppliers and other contractors who work in partnership with us.

This document reinforces that the Reporting Channel can be accessed by anyone, inside or outside Vale, who wants to report a case of suspicion or violation of our [Code of Conduct](#).

Human Rights Due Diligence: Vale’s human rights management has covered our suppliers since 2019. The process begins at the registration stage and continues through to supplier contract management. Some of the practices we’ve ramped up over the last four years include: monitoring the ‘Dirty List’, risk assessment, application of a self-diagnosis questionnaire, training and engagement, documentary and field inspections, housing inspections, and monitoring of supplier action plans.

In 2023, 533 suppliers in Brazil were classified as high risk in terms of human rights based on the characteristics of their contract with Vale and the risk classification in the ESG Matrix, as part of the risk management measures of the Responsible Purchasing Program. Among these

suppliers, mitigation actions were implemented for 376, with human rights inspections being carried out for 72 (in addition to 3 other suppliers that were not classified as high risk, but were still subject to inspection). The results of the inspections pointed to the following main challenges: tackling the sexual exploitation of children and adolescents, addressing the reliability of reporting channels, and improving labor relations and conditions.

During this period, we began to implement standardization on the human rights management process for suppliers; in Malaysia, 40 suppliers were classified as high-risk in terms of human

rights, and mitigation actions were implemented for 25. Human rights inspections have been carried out for 17 of these suppliers and recommendations are being elaborated, to be followed by an action plan, to address the main challenges identified related to human rights, such as contractor working conditions, infrastructure and facilities management, property security, workplace and sexual harassment, discrimination, and diversity and inclusion.

Our approach to human rights incorporated into our policies and decision-making processes of critical business functions is considering all areas, such as risks, procurement, corporate security, human resources, facilities, and health and safety.

Risk Management in the Base Metals Supply Chain

We seek through Vale Base Metals (VBM), to responsibly producing and sourcing minerals and metals feeds, including nickel, copper, cobalt, platinum, palladium, ruthenium, rhodium, iridium, gold, and silver. We require all leaders, employees, suppliers, and contractors to uphold this commitment. To that end, the Company has implemented due diligence processes to assess and manage the risks outlined by the Organization for Economic Co-operation and Development (OECD)¹ and confirmed in our [Policy Statement on Responsible Sourcing of Minerals and Metals](#).

These processes incorporate third-party and supplier risk assessments, red flag identification, and implementation of risk management strategies to mitigate identified risks, including financing of conflict, human rights abuses, bribery, fraudulent misrepresentation of the origin of minerals, money laundering, and public or private security forces. We also have an independent audit process that includes a review of management systems related to responsible sourcing, as well as an assessment of the effectiveness of the Company's efforts to mitigate risks in the supply chain including [Copper Mark's Joint Due Diligence Standard \(JDDS\)](#) and the [Responsible Minerals Initiative's Cobalt Refiner Standard](#).

In 2023, VBM achieved assurance under the third-party Copper Mark Joint Due Diligence Standard (JDDS) at three of our North Atlantic refineries: Copper Cliff Nickel Refinery (Ontario), Long Harbour Processing Plant (Newfoundland), and Clydach Nickel Refinery (Wales). The results of these assessments are publicly available for review. Vale also achieved the Responsible Minerals Initiative's Cobalt Standard for our Port Colborne Refinery (Ontario). Based on our due diligence process, VBM only identified one high-risk supplier, and this supplier was assessed by a third party. The results of the assessment presented no material findings, with only minor governance improvement recommendations. VBM's Port Colborne Refinery achieved certification with the Responsible Minerals Initiative's Cobalt Refiner Due Diligence Standard in 2023. The certification will be renewed in Q2 2024.

Through our risk mitigation approach, VBM strives to ensure responsible sourcing practices throughout our supply chain. We achieve this by collaborating with our suppliers, actively monitoring their performance, and maintaining a zero-tolerance policy towards human rights violations and support of non-state armed groups. Our responsible sourcing practices have yielded data that has strengthened our due diligence efforts, identifying feeds that are higher risk and prompting us to take enhanced due diligence measures aimed at mitigating those risks.

Tailings, dam management, and safety

GRI 3-3 [Dams]

The tragedies in Brumadinho and Mariana have led us to search for answers on how we can evolve our management and monitoring processes for dams and tailings storage facilities (TSF² or EARs in Portuguese) as part of our efforts to become a more reliable operator. We aspire to “never again,” and have embarked on a journey of cultural transformation in which we seek to de-risk our geotechnical structures and enhance engagement with communities surrounding our mining operations.

In Brazil, we operate 134 mining dams. Of these, 95³ are subject to the requirements of the National Dam Safety Policy (PNSB), as stipulated by Federal Law no. 12,334. These 95 dams must meet legal requirements that include submitting six-monthly Safety Inspection Reports and issuing Stability Certificates (DCEs).

Our 134 mining dams include:

- **95 sediment dams** (75 in Iron Solutions and 20 in Transition Metals);
- **39 tailings storage facilities** (37 in Iron Solutions and two in Energy Transition Metals).

In our North Atlantic Base Metals operations in Canada, we operate 67 facilities (in Ontario, Manitoba, Newfoundland, and Labrador), which are reported on under the regulations of the Canadian Mining Association.

In Brazil, three Geotechnical Monitoring Centers monitor our main dams 24 hours a day, seven days a week. Vale's dams are also regularly inspected by internal and independent engineers, who respond promptly when necessary with preventive or corrective action. Vale has also built four⁴ downstream containment structures—physical barriers which aim to contain the tailings released in the event of a dam breach, protecting downstream communities and ecosystems. It is also important to note that there are now no communities that we are aware of which would be at risk in the event of a dam breach.

Our current approach to tailings governance adopts several layers of protection, which improves our ability to prevent accidents:

Business unities	Security and operational excellence	Internal audit and reporting channel
Operational Geotechnical Area	Geotechnical Office	Audit and Compliance Office
First line of defense	Second line of defense	Third line of defense
External sentinels		
Record Engineer	Independent Audits	Dam Safety Review
Dam safety inspections and performance assessments	Technical reviews by public prosecutors and the Independent Tailings Review Board (ITRB)	Periodic technical reviews by an external engineering company.

¹ Annex II of the OECD Due Diligence Guidance for Responsible Supply Chains of Minerals from Conflict-Affected and High-Risk Areas OECD Guidance⁹¹ (OECD Responsible Sourcing Requirements), [link](#).

² Tailings storage facilities include sediment, water and tailings impoundments, drained stacks, and wing and saddle dikes (tailings storage facilities may also be grouped into systems).

³ Reference: December/2023

⁴ Sul Superior (Barão de Cocais), B3/B4 (Nova Lima), Forquilha I, II, III and Grupo (Ouro Preto-Itabirito), as well as the Minervino and Cordão Nova Vista (Itabira) dikes.

What is a dam?

It is a barrier for containment of liquid or a mixture of liquids and solids, forming a reservoir.

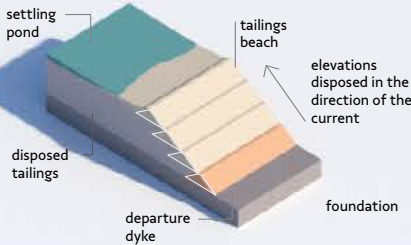
The reservoir consists of at least one main dam (also known as a departure dyke) and, if present, also internal dykes and saddle dykes (accessory dykes). This set is known as the dam system. It can be used to store water, sediment, mining tailings or to generate energy. Dams that store tailings, sediment or water in a mining environment can also be generically called “mining dams”. Structures such as dams, drainage piles, saddle dykes or internal dykes with the main purpose of containing tailings can be generically referred to as tailings storage facilities (TSFs).

What are tailings?

Tailings are what is left over after the ore has been processed in the processing plants. It consists of ore, sand and water and is not toxic, corrosive or flammable.

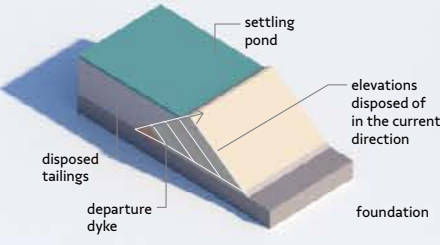
Dam construction and types¹

Upstream



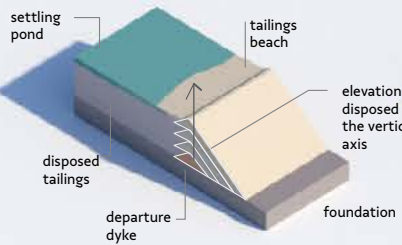
The lifting massifs are supported by the tailings or sediment previously deposited in the direction of the tailings. This category are also those formed on reservoirs already in place.

Downstream/conventional



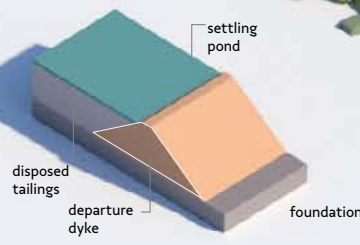
Located downstream of the departure dyke. The massifs are built with material or with the tailings.

Center line



The elevations are disposed in such a way that the axis of the dam remains aligned with the axis of the starting dyke, due to the arrangement of the construction material, part downstream and part upstream, in relation to the upstream, in relation to the crest of the previous stage.

Single Stage



In this model, there are no elevations. A dam is built with compacted soil or rockfill (stone blocks), without the subsequent construction of capacity.

Emergency dams level

There are 20 dams at emergency level located in the state of Minas Gerais



For more information on emergency levels, dams and acronyms visit our [Dams Manual](#)

Municipality	number of dams	Dams	Emergency level
Nova Lima	7	5-Mutuca 6 7A B B3/B4 Vargem grande	01 01 01 01 01 01
Ouro Preto	6	Dique de Pedra Doutor Forquilha I Forquilha II Forquilha III Grupo	01 01 02 02 03 02
Mariana	3	Campo Grande Dicão Leste Xingu	01 01 02
Barão de Cocais	2	Norte/Laranjeiras Sul Superior	01 03
Itabira	1	Sistema Pontal	01
Itabirito	1	Maravilhas II	01

What is dam decharacterization?

This is the process in which the structure no longer performs the function of containing tailings, sediment or water. Its aim is to eliminate the risk associated with the structure, increasing the safety of people and the environment. By 2035, 30 structures will be decommissioned.

1 Dam decharacterization

The decharacterization of upstream structures, which are built on tailings, is a commitment made by Vale that has become a legal obligation.



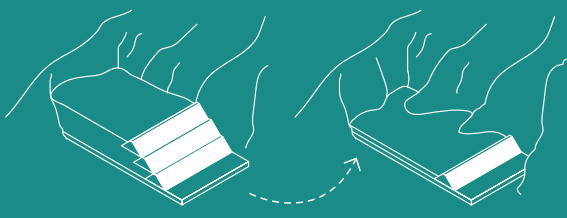
2 Reinforcing the structure

Construction work is complex and each project has its own characteristics and challenges. In some cases, for example, it may be necessary to build a reinforcement to improve the stability of the structure in order to carry out the works.



3 Tailings removal

The removal of tailings is totally or partially done so that the dam loses its storage function.



4 Environmental regeneration

The final stage of the work is revegetation to reintegrate the area into the local environment. So far, Vale decharacterized 13 upstream structures.



Technical Executive Vice President

Vale’s efforts to improve dam management and safety and prevent recurrence of previous incidents included the creation of a Technical Executive Vice President position in 2023 to oversee all mining, geotechnical, mine planning, technology, innovation, and mineral exploration activities, Geotechnics, Health, Safety and Environment and Operational Excellence.

The importance of a technical vice-presidency is to provide a comprehensive view of operational stability performance and the status of our programs in an effort to develop sustainable mining solutions across three key areas:

- **Tailings disposal and repurposing**, including the development of innovative products and USD 2.5 billion in investments in filtered tailings operations;
- **Decharacterization of tailings dams built** using the upstream method through a robust program that prioritizes safety throughout the decharacterization process, with total expenditure of more than USD 3 billion; and
- **A cultural transformation** based on a commitment to be a leader in sustainable mining.

Risk assessment and monitoring

Goals

100% of tailings storage facilities operating with ‘Very High’ and ‘Extreme’ potential consequences be GISTM compliant by 2023.

100% of tailings storage facilities (TSF or EARs)¹ GISTM compliant by 2025.

Dam decharacterization plan: 60% of Vale’s upstream dams in Brazil decharacterized by 2025, 90% by 2029 and 100% by 2035.

Status in 2023

In addition to our public commitment, GISTM was implemented for 48 tailings storage facilities in 2023.

GISTM will be implemented for an additional two tailings storage facilities by 2025, achieving 100% GISTM compliance.

43% (13 out of 30) of upstream-raised structures in Brazil to be decommissioned by year-end 2023.

Dam decharacterization

Vale will decharacterize a total of 30 upstream-raised dams by 2035. In 2023, we completed the decharacterization of our 13th dam, the Dike 2 in the Pontal dam system in Itabira, reaching 43% completion of the program.

Number of upstream geotechnical structures (per year)

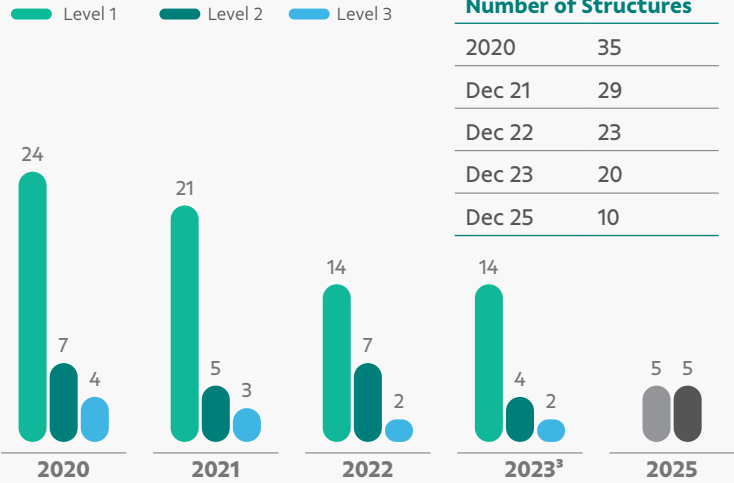
2019 to 2022	12
2023	1
2024	3
2025	2
2026	2
2027	2
2029	5
2035	3
TOTAL	30

13th decharacterization completed in 2023

A total of 30 upstream dams will be decharacterized by 2035

Because dams are complex structures, decharacterization requires caution, diligence, and solutions tailored to each structure. We strive to prioritize the safety of people, risk reduction, and protecting the environment.

Structures at emergency level²



Emergency levels are a system used under Brazilian regulations (ANM 95/2022) to rate dams based on the potential damage caused in the event that dam safety is impaired. In 2023, we successfully derated dam B3/B4 in Nova Lima (MG) from Level 2 to Level 1, due to the progress of its decharacterization works. The completion of the works was anticipated for 2024. By 2025, Vale aims to have no dams at emergency level 3. As our decharacterization efforts continue to progress or as

the safety assessment analyses evolve, the dams will decrease in emergency level.

In the case of these dams classified as Level 3, activities on the structures (such as tailings removal) are carried out using remotely operated equipment, with employees located outside the dam’s risk zone. In addition, in order to minimize risks to the lives of the local population, there are no longer any communities living downstream of dams that are at emergency level 2 or 3.

¹ EARs (tailings storage structures) consider sediment, water and tailings dams, drained piles, and saddle and internal dikes (tailings dams can also be grouped into dam systems).

² Emergency levels are categorized into 1, 2 or 3, with level 1 representing the lowest risk to the safety of the structure and level 3 representing the highest risk.

³ The emergency level of the Area IX dam was reduced from level 2 to alert level; and the Dique de Pedra from level 2 to level 1.

Dam maintenance, repairs, and improvements

Vale has evolved its approach to managing dams and tailings, which now includes added controls and an in-depth assessment of historical and current conditions, including the performance of each structure.

Vale’s adoption of the Global Industry Standard on Tailings Management (GISTM), which includes 77 cross-cutting requirements, has strengthened governance in support of our goal to reduce risks and improve operational safety through all phases of a facility’s lifecycle, including planning, design, operation and post-closure.

To date, Vale has implemented the GISTM for 48 tailings storage facilities, including 35 within our Iron Ore Solutions operations in Brazil and 13 in our Energy Transition Metals operations (11 in Canada and two in Brazil). Another two facilities in our Iron Ore Solutions operations in Brazil —Torto and Dique de Pedra — will be compliant with the standard by August 2025.

The GISTM standard includes social, environmental, and technical requirements and strives to achieve the ultimate goal of zero harm to people and the environment with zero tolerance for human fatality. Information on our initiatives and progress to date is available at our [ESG Portal](#).



Photo: Ricardo Teles

Canaã dos Carajás, Pará, (PA), Brazil – aerial drone photo of the Sossego Mine.

Mining and metallurgical waste management

GRI G4 MM3

In 2020, Vale introduced a Mining and Metallurgical Waste Management Policy to support our efforts to transition to a circular economy model through innovation.

We have since launched initiatives to achieve tailings-free processes by developing co-products such as sustainable sand, implementing blending, expanding production in our North System to 240 Mtpa, implementing the [Capanema project](#), and retrofitting Plant 1 in Serra Norte for natural moisture beneficiation.

Natural moisture processing of iron ore eliminates the need for water and, as a result, the production of tailings. This method reduces overall water consumption by 93%, improves productivity and resource efficiency, and minimizes energy consumption by reducing the number of process steps. In 2023, 69% of the ore produced by Vale was natural moisture. In addition, of the remaining 31% of tailings generated, around half (15.5%) were filtered and disposed of in dry piles or pits. Finally, only 15.5 % of Vale’s iron ore production required tailings to be deposited in dams. In short, Vale has advanced with technology and safety in recent years, so that 84.5% of Vale’s iron ore production did not depend on dams for tailings disposal.

Total mining and metallurgical waste (in millions of metric tons)

	2021	2022	2023
Iron ore – waste rock	207.6	208.5	282.4
Iron ore – tailings	47.2	46.9	48.5
Other business areas ¹	260.4	150.6	153.0
Total	515.2	406.0	483.9

¹ Includes waste rock, tailings and slag from nickel, copper and manganese mining.

Through New Steel, a company acquired by Vale in 2019, we are investing in new technology to expand dry beneficiation. A magnetic concentration technology for iron ore is under development, and the first industrial-scale magnetic concentration plant is being built at the Vargem Grande mine in Nova Lima (MG), with a planned production capacity of 1.5 million metric tons per year.

In some operations in which wet processing (water) is still used, Vale is currently filtering the tailings and disposing of them in piles to reduce the use of tailings dams. Tailings removed during the decommissioning process are stored in exhaust pits and in waste rock and tailings piles.

Assessments are currently being implemented at several facilities to give a sustainable destination to the material. The construction of our first tailings filtering plants began in 2019, in a project that employed approximately 6,000 workers at its peak. Our planned investments in tailings filtering systems and dry stacking are projected to amount to USD 2.2 billions between 2019–2027.

In 2023, we completed the construction of our fourth tailings filtering plant in Minas Gerais. Another three have been installed in the Vargem Grande, Brucutu, and Itabira (Conceição mine) complexes. These plants have a combined filtering capacity of 60 million metric tons of tailings per year.

At these facilities, approximately 90% of the water recycled from the tailings is reused throughout the production process. Repurposing tailings reduces environmental impacts from the decommissioning process by minimizing the need for land for safe disposal.

Community perceptions of our risks

GRI 203-1

Mining Dam Emergency Response Plans (PAEBM) are technical documents outlining procedures for the immediate response in the event of an emergency and are designed to minimize risks to communities and impacts on the environment and cultural heritage. All dams in Brazil that are subject to the National Dam Safety Policy (PNSB), and all dams that are subject to the Minas Gerais State Policy on Dam Safety (PESB) have individual Emergency Response Plans.

Each plan is developed, implemented, and managed to comply with legal requirements and emergency response guidance provided by civil defense authorities. ERPs are submitted to the municipal government and civil defense authorities and are publicly available [here](#).

Vale strives to achieve transparency, to disseminate industry best practices, and to ensure legal compliance. As part of this aim, we regularly engage and communicate with communities about dam safety and risk prevention. We have a wide range of preventive measures in place in an effort to ensure our mining operations are safe,

including emergency signage, drills, siren tests, public meetings, and training.

As part of our dam safety initiatives in 2023, we performed the following actions:

- **Review of internal procedures** relating to our corporate social responsibility framework, including risk and impact management processes;
- **Development of specific procedures** for holding instruction sessions, drills, site visits, ERP preparation, dam monitoring/controls demonstrations, etc.;
- **Development of a general procedure** for post-collapse reparation based on lessons learned from Brumadinho;
- **Implementation of a participatory model for drill feedback and interactions under ERP Engagement Plans**, with a total of 22 plans uploaded to Vale’s Stakeholders, Claims, and Issues System. These are now being implemented as part of integrated community safety plans. During the orientation seminars/ public meetings, the community is invited to fill in an evaluation survey about the event and include any questions or comments. In emergency drills, residents of the Self-Rescue Zone (SRZ) are invited to evaluate the drill;

- **Training of more than 1,000 employees from community relations teams and other internal areas of Vale** with the aim of qualifying participants on the compliance criteria of the 21 social requirements of GISTM, as well as the evidence produced, the engagement processes adopted and addressing the gaps on the subject from 10 training sessions of the “GISTM Social Journey”;
- **Training for Community Relations teams and other areas of Vale** with the aim of qualifying participants on the compliance criteria of the 21 GISTM social requirements, as well as the evidence produced, the engagement processes adopted and addressing gaps.
- **Hiring and training local residents to work in the processes** of mobilizing and registering communities for prevention actions related to dams;
- **Supported visits by local residents to dam de-characterization works and geotechnical monitoring centers** and development of “abandonment plans in schools” in partnership with the municipal civil defense. One example is the “Dona Sirene” project, which began in Itabira (MG), in conjunction with the Department of Education and the Civil Defense, to work on the perception of dam safety risks among the school community.



2023 in numbers:

22 municipalities within the Self-Rescue Zone engaged in ERP activities

25 external drills with community participation

32 instructional sessions/public meetings with communities

116,000 people registered in emergency response plans

16,000 buildings visited as part of the emergency response mobilization for emergency actions to mobilise the population to take part in seminars, public meetings, and other actions related to dam safety.

Evacuated areas

GRI G4 MM9

Communities in Self-Rescue Zones at emergency level 2 and 3 were evacuated, and Vale built containment structures intended to protect people and the environment.

In the territories where emergency evacuations (Barão de Cocais, Nova Lima and Itabirito) and preventive evacuations (Ouro Preto) have taken place, based on dialogue with residents and public authorities in each municipality, Compensation and Development Plans are underway to offset the impacts caused by the safety improvements underway.

“The relationship with the company has had its ups and downs, but it would be hypocritical to say that the company has done nothing in recent years. There was the delivery of the new municipal school, the work on the spillway, and the transport of schoolchildren that has been taking place since 2019. Vale has brought qualified and more humane professionals to the area to serve the community, and for me that has made all the difference. I confess that I still feel afraid, and I don’t like the siren test day, which happens every month. But today I see the whole scenario more clearly and there is always someone from the Vale team on duty, ready to assist us, even if it’s just to answer questions, which reassures me.”

Perla Antonieta Lima, a resident of Parque do Engenho, in São Sebastião das Águas Claras (Macacos), in the region of Vale’s B3/B4 Dam, in Nova Lima, Minas Gerais.

“In 2019, Vale removed us from our home. We went to a temporary residence while the dam was at risk. Vale paid our rent, water, electricity and gas. We left our home because my uncle who lived with us had a disability that, in the event of an emergency, we wouldn’t be able to evacuate the area quickly. Vale paid for his transport to the doctors. It was a very positive point because it reduced our anxiety in a scenario of a falling ravine and a flooding river. But thank God everything worked out and we’re back home today.”

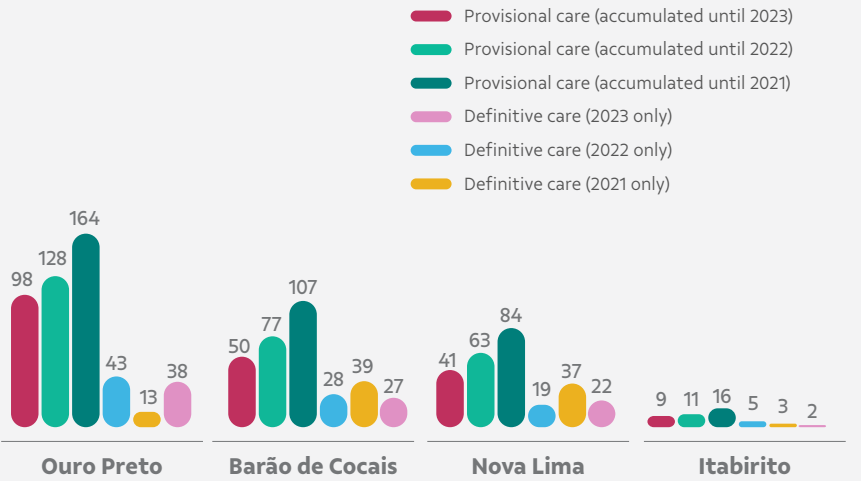
Aline de Lima Silva, a member of a family that received temporary assistance due to emergency evacuations, in Vila Alegre, Itabirito, Minas Gerais.

Negotiation processes concluded

Municipality	2023	2022	2021
Ouro Preto	38	171	177
Barão de Cocais	27	105	146
Nova Lima	22	82	121
Itabirito	2	16	19
Total	89	374	463

Total of families receiving assistance due to emergency evacuations – evacuated areas

GRI G4 MM9



¹ The scope of “Evacuated Territories” deals only with emergency evacuations and evacuations/resettlements due to dam de-characterization works.

Reparations

GRI 203-1

We strive to ensure that the tragic dam collapses in Brumadinho and Mariana are never repeated. We will never forget these events. We are continuously working to compensate for and remedy the damage caused to people and communities as we aim to become a better company.

Our commitment to “never again” has inspired a cultural transformation within Vale, including a comprehensive review of all our major processes, such as governance, risk management, and dam management. We are challenging ourselves as we seek to achieve recognition as an industry leader for safety and as a reliable operator. As we seek to ensure the damages are repaired and safety is improved, we are establishing a new set of standards and guidelines, as well as a culture of increased accountability, humility, empathy, respect, and active listening – aiming to reshape our relationship with society.

Brumadinho

The local fire department's search for the three individuals still missing, among the 270 victims of the dam breach, two of whom were pregnant, is still ongoing. We know that human losses are irreparable.

[Learn more about Vale's efforts here.](#)



Brumadinho Comprehensive Reparation Agreement in figures

333

projects approved

91

converted¹

29

completed

161

in progress

52

completed pending final discharge

“Vale has made significant progress on its cultural transformation journey. In response to the Mariana and Brumadinho disasters, the company has committed to rethinking everything related to not only how it operates, but also why it exists. Vale’s purposeful commitment to reparations, safety, and sustainability is both impressive and genuine. The company has such a critical role to play going forward in the most important issues facing the world, including driving the green and just transition, addressing the climate crisis, deepening its nature positive work, and fulfilling the UN’s Sustainable Development Goals in key regions where it operates.”

Chris Coulter, CEO Globescan.

About the Comprehensive Reparation Agreement

On February 4, 2021, Vale signed a Comprehensive Reparation Agreement with the Government of Minas Gerais, the Federal and Minas Gerais state public prosecutors’ offices, and the Public Defenders’ Office of Minas Gerais, formalizing the following obligations for socioeconomic and socio-environmental reparation:

- Funding to replace emergency aid payments with the Income Transfer Program;
- Measures to enhance quality of life, access to public services, and economic growth in the affected region; and
- Projects to restore living conditions for affected individuals to a level equivalent to that existing before the dam breach, supporting their autonomy and empowerment.

¹ Projects related to obligations to do that were converted into obligations to pay.



Photo: Gustavo Baxter – Nitro

Teams from the Minas Gerais Fire Brigade searching for the remains of the victims of the Corrego do Feijão tailings dam collapse.

Performance obligations






25% completed

Payment obligations

87% completed

Total obligations

68% completed

2019  B1 collapse	2021  Signing of the agreement	2023  68% completion of the agreement	2026  100% payment obligations	2028  Removal of tailings from the Paraopeba river basin (6km)	2030  100% recovery plan of degraded areas (PRAD)	2031  100% performance obligations
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“The dam breach changed our lives drastically. I lost my father in the tragedy and could not get myself to tend to the garden for two years. He used to help me on his days off and there was a patch he had just planted. One day they asked for my permission to renovate the garden and asked which area I wanted to renovate first. I said: the patch my father planted. So we started a cleanup together. On the day we finished, I received the news that they had found my father’s body. I now look at that area and see it as representing a renewal, a new lease on life. I feel like he’s with me, it’s where I find comfort.”

Aline Aparecida Lopes Muniz, 31, owner of the Cheiro Verde vegetable garden in Córrego do Feijão since 2016.

Programs within the Brumadinho Comprehensive Reparations Agreement

GRI 203-1

In 2023, we made further progress on our programs under the Brumadinho Comprehensive Reparation Agreement, which has now reached 68% completion of total obligations, including performance¹ (25% completed) and payment² (87% completed) obligations. The initiatives completed in the year met the demands made by compliance enforcement agencies

(Government of Minas Gerais, the Public Defenders’ Office of the state of Minas Gerais, and the Federal and Minas Gerais state prosecutors’ offices) and were approved by the courts. [Learn more about the Agreement here.](#) 

A new procedure has been established for converting performance obligations into payment obligations, with

approval from the enforcement agencies, municipal governments (beneficiaries), and the courts. This has helped to expedite our obligations under the Comprehensive Reparation Agreement, with more than BRL 1.6 billion (USD 320.3 M) in payments completed and with the completion of performance obligations increasing from 8% at year-end 2022 to 25% in 2023.

¹ Performance obligations: obligations under the Agreement that require Vale to implement actions required by the enforcement agencies within the financial limits stipulated in each schedule. Among the actions completed to date are capacity building for educators, hospital outfitting, support for agriculture, and procurement of materials for the civil defense authorities and the local fire department.

² Payment obligations: payments required under the Reparation Agreement to fund programs executed by the state of Minas Gerais, including actions to improve water security, funding for the construction of a beltway, subway improvements, and initiatives to strengthen public services, such as by improving public health care facilities and equipment.

³ <http://www.feam.br/component/content/article/15/1992-boletim-informativo-do-cidadao-sobre-a-qualidade-da-agua-no-rio-paraopeba>

Other programs beyond the Agreement

GRI 203-1

In 2023, we delivered the 25 de Janeiro city square, the Ipê Amarelo community market, and the Laudelina Marcondes culture and handicraft center in the community of Córrego do Feijão. Additionally, the Brumadinho Memorial—a tribute to the victims and their families—was formally established with the signing of Terms of Commitment in August between Vale, the Minas Gerais Public Prosecutors’ Office, and the Association of Victims and Families Affected by the Córrego do Feijão Dam Collapse (AVABRUM). This was followed by the establishment of the Brumadinho Memorial Foundation, an entity responsible for managing and preserving the Memorial with funds stipulated within the Terms of Commitment.

Additional Terms of Commitment and other agreements were signed with the Pataxó and Pataxó Hã-Hã-Hãe Indigenous communities in Tronco Gervasio and Antônia. Vale is awaiting certification of the court decision to finalize payments to the Indigenous communities that have opted into reconciliation for dispute resolution (the Katurãma and Tronco D. Eline Indigenous communities, pursuant to Terms of Commitment signed in September 2022, and the Tronco Gervásio and Antônia Indigenous communities, pursuant to Terms of Commitment signed in August 2023). Negotiations are currently pending with the Naô Xohã Indigenous community.

Vale has continued to comply with the court decision requiring it to provisionally relocate families from the Naô Xohã community who remained in the area affected by the Córrego do Feijão dam collapse. Land was purchased in Brumadinho on the recommendation of the Indigenous community for the temporary relocation of affected Indigenous families. This area may become their permanent place of residence under a collective reparation agreement with this group.

For the four quilombola communities impacted by the dam collapse, we defined measures to repair collective diffuse damage, linked to the Quilombola Component Studies for the Impact and Damage Assessment. All stages of this process involved the active participation of the communities and were supervised by the Palmares Cultural Foundation, the body responsible for protecting the rights of these communities; the Independent Technical Advisory Body; and the Federal Public Defender’s Office. The resulting measures will be negotiated with the parties involved as part of the Comprehensive Judicial Reparations Agreement. In the case of the three quilombola communities in the Paraopeba River basin, we are waiting for the government agency to issue the Terms of Reference for carrying out studies to support the Human Health Risk Assessment and Ecological Risk Assessment (ERSHRE).

Vale works to engage with stakeholders to understand their views and perspectives and build trust. We report on progress towards reparation and on actions aimed at preventing recurrence through direct and open communication with communities, investors, and other stakeholders, including site visits. This also helps us to better understand the initiatives being implemented in communities, identify areas for improvement, and draw lessons.

Vale also sought to make progress on the environmental front throughout 2023, including: handling of 77% of a total of 12.4 million cubic meters (m³) of tailings, cessation of damage to aquatic and terrestrial biota in the Paraopeba River, and confirmed sightings of threatened species. In 2023, we also secured SISEMA⁴ approval of a specific methodology to expedite the sustainable rehabilitation of affected areas. In relation to water quality, observed dry-season conditions were as good or better than before the dam breach³.

Among the actions to give new meaning to the Brumadinho reparations process, Vale organized a Leadership Strengthening Course for 67 people, divided into four groups: Tejuco, Aranha, Brumadinho Sede, and Conceição do Itaguá. The meetings began in September 2022 and ended in April 2023 and were held weekly at the community associations' headquarters.

The aim of this initiative was to strengthen community ties and enhance the work of local leaders by developing the skills and competences needed to exercise leadership, such as team spirit, proactivity, empathy, non-violent communication, the use of participatory tools, and conflict mediation. The topics covered were mining-dependence, governance, project development, public policies, engagement, and participatory processes.

"I once heard that action means doing, but transformation means giving new meaning, and I feel that this is what has been happening to us. I'm very happy to have met people who are going to change the reality of the community, I was encouraged by what was presented and I believe that we are capable of going much further."

Natália Oliveira, Course Participant, Brumadinho municipal center class.

Tourism in Brumadinho

The Sustainable Tourism Promotion program in Brumadinho, which has been in operation since 2019, has benefited 39 businesses and 133 individuals, 82% of whom are women. Additionally, it formalized 12 new businesses and provided capacity building to strengthen the handicrafts and hospitality value chains.

Developed in collaboration with the municipality of Brumadinho, partners, and the local tourism industry, the program seeks, among other things, to strengthen tourism governance, boost rural and community-based tourism, diversify local tourism offerings, expand financing mechanisms, and restructure the tourism events calendar.

The Sustainable Tourism Promotion program

12 new businesses, promoting training and strengthening the crafts and accommodation production chain. Since 2022, the Program has generated BRL 245 thousand (USD 49 thousand) in sales (products and experiences) and around BRL 445 thousand (USD 89 thousand) in events.

BRL 245,000

(USD 49,000) in sales products and experiences, and around

BRL 445,000

(USD 89,000) in events

"We have created a network economy project. We support 21 businesses and have a network of around 15 backyard gardens. We work as a network in a process of re-signification. Córrego do Feijão is now among the tourist attractions in Brumadinho, offering new tourist experiences within the Céu de Montanhas Catalog. These include visits to the Cheiro Verde garden and the Sabores do Feijão street market every first Sunday of the month, and we are starting an events calendar as a way to attract new visitors."

Marina Fantoni, Community Relations Analyst in Córrego do Feijão, Brumadinho/MG.

Relations with affected communities

Vale has a dedicated team for the reparation efforts in Brumadinho. Additionally, we provide a toll-free phone number for general support to all individuals who have been directly or indirectly affected by the Brumadinho dam breach or the ensuing preventive evacuations.

In 2023, of the 12,132 complaints registered on the Reparations support channel, 99.2% were answered and 88.0% were addressed. The main events generating the grievances are related to requests for transport, water resources and compensation/financial support.

Vale representatives can be reached via a toll-free number (0800 031 0831), our [website](#), or our local indemnities offices.

Reparation vs. mental health and cultural transformation

"My journey at Vale can be divided into two periods: before and after the Córrego do Feijão dam collapse. When it happened, I was devastated. I felt the urge to be in Brumadinho 24/7. After my shifts, I'd head there as a volunteer. It was a whirlwind of emotions: I felt anger, fear, shame, and vulnerability. I did everything in my power to help repair and mitigate the damage. I thought I had to be flawless, to deliver at any cost, as quickly as possible. I tried to be a hero, but I'm not one. When we push beyond our limits, we become unwell. I needed help. Others who pushed themselves too hard also suffered. Our leadership soon realized the need for a program to support people in this process, to navigate our daily challenges. I learned to respect my boundaries."

Lucas Oliveira, Health and Safety Analyst

"We are here today after the consequences of the dam collapse, which left an open wound in our community, and this moment is healing. I believe that strong people are the ones who make people stronger and that's what I've seen happen throughout the course."

Adilson Thiago, Course Participant, Conceição do Itaguá class.

Mariana

The Renova Foundation was established in 2016 under a Framework Agreement (TTAC, acronym for Termo de Transação e Ajustamento de Conduta) for reparation of the damages caused by the Fundão dam collapse in Mariana (MG), which affected 39 municipalities in Minas Gerais and Espírito Santo. The dam was operated by Samarco, a joint venture with equal stakes owned by Vale and BHP (50/50). The Renova Foundation is therefore jointly funded by Samarco, Vale, and BHP.

Samarco is responsible for reparations in the affected areas through the Renova Foundation, with Samarco, Vale, and BHP as additional stakeholders. We are actively working to expedite the reparation process, seeking to ensure it is carried out compliantly and leaving a positive legacy for the communities and the environment. Working through Renova and its governance bodies, Vale is committed to full reparation and compensation while also aiming to contribute to infrastructure programs in affected communities.

However, we recognize that the reparation process in Mariana is intricate and demanding given the extensive territory affected and its diverse social, cultural, and economic landscapes. Pursuant to the Framework Agreement, Renova is conducting a total of 42 social, economic, and environmental reparation programs in affected territories, along a stretch of river approximately 670 km in length.

Renova initiatives

Renova's main reparation priorities include the restoration of the Doce River watershed, the resettlement of residents, and the compensation of families directly affected by the collapse of the Fundão dam. As of December 2023, over BRL 35 billion (USD 7 billion) has been disbursed for reparation and compensation, across a set of three program areas:

People and Communities

Registration, indemnities, financial aid, Indigenous and traditional communities, economic and innovation programs, dialogue and communication, education, tourism, heritage, and fisheries.

Land and Water

Agricultural recovery, rehabilitation of protected areas, water quality monitoring in the Doce River, tailings management, and fauna and flora.

Reconstruction and Infrastructure

Resettlement of families and the reconstruction of the villages of Bento Rodrigues and Paracatu; improvement of water-supply and sewage collection and treatment systems.

On the socioeconomic reparation front, compensation for those affected is the main focus. By December 2023, BRL 17 billion (USD 3.4 billion) had already been paid out in compensation and financial aid to more than 468,000 people, of whom around 332,000 were assisted under the Mediated Compensation Programme (PIM), 106,000 under the new compensation system (NOVEL) and a further 32,000 people were assisted by Emergency Financial Aid payments.

The delivery of infrastructure to residents of affected communities follows a construction model with customized projects and public structures, including schools, squares, and health units. The delivery of keys in the districts of Bento Rodrigues and Paracatu, in Mariana, has been accelerated. By December 2023, 575 housing solutions have been reached, which is equivalent to almost 90% of the cases in which housing solutions have been approved by the family. We aim to complete the resettlement of most of the families by the end of 2024.

In the collective resettlements of Bento and Paracatu, 153 keys have already been delivered and 112 changes have been made. By 2024, Renova aims to reach 243 keys delivered in the two resettlements.

Reparation also extends to the Indigenous and traditional communities affected by the collapse. The Degredo Quilombola Community has defined the initiatives being undertaken in their territory through a set of 18 programs outlined in a "Quilombola Basic Environmental Plan." Of these programs, three have been completed, while the others are being implemented by the Renova Foundation following a court decision that deemed their execution by community organizations unfeasible. Discussions are ongoing between the parties and the municipality of Linhares regarding the implementation of a Water Supply System in the community.

Meanwhile, the Krenak Indigenous families in Minas Gerais and the Tupiniquim and Guarani in Espírito Santo are receiving Emergency Livelihood Assistance, water supply, productive support, and other immediate measures as negotiations continue for comprehensive and definitive reparation strategies, with community participation. The negotiation for a revised agreement with the Tupiniquim and Guarani peoples progressed in 2023, and consensus is expected in 2024 to resume structural initiatives in the territory once the Indigenous Basic Environmental Plan is finalized.

Water Quality of the Doce River

Water quality in the Doce River basin has been restored to conditions comparable to those before the dam collapse, according to data released on the [Rio Doce Monitoring portal](#). River water can now be safely used for irrigation purposes as well as for use as drinking water for animals after undergoing conventional treatment. The water in the Doce River is monitored at more than 80 strategic stations, feeding real-time information to an alert network to facilitate planning for the main water supply systems in the basin.

Photo: Renova Foundation archive

33
thousand
hectares
reforested

2.5
thousand
springs
recovered

Among ongoing environmental initiatives, Renova is working on reforesting 40,000 hectares and restoring 5,000 springs. Additionally, sanitation and solid waste management efforts are underway aiming to improve water security and mitigate the release of untreated effluents into water resources.

Concurrently, Renova is working to support small businesses, strengthen local economic activities, and help farmers in the region with technical support to expand their production capacity, adopt more efficient planting methods, manage livestock and soil, and conserve natural resources.

Further details about reparation programs can be found on the [Renova Foundation's website](#).



Photo: Vale Archive



The Salobo mine. Seedling nursery during the harvesting of Brazil nut seeds – Marabá, Pará (PA).

Nature

GRI 3-3 [Biodiversity] | 304-2 | 304-3 | 304-4 | MM1 | MM2

Nature figures prominently in Vale's business and is essential to the well-being of humanity. In particular, the Amazon, where we have iron and base metal projects, plays a fundamental role in regulating the climate at a global level: supporting the balance of rainfall, stabilizing temperatures, and storing large stocks of carbon. The conservation and recovery of its forests is essential for the world and for business.

Through our integrated approach and with inputs from stakeholders, we have set an ambitious goal of becoming a global leader in practices to minimize negative impacts and enhance positive outcomes for nature and people.

To realize this ambition, we have established a **set of goals**. Connected to our nature agenda and aiming to reduce pressures on the environment and bring gains, we have robust targets in our **sustainability agenda focused on reducing our emissions** and **new water abstraction**, as well as **protecting and restoring forests**. Our actions go beyond our legal obligations and the boundaries of our operations, seeking to combine economic development with environmental protection and well-being for the communities where we operate.

Find out more at
[Our 2030 commitments.](#)

Amazonia

For almost 40 years, Vale has been operating and supporting Amazon conservation in the southeastern region of Pará. There are around 800,000 hectares of protected areas – about five times the size of the city of São Paulo – in partnership with ICMBio. This land contributes to sequestering around 400 million metric tons of carbon¹ equivalent, protecting more than 22,000 **springs** and more than 3,000 species of Amazonian **flora** and fauna.

Our operations currently occupy less than 3% of these protected areas, where 60% of our iron ore production comes from, demonstrating that it is possible to develop a mining model that contributes to keeping the forest standing. The importance of these actions becomes even clearer when we analyze the context of pressures in which this area is inserted, known as the arc of deforestation.

In 2023, sought to strengthen our commitment to the region by expanding our voluntary actions, with the goal of contributing to the conservation and regeneration of the Amazon, strengthening its bioeconomy and promoting socioeconomic development. We focus on socioenvironmental actions, research and development, and on strengthening public policies.

“The mining industry owes its very existence to nature. At a time when the health of our natural world is in peril, yet the demand for critical minerals is set to soar, we have committed to significant collective action to help create a nature positive future. These commitments build on the significant individual goals and actions of ICMM members over several decades, including habitat conservation, species protection, and landscape restoration.”

Rohitesh Dhawan, President and CEO of the ICMM

“Throughout 2023, interacting with numerous Vale employees, it was very encouraging to see that the term ‘nature’ is no longer solely applied to non-human living beings but to the ‘whole’, of which we are an interdependent part. It shifts from being perceived as a problem to being seen as a solution.”

Fabio Rubio Scarano, professor of ecology at Universidade Federal do Rio de Janeiro and chair of Cátedra de Futuros at the Museu do Amanhã.

¹ Values consider the carbon stock of CUs in the Amazon only and are in accordance with the methodological reviews of Vale's LULUCF inventory, verified by an independent third party. It includes the carbon stock, and the biomass above and below ground, but does not include the carbon stock in the soil above and below ground and does not include the carbon stock in the soil.

Nature Positioning Statement

Vale, as a member of the International Council on Mining and Metals (ICMM), contributed to the development of the organization's new Nature Position Statement, approved in December 2023.

This document defines the approach to be adopted for the protection of biodiversity (land, freshwater, oceans, and atmosphere), in synergy with the goals of the Kunming-Montreal Global Biodiversity Framework (GBF) 2030 and the ICMM's existing commitments relating to Indigenous peoples, climate change, water, and respect for human rights.

In the Statement, ICMM members commit to developing actions to contribute to a nature positive future. The publication replaces the 2003 Position Statement on Protected Areas and covers four spheres of influence: direct operations, value chain, landscapes, and systems transformation. They are supported by the ICMM's Governance sphere, which aims for transparency in information disclosure.

Find out more [here](#)

Photo: Ricardo Teles

Biodiversity

GRI 3-3 [Biodiversity]

Biodiversity is a cross-cutting theme at Vale. In 2023, we continued on our commitment to achieve No Net Loss and generating Net Positive Impacts through neutralization of impacts. Contributing to our business to interact sustainably with biodiversity over the long-term, one of our goals is to prevent and neutralize significant impacts from greenfield and brownfield projects in areas of high biodiversity value, supporting our.

Our strategy involves performing baseline studies and assessments to anticipate risks, assess impacts on biodiversity, and prioritize locations and attributes of important biodiversity features (habitats, species). These studies serve as a basis for our efforts to avoid, minimize, recover, and/or offset impacts on biodiversity. This approach was codified in standards and procedures for biodiversity management that were issued in 2020, which are reflected in our Vale Production System (VPS).

Find out more [here](#)

"Throughout 2023, I witnessed Vale's efforts to deepen its engagement with local communities, particularly Indigenous communities, with a renewed focus on the forest and its Amazon context. Another commendable move by Vale is its readiness to meet the demand for low-carbon hydrogen to decarbonize strategic steelmaking hubs, both domestically and internationally. Looking ahead, I expect Vale to continue to lead in implementing mining practices that regenerate the environment, optimize natural resource use, and build engagement with local communities."

André Clark, Vice President of Siemens Brazil and a member of *Vale's Sounding Panel*.

GRI G4 MM2

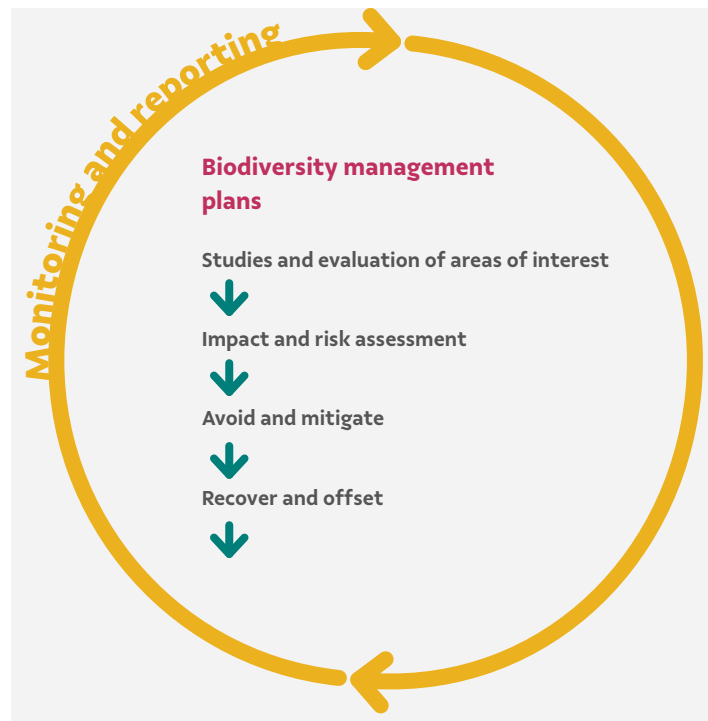
Of the 54 operational sites assessed in 2023, 50 have been identified as requiring biodiversity management plans. Of these, 82% have biodiversity management plans in place, and the remainder have plans under development or planned.

We report annually on the biodiversity impacts, risks, and opportunities in our operations considered a priority, according to location and interface with nature, and on our strategy for managing them. This acts as a part of our response to the CDP Forests questionnaire for the Minerals and Metals sector, and information is also available on our [ESG Portal](#), following the recommendations of the Taskforce on Nature-related Financial Disclosures (TNFD).

The total area affected by our direct operations worldwide in 2023 amounted to approximately 89,000 hectares. Brazil and Indonesia host operations that overlap with areas of significant biodiversity. Certain sites in Brazil also overlap with protected areas, specifically “sustainable-use conservation units” that allow for certain economic activities as permitted by the decrees under which they were created.

In 2023, we conducted an assessment of our dependencies, impacts, risks, and opportunities based on the TNFD’s proposed approach. The results of this assessment, along with the reporting of qualitative indicators in each operational area (GRI 304–2), indicated that our most significant impacts are associated with changes in vegetation cover and land use. Critical dependencies include water supply (both ground and surface), climate regulation, and erosion control.

In 2023, 4,125 species were recorded in habitats impacted by or located close to Vale’s operations. Of these, 147 are considered threatened by the International Union for Conservation of Nature (IUCN): 13 are classed as Critically endangered, 59 as endangered, and 75 as vulnerable. [GRI 304–4](#)



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Photo: Alexandre Rezende – Nitro

Taskforce on Nature-related Financial Disclosures

In January 2024, in Davos (World Economic Forum Annual Meeting), 320 companies elected to lead, as early adopters, the Taskforce on Nature-related Financial Disclosure (TNFD), which establishes guidelines for companies to provide disclosures on biodiversity and natural capital risks in their financial reports. Voluntary first adopters will provide disclosures through 2025.

Among them are six mining companies, including Vale (Brazil), Anglo American (UK), Vedanta (India), Endeavour Mining (UK), Rio Branco (Angola), and Cerrejon (Colombia). Additionally, eight Brazilian companies have joined the initiative, including four corporations (Vale, Suzano, Natura, and Telefônica), two financial institutions (BTG Pactual and JGP), and two service providers (Rever and Green Initiative Intl).

Scientific research and data

Scientific research and data are important tools in our approach to managing biodiversity impacts, guiding related decisions, and shaping our strategy for mitigation, recovery, and offsets. We actively pursue partnerships with research institutions and experts. We have leveraged the [Vale Institute of Technology](#) to catalyze research in the Amazon and in the Vale Natural Reserve, with the latter serving as a center for conservation of and research on the Atlantic Forest.

Actions for biodiversity



Photo: Gustavo Magnago

Cherry-throated tanager

In 2021, Vale entered into a technical cooperation agreement with the Marcos Daniel Institute (IMD), a private non-profit association dedicated to **conserving the cherry-throated tanager** (*Nemosia rourei*), a critically endangered bird species endemic to the Atlantic Forest of Espírito Santo.



Conservation of a rare aquatic plant in Carajás

A scientific research collaboration between the Vale Institute of Technology and the Federal University of Rio de Janeiro has yielded significant insights into *Isoetes cangae*, an aquatic macrophyte species found exclusively in a lagoon in the Serra Sul region of Carajás (PA). Over a decade of research, including genome analysis and studies of population ecology, physiology, reproduction, cultivation, and various other aspects, has greatly expanded our understanding of this species. Research findings were compiled into a paper published in 2023 and have informed decision-making and conservation strategies aimed at preserving the species while fostering regional development.

Find out more [ITV website](#).



“We’ve partnered with the Vale Natural Reserve to conduct technical studies on forest surveying, reforestation, and bird monitoring in areas harboring cherry-throated tanagers, the only endemic bird species in Espírito Santo. The Reserve brought in the Vale Institute of Technology (ITV) to collaborate on initiatives as part of our Action Plan to explore the genome of this species. Our main goals are to gather data to inform species’ taxonomic position, degree of relatedness, and sexing of captured birds. ITV’s membership of the partnership opens up many possibilities to contribute to research and conservation of the cherry-throated tanagers.”

Gustavo Rodrigues Magnago, Field Coordinator in the Black-hooded Antwren Conservation Program, Marcos Daniel Institute.

Biodiversity conservation is also integral to Vale’s carbon offset initiatives and partnerships. We protect approximately 965,000 hectares of forests on both our own and third-party land, either through voluntary initiatives or in compliance with regulations.

GRI 203-1 | GRI 304-3

For every hectare affected by our operations, we protect 11 hectares in sensitive areas¹, including key areas for biodiversity conservation and other areas of high biodiversity. Forest preservation and conservation plays a crucial role in combating climate change by helping to maintain and expand stored carbonstocks.

Focusing on our long-term goal of having No Net Loss of biodiversity, the recovery of degraded areas is an important measure to mitigate, restore, and compensate for the impacts of our operations. In the short-term, the recovery process is aimed at the areas altered by our projects, mainly with a view to reducing the impacts on the physical environment without eliminating the possibility of restoring them in the long term and in accordance with planned future use. As a restoration measure, rehabilitation seeks to facilitate or expedite

natural ecological succession, enhancing biological diversity in disturbed land or other areas of interest.

Additionally, rehabilitation efforts can serve to offset residual impacts on biodiversity by restoring other areas within the same biogeographic region and with ecological characteristics similar to the areas affected by the project, in terms of regional biodiversity and landscape.



Photo: Ricardo Teles

Canela de Ema plant at the Vale seedling production center, in Nova Lima, Minas Gerais.

¹ Sensitive areas: Wilderness (Amazon) and Hotspots (Atlantic Forest and Sundaland).

Forest Goal

GRI 203-1

Vale has committed to recover and protect 500,000 hectares of forests beyond its fenceline as part of our 2030 Forest Goal. This commitment comprises two separate goals: to recover 100,000 hectares through production arrangements and partnerships with businesses with social and environmental impact; and to protect 400,000 hectares through partnerships. This pledge is voluntary and goes beyond minimum legal requirements, contributing to a nature-positive future. Our strategy and implementation include support from the [Vale Natural Reserve \(RNV\)](#) and the Vale Fund.

In 2022, our efforts to protect 400,000 hectares benefited from further integration with our climate commitments. In 2023, a total of 165,000 hectares were protected in partnership with public protected areas and REDD+¹ projects.

In our efforts to restore 100,000 hectares of forests, we rely on a network of partners and business arrangements with positive socio and environmental impacts. These impacts include more sustainable production systems that improve landscape permeability, sequester carbon, and generate employment and income for communities. In 2023, we supported the restoration of 5,220 hectares through the Belterra and Caaporã social-impact businesses,

and we have four new businesses (CAMTA, Courageous Land, Futuro Agroflorestal, and Radix) in the proof-of-concept phase.

Given the scale of our Forest Goal, we have established partnerships with the goal of strengthening these businesses, generating knowledge, disseminating sustainable production systems, and advancing the agenda. This includes seeking other sources of funding to reduce the cost per hectare of landing. Additionally, we work on these developments in partnership with companies and organizations such as Imaflora, Ideflor, Embrapa Florestas, Natura, Biomas, Palladium, Provalia, Move and JGIM.

¹ Acronym for Reducing Emissions from Deforestation and Forest Degradation.



Photo: Vinicius Santos

Black-hooded antwren
(*Formicivora erythronotos*).

Partnership with the INEA for Atlantic Forest conservation

Established in 2008, the Cunhambebe State Park spans over 38,000 hectares of Atlantic Forest, covering parts of the municipalities of Mangaratiba, Angra dos Reis, Rio Claro, and Itaguaí. Managed by the Rio de Janeiro State Institute of Environment (INEA), a significant portion of the area boasts well-preserved forest encompassing the wildlife corridor between the Bocaina and Tinguá formations and part of the Serra da Bocaina / Paraty / Angra dos Reis Key Biodiversity Area. The park supports the conservation of native species of fauna and flora, including threatened and endemic species, as well as serving as an important water catchment area.

“As a result of the cooperation agreement between INEA and Vale, significant progress has been made in wildlife monitoring. This has helped to expand the list of recorded species and identify new areas of occurrence of endemic and threatened species, such as the black-hooded antwren, as well as a new snake species. Using camera traps, over 500 individuals have been documented within the Park, including pumas. Flora inventories have provided invaluable data and provides inputs into environmental education initiatives. The agreement also includes a range of infrastructure enhancements for the park, such as signage, hiring environmental monitors, establishing a crew of forest fire responders, providing vehicles, and purchasing essential equipment.”

Ana Carolina Maia, manager of the Cunhambebe State Park (Rio de Janeiro State Institute of Environment – INEA/RJ)



Photo: Vale Archive

Belterra Agroforestry's São Francisco farm in Parauapebas/PA.

Impact Business

GRI 203-1

Established in 2009, the Vale Fund aims to generate a positive impact by fostering and investing in forest and climate initiatives, with a special focus on the Amazon. Through partnerships with civil society organizations, the Vale Fund develops projects that

advance the bioeconomy, land reclamation, and forest preservation. In the nearly 15 years since it was founded, the Vale Fund has supported over 300 socio and environmental businesses, strengthening their management and facilitating

access to credit, benefiting around 18,500 farmers and forest gatherers. In 2023, more than 100 social-impact enterprises benefited directly and indirectly from Vale Fund-supported initiatives. These include the following standout initiatives:

We have supported over **300** socio and environmental businesses Since 2020

More than **100** social-impact enterprises benefited directly and indirectly from Vale Fund-supported initiatives Only in 2023

benefiting around **18,500** farmers and forest gatherers

5Cs strategy	Highlights from 2023
Catalyzing businesses with a positive socioenvironmental impact	The <i>Jornada Amazônia</i> (“Amazon Journey”) initiative, which supports the development of startups in forest-related value chains, engaged more than 4,000 entrepreneurial talents in nine states and 211 municipalities; incubated 200 forest businesses; and scaled up 21 businesses. The initiative is working towards a goal of creating 200 startups in the next three years.
Investing in and unlocking patient, catalytic, and flexible financial capital	<p>In partnership with Fundo CX, Conexsus’ finance platform, we developed a new microcredit line for community businesses in the rubber supply chain, in collaboration with Michelin.</p> <p>In partnership with Banco Nacional de Desenvolvimento Econômico e Social (BNDES), Energisa, and Norte Energia, a call for proposals was launched for forest restoration in the Xingu river basin (PA), providing BRL 24 million (USD 4.8 million) to support civil-society projects, covering approximately 1,000 hectares.</p>
Acting in coalitions to gain an understanding of and collaborate with different actors in the ecosystem within a systemic approach	<p>A partnership was established with ICMBio to support six projects for strengthening value chains within 15 Non-timber Forest Product Reserves in the Amazon, bolstering the bioeconomy. The program covers nearly 10 million hectares and involves the pirarucu, Brazil nut, timber, oils, açai, chestnut, and agroforestry value chains. Support for broadband internet access was also provided to 356 remote traditional communities in the region (benefiting around 30,000 people), along with a network of over 30 partners. Another initiative is developing a bioeconomy innovation space in Pará to strengthen public programs in the state.</p> <p>In addition, the Vale Fund is a member of various networks and coalitions in the areas where it is present.</p>
Capacity building by producing and disseminating knowledge to develop and strengthen partners and individuals	Cocoa supply chain handbooks were produced containing instructional information on agricultural pollination, preventing forced labor, and best practices in occupational health and safety. The Vale Fund also supported the launch of an online course on sustainable cocoa production with over 3,000 participants and funded the publication of thematic studies on high-impact ecosystems.
Contributing to Vale’s Sustainability Commitments	<p>In 2023, we supported the restoration of 5,220 hectares through the Belterra and Caaporã social-impact businesses, and we have four new businesses (CAMTA, Courageous Land, Futuro Agroflorestal, and Radix) in the proof-of-concept phase. Rehabilitation areas were established in eight states of Brazil, across three biomes harboring over 40 different species, 75% of which are native.</p> <p>The Vale Fund also supports Vale’s Social Ambition program to help reduce extreme poverty in the Brazilian Amazon by expanding and adapting sustainable solutions. Field activities began in 2023 with a questionnaire-based survey to identify families suitable for the program.</p>

For more information, visit www.fundovale.org.



Belterra Agroforestry's São Francisco farm in Parauapebas/PA.

Belterra, Vale Fund and and Vale Institute of Technology

GRI 203-1

Belterra, a company created with the aim of enabling the implementation of agroforestry systems on a large scale, works supported by Fundo Vale to transform degraded areas into productive forests together with small- and medium-sized farmers. Among the species planted are cocoa, cupuaçu, açaí, pupunha, cassava, and banana.

Innovation contributes to generating positive impacts, such as the development of the best cocoa seedling, pollination and diagnostic studies of the weaknesses of its production chain, in conjunction with the **Vale Institute of Technology**. Encouraging quality production can also results in social benefits for producers, who become part of a regenerative chain that strengthens the bioeconomy.

Talents in the Amazon

GRI 203-1

Since 2019, the Vale Institute of Technology's professional master's program has awarded scholarships to students living in Pará to develop their research on topics related to the UN's Sustainable Development Goals. Training and retaining young talent in the Amazon is the main objective of the program, which has already trained around 50 young researchers in sustainability issues.



Biomass: Protecting native forests in Brazil

In 2023, Biomass, a company founded by Itaú, Marfrig, Rabobank, Santander, Suzano, and Vale, completed the structuring of its governance systems, assembled its team, identified suitable areas for pilot projects to restore native ecosystems, and progressed with opportunities for implementation in 2024. It also undertook advocacy efforts regarding the carbon market bill currently pending in Brazilian National Congress and, regarding forest concessions, working to promote high-integrity markets.

Eco-efficiency

GRI 3-3 [Eco-efficiency]

Water

GRI 303-1 | 303-3 | 303-4 | 303-5

Water is a vital resource across our operations, from conceptual design to future use. Our goal is to ensure that water resources and the effluents generated in mining operations are responsibly managed. We aim to use water resources in ways that are rational, socially equitable, environmentally sustainable, and economically beneficial while taking into account the needs of stakeholders and river basin conservation.

Vale's water security strategy was recognized by the CDP (formerly the Carbon Disclosure Project); due to actions taken in 2023, the Company received an A- grade in the ranking released at the beginning of 2024.

2030 Water Target

In 2023, Vale updated the Water Target to a cumulative reduction in specific freshwater use of 27% compared to 2017. The update was established based on the four pillars of Vale's water and effluent management, which cover internal and external management, guided by the characteristics of the watershed where we operate, delimiting our territory of operation.

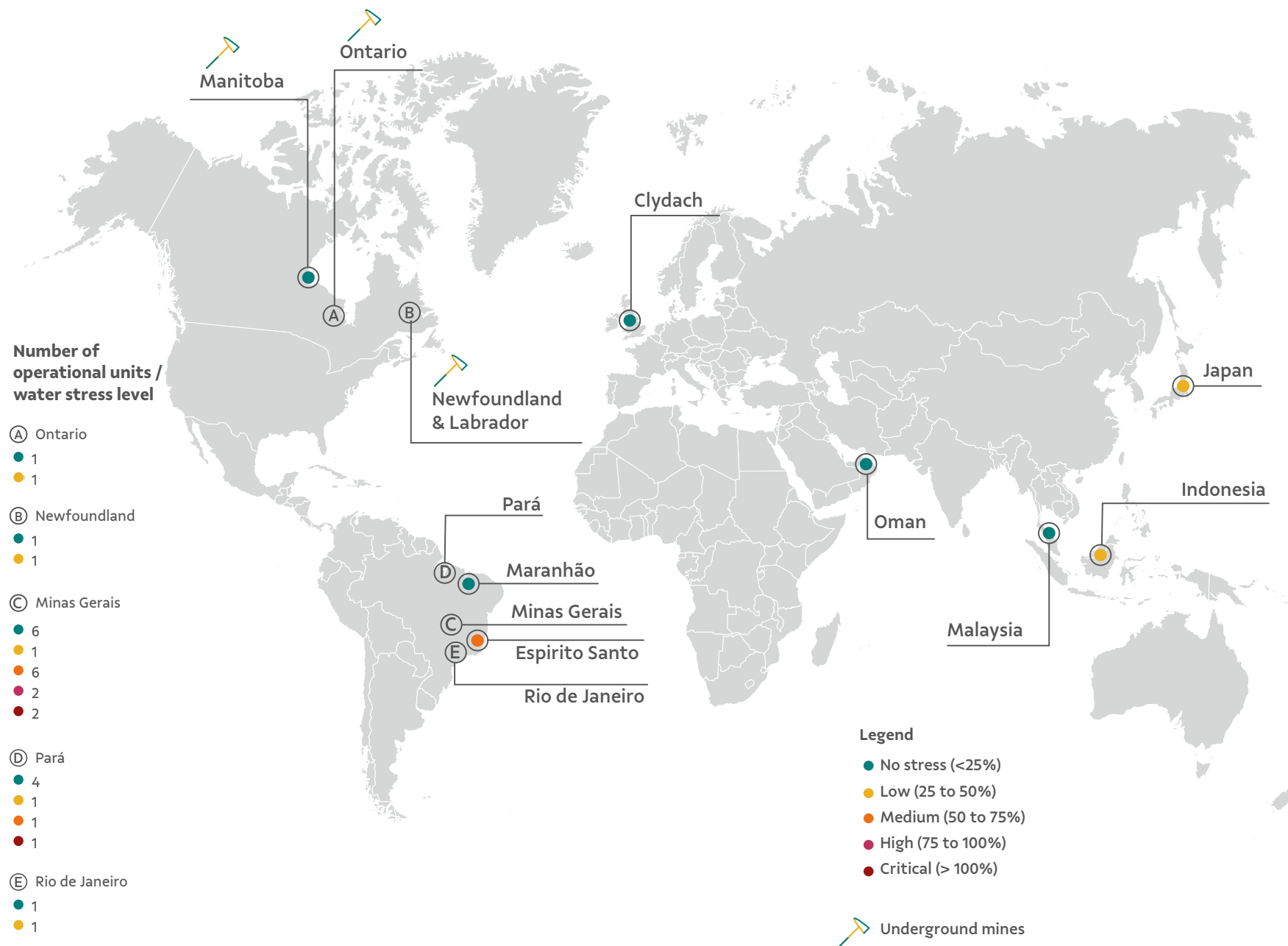
Pillar	Target
Governance	Global water governance to be implemented by 2025.
Monitoring and control	Strategic monitoring network for surface water quality to be implemented by 2027. Cumulative 27% reduction in specific water use (2017–2030).
Engagement	Water Resources and Effluent Engagement Plan to be implemented by 2030.
Water risk management	Water risks identified and managed by 2030.

Our approach to water management includes assessing water stress in watersheds where we operate.

These assessments use a methodology developed by the [UN Food and Agriculture Organization](#) (FAO) which considers total freshwater withdrawal by major use sector, available freshwater volume, and the ecological flow of the river basin (the amount of water necessary to sustain river ecosystems).

Water stress is divided into five levels – high, critical, medium, low, and none – as illustrated in the figure below. We have set more ambitious reduction goals for operations in basins with higher water stress.

Level of water stress in the watersheds where we operate



Our water approach

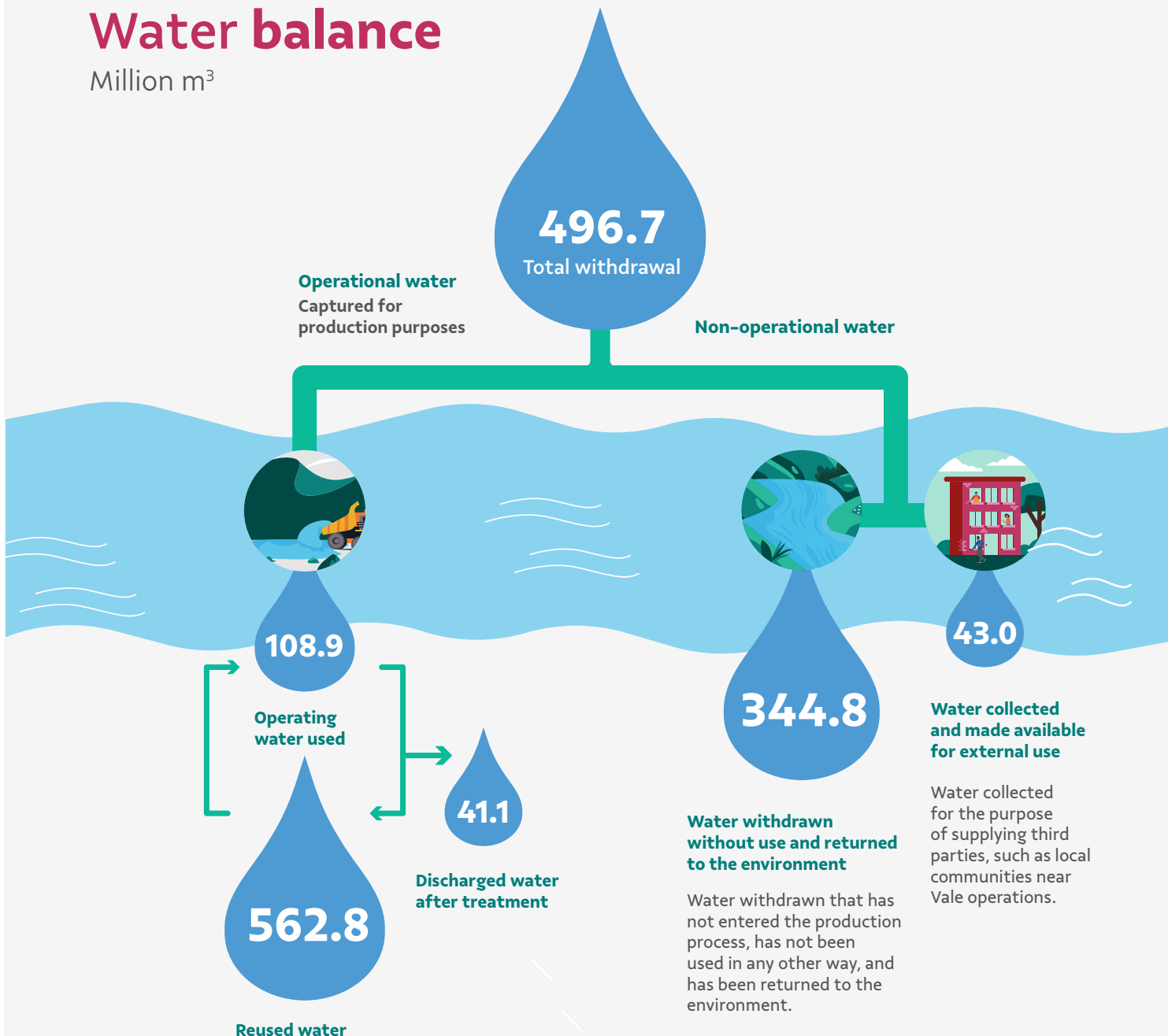
Watersheds are a shared resource. We are active members of seven Watershed Committees (CBH) in Brazil. Additionally, we are a member of water resource working groups at Brazil's leading mining associations (ICMM and IBRAM), in which we provide inputs into the formulation of guidelines for responsible water resource management and effluent treatment in the sector.

To support greater operational efficiency and sustainable growth, we invest in water monitoring and data storage through an integrated data management system that is audited annually. We also aim to optimize our water usage and discharge volumes, implement water recycling projects, and implement systems for controlling and treating water and effluents. In addition, we explore alternative water sources where feasible, thereby enhancing the availability and quality of water resources in the watersheds where we operate.

GRI 203-1 | 303-3 | 303-4 | 303-5

Water balance

Million m³



In 2023, our total water withdrawals amounted to 496.7 million cubic meters. Of this volume, 69% was directly returned to the environment, while 9% was directed to water utilities through partnerships with institutions and concessionaires, being treated to ensure a safe, high-quality water supply. The remaining portion was recycled for operational use, with 22% being used for production purposes.

To help ensure responsible resource management and prevent conflicts of use, we believe it is important that we source water for operational uses primarily from less critical sources. In order to establish this prioritization, we classify water sources into three groups:

1

Second-use Waters:

These include water resources used for a secondary purpose after initial utilization in specific operations, including reuse, recycling, recirculation, and recovery.

2

Sustainable Sources:

Water sourced through sustainable operations such as desalination, utilization of treated effluents from external sources, and rainwater harvesting.

3

Conventional Sources:

First-use surface water (rivers, lakes, canals, etc.) and groundwater (subsurface aquifers) withdrawals under permits.

Out of our total operational water requirement in 2023 (671.7 million cubic meters), 84% was sourced from recirculated water, 1% from sustainable sources, and 15% from conventional sources. This approach supports enhanced environmental sustainability and water efficiency while helping to ensure that our operations are supplied with water of the requisite quality for each specific application.

For more information on Vale's water management, visit our [ESG Portal](#).



Atmospheric emissions

GRI 305-7

Mining and iron ore processing operations release particulate matter (PM), sulfur oxides (SOx), and nitrogen oxides (NOx) into the atmosphere, affecting air quality and local ecosystems. These airborne pollutants are emitted from hauling, handling and storage operations, the chimneys of power plants for the production of briquettes, pellets, and base metals, as well as from fuel combustion in mobile equipment.

We have publicly committed to mitigate these impacts by implementing more efficient and sustainable processes. We are also working to implement innovative emissions management technology such as dust suppressors, spray nozzles, enclosures around facilities, and improvements to end-of-line controls, such as bag filters and electrostatic precipitators.

We seek to go beyond minimum legal requirements, in line with our global strategy of leading the transition to sustainable mining. We are also working to minimize impacts from atmospheric emissions on communities surrounding our operations. In support of this, we regularly monitor and analyze monitoring data from weather and air-quality stations.

Find out more about Vale's atmospheric emissions [here](#).

Global emissions reduction goals to be achieved by 2030

16% for particulate matter

16% for sulfur oxides

10% for nitrogen oxides

Our emissions management practices are based on source inventories, atmospheric dispersion studies, emission control systems, and atmospheric monitoring, with a goal to eliminate or, when not possible, mitigate environmental impacts.

In our main operations in Brazil, we have Environmental Control Centers (ECCs) operating 24 hours a day, collecting environmental monitoring data that is fed directly by Operational Control Centers. This data helps us to assess our emission performance, identify weaknesses, and improve emission processes. At the other units, the environmental and operations teams are responsible for monitoring activities.

Particulate matter emissions (in metric tons)

GRI 305-7

	2021	2022	2023
Nickel	3.3	2.6	4.7
Pelletizing	1.4	1.6	2.0
Manganese	0.1	–	–
TOTAL	4.8	4.2	6.7

SOx emissions (in metric tons)

	2021	2022	2023
Nickel	66.1	66.5	71.4
Pelletizing	8.2	7.1	8.1
Logistics	2.0	1.9	1.9
Other businesses	1.2	0.2	0.2
TOTAL	77.5	75.7	81.6

NOx emissions (in metric tons)

	2021	2022	2023
Nickel	8.0	5.7	13.0
Pelletizing	18.1	19.8	16.9
Iron ore	3.0	2.8	3.0
Logistics	18.3	15.6	16.1
Other businesses	1.4	0.8	0.8
TOTAL	48.8	44.7	49.8

Sustainable PET-based dust suppressant

A decade-long research collaboration between Vale and the Federal University of Espírito Santo (UFES) resulted in the development of a groundbreaking dust suppressant, which uses recycled plastic to form a protective film that effectively reduces dust emissions. This innovation has now been patented by Vale and UFES and should soon be applied at scale in Vale's operational units.

Beyond its environmental benefits in reducing air pollution, this sustainable dust suppressant has the potential to remove the equivalent of over two million plastic bottles from the environment monthly. Vale plans to expand its usage across other operations. Most of the plastic used to make the suppressant will be sourced from associations of recyclable material collectors.

As a way to support and strengthen these associations, Vale launched a project, called Reciclo, that, over the past three years, has undertaken various initiatives to improve the physical infrastructure, management, and sales of recyclable materials, as well as expand waste segregation in gated communities and on company premises. To date, Reciclo has positively impacted 580 individuals, including waste collectors and their families, through collaborations with 12 associations across six municipalities in Espírito Santo, with an increase in income of around 45%, with an average salary of USD 267 per person.



Photo: Francisco Xavier

Around **580** people have already benefited from Reciclo's actions

45% increase their income



Photo: Francisco Xavier

“Our livelihoods have greatly improved thanks to the Reciclo project. After years rummaging through waste at a landfill, we now have dignified occupations and recognition.”

Luzenita Meireles, founder of Acamarp (Beneficent Association of Waste Pickers in Nova Rosa Da Penha II).

Environmental management

Vale’s environmental management strategy is based on the [Vale Production System \(VPS\)](#). By considering the risks and impacts of the production process, we aim to minimize the socioenvironmental impacts of operations and respond to the demands of stakeholders. We also draw on international standards, such as ISO 14001:2015 — to which 100% of our operations in Brazil are now certified for the first time, a significant milestone. The remaining global iron ore operations are slated to be ISO 14001:2015 certified by the end of 2024.

In 2023, the implementation of a new methodology for the Survey of Environmental Aspects and Impacts (LAIA) made it possible to standardize the process of mapping operational scenarios and controls of environmental interest, enabling a focus on relevant environmental aspects and assertiveness in the management of associated controls. Additionally, summary maps were developed to provide a spatial view of the main environmental aspects.

We have also implemented multidisciplinary social and environmental plans deriving from the environmental licensing processes for our operations. Licenses secured for new operations in Brazil increased by 45% in 2023. There were three major highlights from these licensing processes: we introduced new and more rigorous licensing approaches; we collaborated with environmental agencies to provide technology and funding for environmental studies; and we improved local community awareness of the importance of projects that are relevant to the environmental agenda.

In the event of environmental incidents, internationally recognized incident management response practices are applicable:

- Initial communication (internal and external);
- Immediate response and containment;
- Investigation of root causes and implementation of corrective action;
- Assessment of extent; and
- Documentation of lessons learned to prevent recurrence, whether at the same location or at any other site.

Total environmental incidents

	2021	2022	2023
Total incidents	33	24	16
Critical and highly critical incidents	0	0	1

Incidents and environmental impacts by country in 2023

Country	Incidents	Environmental impacts
Brazil	9	Changes in water quality
	1	Change in water quality / Loss of trees
	1	Change in air quality
	3	Change in soil and water quality
	2	Change in soil quality and reduction in biodiversity
Canada	0	–
Indonesia	0	–

Circular mining and mineral waste

Circular Mining offers opportunities for Vale’s core business, in addition to supporting the mitigation of environmental challenges that the mining sector faces. Our approach is associated not only with mining co-products but also with the reprocessing of tailings and the reduction of waste, which would otherwise go to dams or tailings piles. It generates new potential pathways for economic growth with positive environmental and social impacts. The development and application of technological innovation in a collaborative approach, driven by new business models, are part of the Circular Mining strategy. Furthermore, as a consequence, there is generation of intangible value, reducing operational risks and sharing value with the territories and the mining ecosystem.

Through our Waste to Value program, which aims to leverage a series of initiatives that already exist in the company, in addition to others with long-term plans, our goal is to establish, by 2035, a global iron ore operation with minimum generation and reprocessing of waste from mineral production, boosting circular mining at the beginning of the chain. In March 2023, we started

operations at the Gelado Project, which will produce pellet feed from the reuse of iron ore waste in Carajás (PA), with an initial production capacity of 5 million metric tons per year, showing the potential of the program’s initiatives.

The reuse of tailings has resulted in the development of various applications containing Vale by-products and the structuring of our sand business, with the creation of the startup [Agera](#). This startup was created to develop new applications for the waste generated. It is also responsible for expanding Vale’s sustainable sand business through research and development of solutions, and through marketing and distribution. Since the structuring of our sand business in 2021, 1.9 million metric tons of sand have been allocated, with the expectation to reach 2.1 million in 2024.

The sand is currently produced in Minas Gerais, at the Brucutu mines in São Gonçalo do Rio Abaixo. Vale also intends to start production at the Cauê mine in Itabira.

[Learn more on our ESG Portal.](#)

Gelado Project

In March 2023, we started operation of our Gelado Project, which produces pellet feed from iron ore tailings. These tailings have been stored in Carajás (PA) over the course of almost four decades.

With a high ore grade of 63%, the material undergoes magnetic concentration to improve its quality before being transformed into pellet feed for Vale's pelletizing plant in São Luís (MA). We are aiming for an annual production exceeding 5 million metric tons.

This product is the result of a USD 428 million investment in research and development to advance a more sustainable value chain. The high-grade pellets produced at the Gelado Project help our steelmaking customers to reduce their carbon emissions compared to lower-grade products. With an initial annual production capacity of 5 million metric tons, the project aims to double its capacity following the conversion of Carajás Plant 1.

The project's sustainability is further enhanced by the use of fully electric dredges and pumps, which use electricity from renewable sources instead of fossil fuels (e.g., diesel). This will avoid 484,000 metric tons of CO₂ emissions over the course of 10 years—equivalent to the annual carbon footprint of 105,000 compact gasoline-fueled cars with one-liter engines. To operate the machinery—which was imported from the Netherlands—Vale has trained 10 inspectors and operators. In all, the project will directly employ 185 people.

Sustainable sand production process

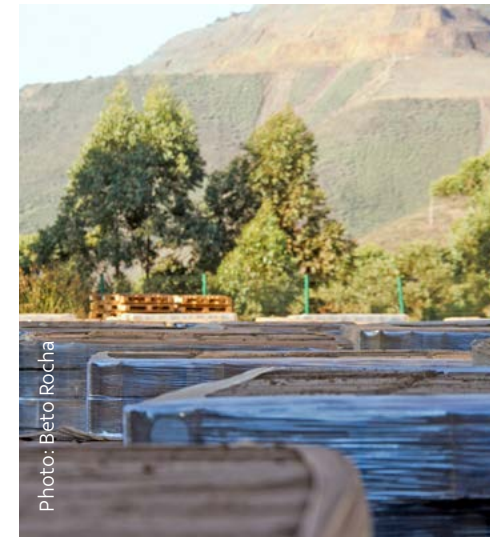
Less than 30% of Vale's production processes use wet processing of iron ore, with the resulting waste disposed of either in tailings dams or piles. These tailings primarily consist of silica, the main component of sand, and iron oxides. They are a non-toxic material that is only processed physically. Vale's sustainable sand is obtained precisely from the treatment of these iron ore tailings.

In 2022, a study by the Universities of Queensland (Australia) and Geneva (Switzerland) has verified that sand derived from the iron ore production process can address two important environmental issues: mitigating predatory sand quarrying and reducing mining waste volumes.

In Brazil alone, approximately 330 million metric tons of sand are used annually in construction and industrial processes. Sand is often quarried from riverbeds at a faster rate than it can be naturally replenished, leading to irreversible environmental impacts. Producing sand from repurposed tailings can help us to achieve 100% circular extraction, transforming a material that would otherwise be discarded into various products beneficial to society, without compromising biodiversity.

Additionally, the use of sustainable sand can enhance profitability in the construction and industrial sectors, as the process enables greater control and ensures a higher quality end product. In concrete production, sustainable sand reduces cement consumption and CO₂ emissions.

In 2023, about 800 kt of sustainable sand was produced from iron ore processing.



Pico block manufacturing facility

The Pico block manufacturing facility is another Vale initiative to produce building materials from mining waste. Located at the Pico Mine site in Itabirito (MG), this facility has a production capacity of 3.8 million precast blocks and is the first facility to use mining waste as a primary raw material in the construction industry.

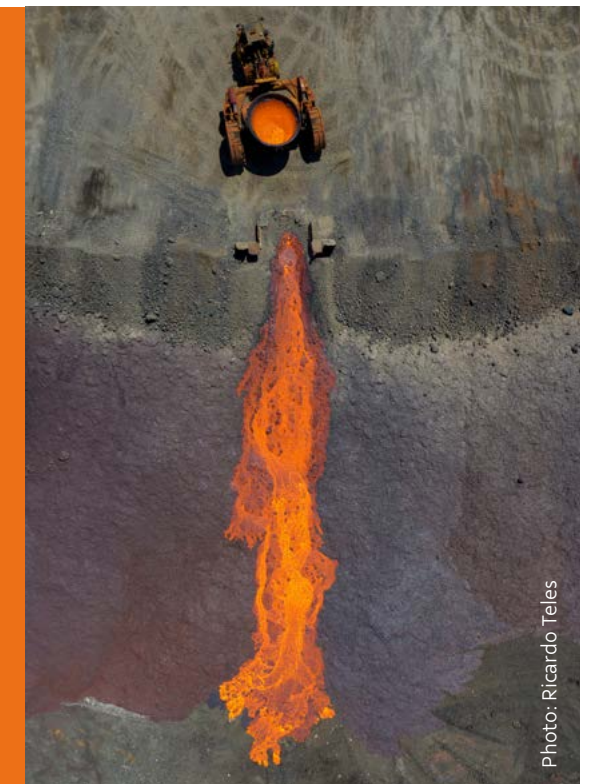
In 2023, production reached

684,000 blocks

Mineral fertilizers

Adding to our circular mining partnerships, in October 2023, Vale Base Metals (VBM) signed a non-binding Memorandum of Understanding with BluestOne, a company specialized in converting waste into agricultural solutions. Under the agreement, over 50,000 metric tons of slag per year will be supplied from the Onça Puma mine refinery (PA) over the next 10 years.

Within a two-year timeframe, BluestOne will build a factory near the mine to produce mineral fertilizers. There are also plans to conduct studies on the treatment and reuse of other waste from VBM's operations in Pará and globally.



Mine closure and future use

GRI 3-3 [Mine closure] | G4 MM10

“Mining is an essential activity for the global economy. However, the impact of mining has become a growing concern. This is leading to an increasing demand for more sustainable practices, including responsible mine closure.” Hernani Lima, professor at the Department of Mining Engineering at the Federal University of Ouro Preto (UFOP)

Recognizing our impacts and our responsibility for rehabilitating mined land, all our mining operations have closure plans we believe align with practices adopted by the International Council on Mining and Metals (ICMM) and applicable laws and regulations. We monitor and oversee all mine closure and rehabilitation activities, thereby helping to ensure that resources are used effectively and that we thoroughly assess potential social, economic, and environmental impacts.

Vale has reorganized its mine closure management function, incorporating it into its mine planning department, which is responsible for managing mining rights in its iron ore solutions operations. As a result, both aspects—technical and closure management—are now addressed together with long-term mine planning. This helps operations to be managed sustainably and responsibly from mine development to closure.

Also in 2023, we implemented an Executive Committee on mine closure and reclamation, aiming to enhance integration between technical processes and sustainability requirements in progressive closure and opportunities for implementing future use in the post-mining phase. We highlight the importance of this integrated approach to deliver benefits and a positive legacy for the communities where we operate.

Mine closure and reclamation plans

We oversee mine closure activities, including the progressive closure of our units, in a way that helps ensure effective resource allocation. In 2023 Vale spent USD 172 million on final and progressive mine closure activities. For future closure activities, the provision is USD 3.8 billion¹.

Closure plans, reclamation, and assessments of social and community risks are guided by standards and by information obtained through stakeholder engagement surveys and workshops. In 2023, efforts were focused on updating and formalizing the Mine Closure Plan for the Águas Claras Mine (MAC) at the National Mining Agency and the Minas Gerais State Foundation for the Environment.

¹ Every year, we review the estimated cost for decommissioning assets – called Asset Retirement Obligation (ARO) – with disclosure in the accounting reports and meeting the requirements defined by International Accounting Standard (IAS) 37 and Technical Pronouncement CPC 25. The internal controls related to this review of ARO estimates are part of the flows defined by the company to comply with the Sarbanes-Oxley Act.

Innovation in reclamation

As part of our reclamation innovation efforts, in 2023, we launched a project that will model several of our mines within the Minecraft Education² environment. This will allow students from select schools to collaborate and share their recommendations for the post-mining phase. In addition to increasing engagement, this initiative will provide valuable insights for the reclamation process.

² Minecraft Education is Microsoft's educational version of the Minecraft game and promotes interactive learning through virtual experiences and collaborative construction in the classroom.

Águas Claras Mine reclamation project

The Águas Claras Mine (MAC), located in Nova Lima, is being reclaimed to leave a positive and sustainable legacy for all of society. The site is currently undergoing mine closure procedures including geotechnical stabilization, risk mitigation, and studies on land-use opportunities.

A progressive rehabilitation strategy has been established with the goal of gradually and optimally reopening the MAC site. The site has been divided into three sectors and subsectors, each of which is slated to be individually reopened as stabilization work progress. In 2023,

one of these subsectors was equipped with pedestrian structures, safety arrangements, and signage to prepare it for community access in 2024, following clearance by the relevant authorities.

After a robust listening process in previous years that consulted more than 600 interviewees and conducted workshops with 140 internal and external stakeholders, throughout 2023 we intensified our engagement actions by participating in meetings with the City of Nova Lima, where we present project updates every two months. We also engaged with different municipal councils and responsible bodies, such as the Minas Gerais State Environment Foundation (FEAM), to present the project's concepts.



Águas Claras Mine, in Minas Gerais, Brazil.



Feasibility study

In 2023, Vale engaged the Eden Project, a company specializing in reclamation projects, to evaluate existing assumptions and studies and conduct a comprehensive feasibility assessment. Previous assessments will be integrated into a reclamation proposal grounded in environmental, social, and economic sustainability principles. Initial plans to complete the business modeling in 2023 have been adjusted following a new approach, based on agile methodology, which must accelerate the process of sustainably opening up these spaces.

Monitoring and long-term care

Effective mine closure requires a multidisciplinary approach that covers environmental, social, economic, and regulatory aspects. This comprehensive approach helps mitigate risks, protect the environment, ensure legal compliance, and facilitate a smooth transition to mine closure while ensuring long-term sustainability.

Community involvement is crucial in ensuring that mines are effectively reclaimed into spaces for communal living, with a focus on creating shared value and supporting local development. Vale actively solicits community expectations regarding land use to provide inputs into the reclamation process and to ensure that we leave a legacy of responsible mining for communities.

For further details about projects, including data from ongoing project monitoring, please see our [ESG Portal](#).

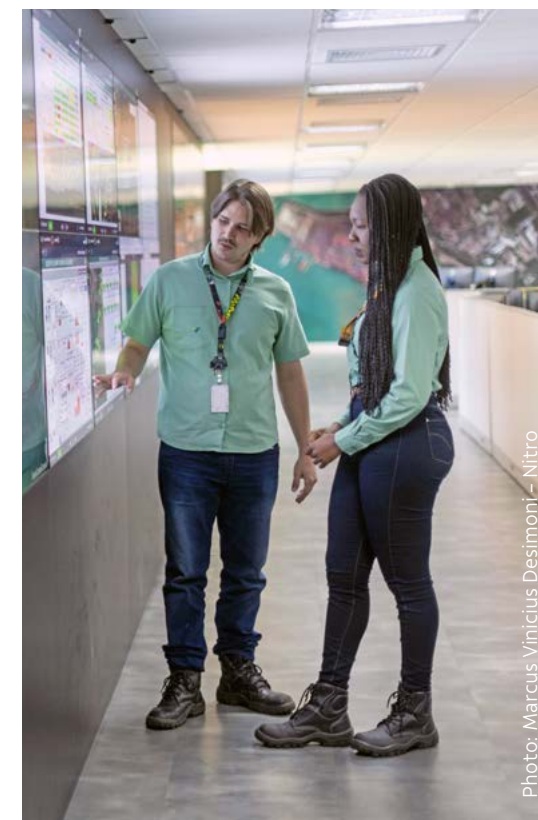


Photo: Marcus Vinicius Desimoni - Nitro

Effective mine closure requires a multidisciplinary approach that covers environmental, social, economic, and regulatory aspects.



2 Low-carbon solutions

GRI 201-2 | 3-3 [Climate Change]

In this chapter:

The role of mining
in decarbonization

Climate Strategy

The role of mining in decarbonization

Mining plays a pivotal role in achieving decarbonization targets aimed at limiting global temperature rises to 1.5°C, as outlined in the Paris Agreement. It aligns public policies and private sector commitments by providing transition metals that facilitate the replacement of fossil energy with renewable sources and that enhance performance in the steel value chain due to their superior quality.

Greenhouse gas (GHG) emissions from the steel industry have been on a steady rise, more than doubling over the past two decades. Steel currently stands as one of the most significant impact on climate change of any industry, contributing to approximately 8% of global emissions. To address these impacts, there is a growing shift towards alternative technologies such as electric-arc furnaces and direct reduction, backed by federal regulations.

Beyond the benefits and progress offered by mining, it is essential to recognize that increased resource demand may pose a risk of supply shortages, potentially jeopardizing established goals. Furthermore, the mining industry faces additional challenges such as the complexity of licensing procedures and adherence to ESG standards, inadequate logistics infrastructure, time constraints for market entry, supply chain integration issues, rising operational costs, and heightened price volatility.

Vale acknowledges that addressing these challenges and ensuring effective allocation of available investments, requires a multifaceted approach. This encompasses forming partnerships to leverage synergies within the supply chain, establishing transparent processes and standards for licensing and ESG compliance, securing government incentives and commitments to mitigate risks, and leveraging technology and innovation to enhance efficiency and capitalize on production opportunities.

In this context, we have embraced four primary pathways to contribute to industry efforts: energy efficiency, renewable energy, the circular economy and low-carbon fuels, energy sources, and supporting the development of new technologies.

“The collaboration between GraviHy and Vale represents an effort to revolutionize the steel industry’s path towards sustainability, addressing the urgent need to decarbonize an industry responsible for 8% of global CO₂ emissions. By merging GraviHy’s novel approach of producing DRI and HBI through water electrolysis with Vale’s cutting-edge cold briquetting technology, this partnership could expedite the adoption of green DRI across Europe, showcasing the importance of cross-industry collaboration and pioneering technology with far-reaching environmental and economic benefits.”

Camel Makhoulfi, GraviHy’s Chief Operating Officer



Photo: Gilson Marcos de Souza

100% Electric Truck, at the Água Limpa Mine, Minas Gerais, Brazil

Climate Strategy

GRI 201-2 | 3-3 [Climate Change]

Addressing the impacts of climate change is a strategic priority on our agenda. We actively pursue reductions of greenhouse gas (GHG) emissions throughout our end-to-end value chain. This effort is reflected in our offering of a portfolio of high-quality products, our increased use of renewable energies in our operations, and our development of less carbon-intensive energy solutions.

In 2023, for the fourth year in a row, we received an A- rating in the CDP¹ Climate Change assessment, a score above the mining sector average. CDP updated the scoring methodology and added new questions to the document, which made the assessment more rigorous when compared to previous years.

Additionally, as part of our commitment to implementing the Task Force on Climate-Related Financial Disclosures (TCFD) guidelines, we have incorporated assessments of climate-related risks and opportunities into our overall corporate risk management process.


We publish Vale’s climate change strategy and its advances, including the decarbonization roadmap, updated annually. In addition to the [2023 CDP Climate Change](#), other information can be found in the [ESG Portal](#) and the [Climate Change Report](#).

¹ Non-governmental organization that evaluates the strategy and practices of organizations on topics such as climate change, water resources and forests

Climate Governance

Our climate governance structure is made up of the Board of Directors (BoD), the Sustainability Committee (which advises the BoD), the Executive Committee, and the leadership. Since 2021, we have established the Low-carbon Forum, in which we regularly involve the C-Level and senior leaders of the company in monitoring progress against climate targets and global best practices. This initiative considers technical and operational discussions, as well as executive deliberation and oversight.

Our GHG emissions reduction targets are also tied to the short- and long-term variable remuneration of our Vice President of Sustainability and executives respectively, supporting our goal to create sustainable value Company-wide.

More information about Vale's climate commitments is available on the [ESG Portal](#). 

GHG Inventory¹

[GRI 305-1](#) | [305-2](#) | [305-3](#)

Vale's Scope 1 and 2 emissions were 9.7 Mt CO₂e in 2023, a reduction of 20.4% when compared to the 2017² baseline. Scope 3 emissions were 451.2 Mt CO₂e, 14.8% down compared to 2018³.

Scope 3 emissions—those associated with Vale's value chain—account for 97.9% of total emissions. Of these emissions, 92.8% are in the "Processing of Sold Products" category.

Our decarbonization roadmap includes projects to expand the use of alternative energy sources and reduce reliance on fossil fuels in our operations (Scopes 1 and 2). Concurrently, we are collaborating with our suppliers and customers to reduce our Scope 3 emissions. In 2020, we became the first mining company to undertake a quantitative target to reduce emissions

within this scope. Vale will review its Scope 3 target in 2025 and every five years thereafter, given existing uncertainties regarding low-carbon technologies and climate policies.

GHG Emissions – Scopes 1 and 2

In millions of metric tons CO₂e

	2017 (baseline)	2021	2022	2023
Scope 1	10.9	8.7	8.6	9.4
Scope 2 ⁴ (market-based)	1.3	0.3	0.3	0.3
Total	12.2	9.0	8.9	9.7

GHG Emissions – Scope 3

In millions of metric tons CO₂e

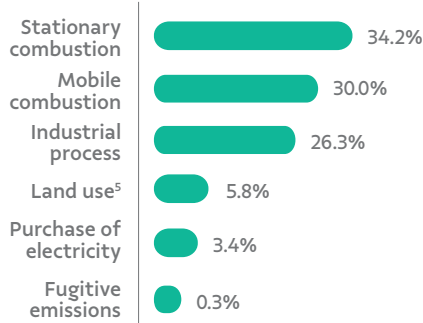
	2018 (baseline)	2021	2022	2023
Scope 3	529.5	470.7	457.6	451.2

Emissions by source

[GRI 305-1](#) | [305-2](#) | [305-3](#)

An increase in production is expected in the short term, according to Vale's production and sales report, which may lead to an increase in emissions. In the medium term, a drop in emissions is expected, in line with decarbonization efforts related to the implementation of low-carbon initiatives.

Emissions by source



Emission intensity

[GRI 305-4](#)

Vale's emission intensity indicator in 2023, of 23.2 kgCO₂e/t MFe-eq³, was 4% lower than the 2017 intensity of 24.0 kgCO₂e/t MFe-eq². This improvement is mainly associated with the consumption of electricity in Brazil, backed by 100% renewable energy certificates, which reduces our Scope 2 emissions.

Emission intensity – Scopes 1 and 2

in kgCO₂e/t MFe-eq⁶



More details about our GHG emissions can be found in our [Scope 1, 2 and 3 Report](#). 

- 1 Vale's 2023 GHG inventory results were audited by a third party.

2 Results are reported in absolute emissions and do not include any compensation.

3 An increase in Vale's Scope 3 emissions is expected due to the growth in sales volume, due to a perspective of increased demand for our products.
- 4 Vale's Scope 2 location-based emissions totaled 0.6 million metric tons of CO₂e, a 52% reduction compared to 2017.

5 The calculation of land use emissions and removals (LULUCF) includes biomass above and below soil and does not include soil carbon. In addition, emissions are restricted to suppressed areas owned by Vale and ADA (Area directly affected by Vale). We have been following the trends of the theme (GHG Protocol) and addressing future accounting improvements.
- 6 The production volumes of Vale's main products, such as pellets, nickel and copper, are converted to metric tons of iron ore equivalent.

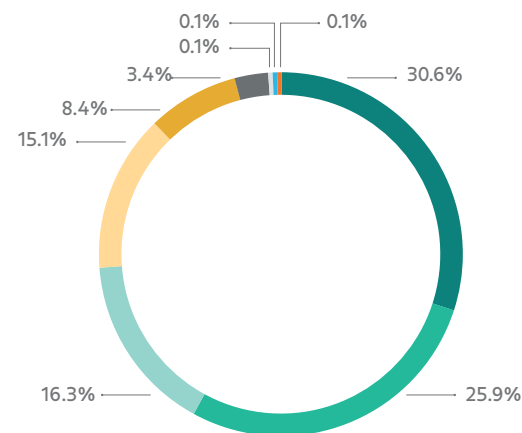


Photo: Vale Archive

Energy consumption matrix by source

GRI 302-1 | 302-3 | 302-4

Energy consumption in 2023 was 147.3 thousand TJ, 7.5% higher compared to the previous year, in line with the increase in production volume.



- 30.6% Electricity
- 25.9% Diesel oil
- 16.3% Natural gas
- 15.1% Coal and coke
- 8.4% Other oils
- 3.4% Renewable fuels
- 0.1% Shipping oils
- 0.1% Other gases
- 0.1% Other liquid fuels

Scope 1 and 2 target

With most of our combined emissions from Scope 1 and 2 deriving from combustion and industrial processes related to our operations (90.5%), we were focused in reducing emissions within these scopes with initiatives to decarbonize our primary sources of direct emissions as well as emissions related to purchased electricity. Our efforts are focused on replacing fossil fuels such as diesel, natural gas, and anthracite with alternative, low-carbon energy sources, as well as developing renewable sources.

In relation to indirect emissions from purchased electricity (Scope 2), in 2023 we met our goal to meet 100% of our electricity requirement in Brazil from renewable sources reaching the goal two years ahead of schedule (2025). It is noteworthy that this progress is mainly associated with the consumption of renewable electricity in Brazil, backed by 100% renewable energy certificates, which reduces our Scope 2 (market-based) emissions. This was partly thanks to our pipeline of renewable generation projects, including initiatives such as the Sol do Cerrado solar farm—which reached full capacity in 2023—as well as other hydro and wind projects in Brazil.

In Malaysia, we took the first step towards the decarbonization of our operations by joining the government's pilot Green Electricity Tariff (GET) program in 2023, which offered renewable energy through the grid. This enabled us to reduce our Scope 2 emissions in Malaysia by 26% for the year. The renewable energy procured via the GET program is validated by the mRECs (Malaysian Renewable Energy Certificates), which have been recognized by major international bodies such as the CDP, GHG Protocol, and RE100, and validated through an external audit. We are currently working to develop a long-term solution to fully meet VMM's power consumption needs with renewable energy by 2030.

Globally, our electricity consumption was 30.6%. Vale has committed to achieving 100% of our global electricity requirement from renewable sources globally by 2030.

For further information, see our [Vale Day 2023 Presentation](#).

Vale's commitment to reducing Scope 1 and 2 GHG emissions

- Reduce absolute Scope 1 and 2 emissions by **33% by 2030 (from a 2017 baseline)**
- **Achieve net zero** Scopes 1 and 2 emissions by 2050
- **100%** renewable electricity globally by 2050.



Photo: Felipe Borges

Progress on carbon reduction technologies

GRI 305-5

Use of low-carbon fuels

Pelletizing plants account for approximately 34% of our Scope 1 emissions. In 2023, we completed feasibility analysis tests on the use of biocarbon¹, replacing 100% of conventional fuel with biocarbon in the process of burning iron ore agglomerate, used in steel production. Additionally, in 2024, our pelletizing plants in São Luís (MA) will switch to using natural gas, reducing this operation's GHG emission in approximately 28%. Throughout 2023, nickel operations in Brazil and Indonesia carried out factory tests to assess the technical feasibility of replacing coal, both as a fuel and as a reductant, with biomass-based alternatives.

Vale is also exploring the use of less carbon-intensive fossil fuels in locomotives. We are establishing

strategic partnerships aimed at collaborating in the joint production of low-carbon solutions. For the year 2023, we highlight: the partnership with Wabtec to develop studies on an ammonia engine as an alternative fuel to diesel; and the protocol of intentions with Petrobras to accelerate the development of low-carbon solutions.

[Vale and Petrobras sign Protocol of Intent to accelerate the development of low-carbon solutions.](#)

[Vale partners with Wabtec on alternative fuels study.](#)

¹ Biocarbon is a renewable product obtained by carbonizing certified biomass, which is currently considered carbon neutral by the GHG Protocol. This product is currently being tested to replace the use of coal.

Adoption of electrical equipment

Regarding investment in electric equipment with a focus on reducing Scope 1 emissions, we have been expanding our fleet of mining equipment since 2018, especially in Canada. Besides that, small 100% electric off-road trucks are being tested in two operations: one in Brazil and the other in Indonesia. There is also a partnership with Wabtec which enabled the purchase of three FLXdrive electric locomotives to increase the energy efficiency of the Carajás Railroad.

However, our learning to date shows us that the investment required in equipment and infrastructure adaptation, in addition to the development time and the difficulties of reconciling this type of technology with the geographic characteristics of our operations, requires that electrification as a solution for decarbonization for large equipment is assessed on a case-by-case basis.

[Vale partners with Wabtec on alternative fuels study and orders three FLXdrive battery electric locomotives.](#)

Electricity Portfolio

We have a robust energy portfolio to support our operations and projects, in addition to continually seeking partnerships with other companies to promote the expansion of renewable energy purchase agreements (PPAs), certified by renewable generation certificates.

Our global electricity generation portfolio is 98.7% renewable and directly contributes to our Scope 2 target. In 2023, Vale's installed capacity worldwide reached 3.1 GW, primarily comprising hydroelectric, wind, and solar generation assets. These assets, both directly and indirectly owned, are mainly situated in Brazil, Canada, and Indonesia.

In Brazil, our 2023 installed capacity from our generation assets, participation in companies and consortiums reached 2.6 GW. By July 2023, we completed the implementation phase of the Sol do Cerrado solar park, which has a total installed capacity of 766 MW, located in the municipality of Jaíba, state of Minas Gerais.

[For more information about the asset portfolio, visit 20-F Report or ESG Portal.](#)

Improvements in energy efficiency

Being more efficient in the use of energy resources is a strategic issue for Vale. Energy efficiency is one of the levers of our decarbonization strategy, playing an important role in reducing emissions, especially in the short-term.

The objective is to include the topic in a structured way in our operational routines, demanding operations adopt initiatives that promote energy efficiency in their processes and thus achieving our goal of improving the global energy efficiency indicator by 5% by 2030, in comparison with the levels recorded in 2017.

One of the ongoing initiatives we highlight is the Sentinela project. Among many objectives, it utilizes Artificial Intelligence to optimize diesel consumption in off-road trucks through recommendations of operational parameters, focusing on the ideal speed for each section of the mine.

In 2022, we developed this tool for the South Corridor mines. By 2023, we replicated its use in the truck fleets at the Carajás and S11D mines.



Foto: Felipe Borges

2030 target

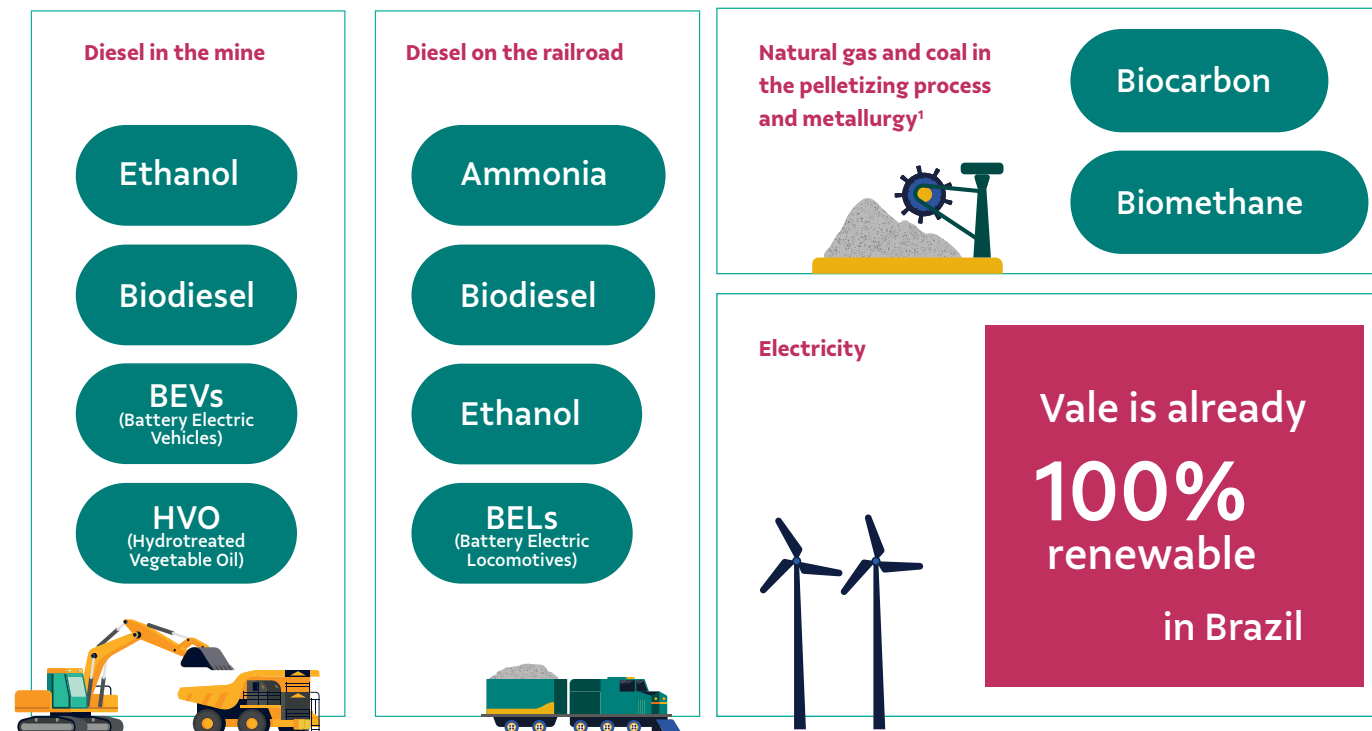
In 2023, we achieved a reduction of 20.4% in Scope 1 and 2 emissions compared to the 2017 baseline. We are on track to meet at least a third of our target by 2025, mainly through fuel oil to natural gas retrofits at all pelletizing facilities, coupled with the conversion of two pelletizing plants to the production of iron ore briquettes, with both projects scheduled to be completed and operational by 2024.

We plan to meet our full Scope 1 and 2 emissions reduction target between 2026 and 2030, by achieving a larger share of renewables and developing less carbon-intensive processes, such

as by replacing anthracite coal with biochar, replacing natural gas with biomethane and bio-oil in pelletizing, expanding the use of biofuels in mines and locomotives, evaluating the application of low-carbon ammonia in locomotives, expanding the use of electric equipment and vehicles and the consumption of renewable energy in all our operations and projects.

By 2024, we expect to reach important industrial testing milestones and complete conceptual projects, especially for the use of biocarbon and biofuels, along with the conversion of two pelletizing plants to produce iron ore briquettes.

Key solutions evaluated to address emissions reductions



- 1 Under evaluation in accordance with the GHG protocol guidelines.
- 2 Portfolio reviewed annually to incorporate risks and viability of solutions. Vision 2023.

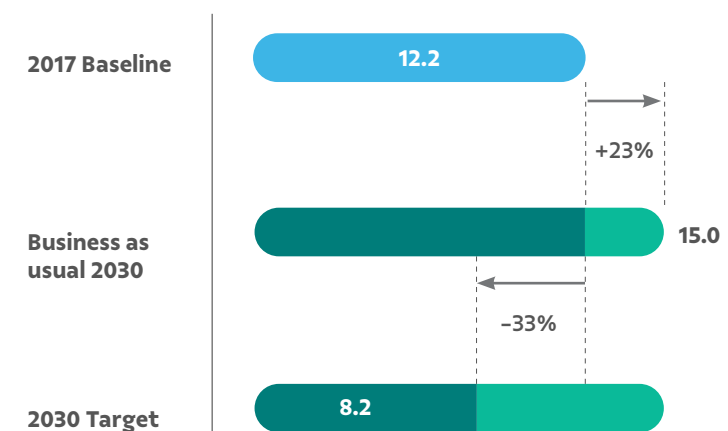
To achieve our targets for reducing greenhouse gas emissions, we have committed to investments in our operations of between

**USD 4 and
USD 6 billion** by 2030

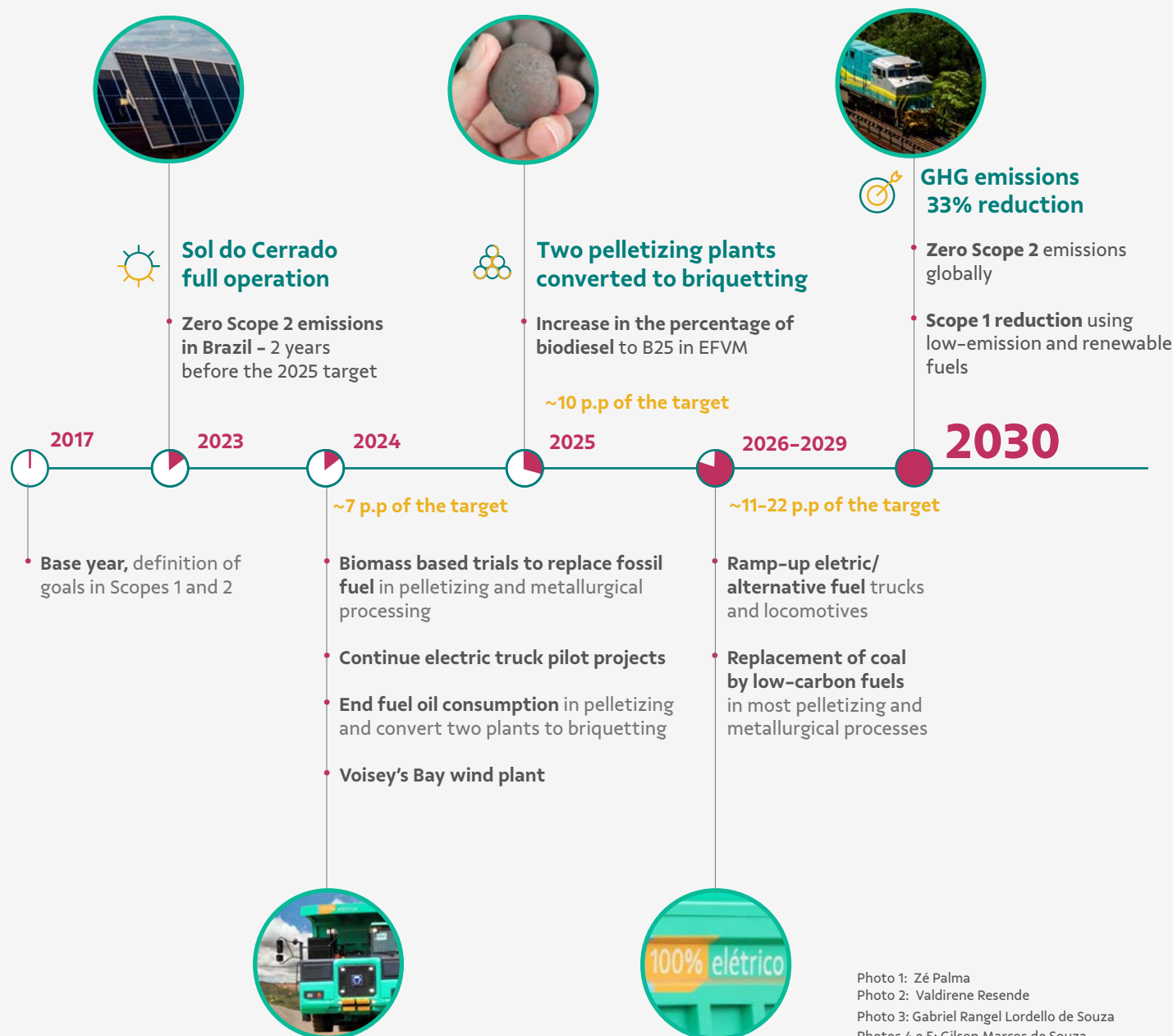
Since 2020, our expenditure on climate change has amounted to **USD 1.2 billion** with **USD 350.8 million** in 2030

Scopes 1 and 2 emissions²

In Mt CO₂e



Solid path to reduce our Scopes 1 and 2 GHG emissions



Marginal Abatement Cost (MAC)

To manage the costs, risks and opportunities of decarbonization, we created a plan, with clear milestones, aimed at meeting the greenhouse gas (GHG) reduction targets. Our portfolio of initiatives includes a variety of projects, which are prioritized according to their cost competitiveness and emissions potential to reach the 2030 target.

We consolidated our portfolio for evaluation and prioritization based on the Marginal Abatement Cost Curve (MAC), a tool that helps determine the cost-benefit relationship between different projects. We emphasize that MAC is subjected to a risk assessment, using the methodology SITA¹, in

addition to assessment of external factors that may impact the initiatives' success, such as macroeconomic, political, and regulatory factors, among other possible obstacles.

Additionally, investment decisions are subjected to analysis considering the internal carbon price of 50 USD/t CO₂². It is based on the continuous evaluation of the portfolio of initiatives that we have directed our path towards reducing GHG emissions, weighing the costs, risks and opportunities against the deadlines of our commitments.

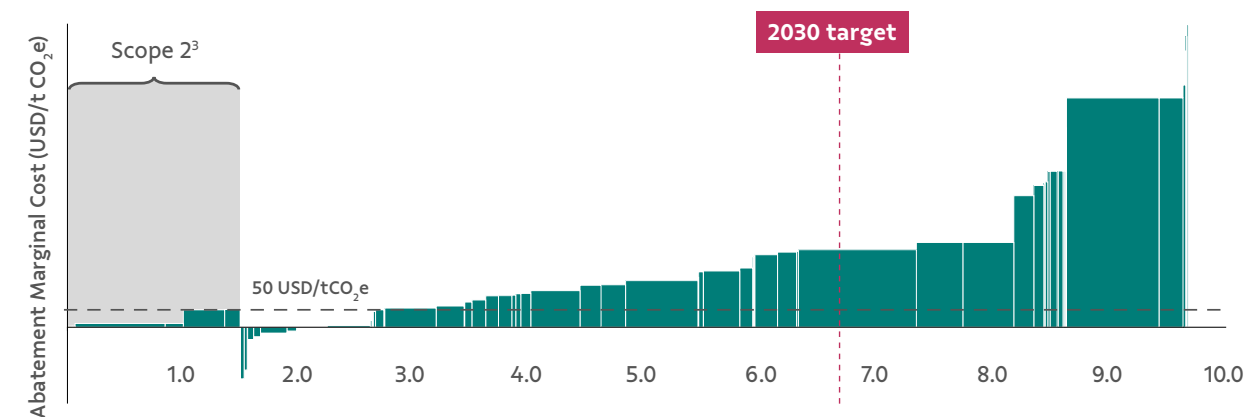
Potential for reducing GHG emissions by type of initiative

Biocarbon	33%
Biofuels	27%
Renewable Energy	20%
Natural Gas and others	15%
New Products	5%

The chart shows the total emission reduction potential in 2030, according to the initiatives accounted for in the 2023 MAC curve.

MAC 2030

Abatement potential for GHG emissions in 2030 (Mt CO₂e)



¹ The SITA methodology considers four criteria for risk assessment: availability of supply and resources (Supply); intensity of emissions reduction (Impact); technological maturity (Technology); and ability to implement technology in a sustainable way, considering deadline and operational risks and necessary adaptations in operations (Ability).

² Projects that do not fit into the previous categories, such as process change and additive use.

³ Established in accordance with the Carbon Pricing Leadership Coalition (CPLC).



2050 target

In addition to our 2030 target, we have committed to accelerating our reduction of Scopes 1 and 2 emissions toward an ultimate goal of achieving Net Zero by 2050. This target is consistent with the Paris Agreement and will require emission reduction beforehand. Eventual residual emissions will be neutralized by high-integrity and acceptable measures.¹

Net Zero 2050 Strategy



Absolute emissions



Neutralizing residual emissions

1

Reductions in operational emissions:

Continuously reduce Scope 1 and 2 emissions through new and existing initiatives involving innovative processes, technology, and partners.

2

Nature-based solutions with socioenvironmental co-benefits

Impact investment strategy, leveraging local opportunities.

3

High-integrity carbon credits

Assurances of additionality and permanence, positive social and environmental impact, and high accountability.

Scope 3 target

To advance decarbonization in the mining industry, it is essential that our entire value chain work together. With our broader value chain accounting for 97.9% of our global emissions, mitigating these emissions is crucial to our overall decarbonization strategy.

We have established a target to achieve a 15% reduction in our value-chain initiatives by 2025, from a 2018 baseline. Our target was defined according to science-based methodology², following the absolute contraction approach³ and aligned with the 2°C temperature increase scenario.

Our strategy to achieve our Scope 3 target consists of two core approaches: providing our customers with a portfolio of low- or zero-carbon iron ore agglomerates and building structural partnerships with our value chain (Memorandum of Understanding).

Vale's commitment to reduce GHG Scope 3 emissions

Achieve 15% reduction in net Scope 3 emissions by 2035

Concurrently, we envisage the use of high-integrity⁴ carbon credits for up to 20% of our proposed target (equivalent to 16 Mt CO₂e) for hard-to-abate sectors. Any use of carbon credits will be compliant with the principles of additionality, permanence, and transparency – demonstrating a strategic focus and commitment to established environmental targets.

¹ Until 2023, Vale has not purchased any forest carbon credits to reduce its emissions or achieve its targets. All purchases of high-integrity credits were made to help the company achieve its Forest Goal.

² Calculation methodology: SBTi – TWG-INF-002 | Version 4.2 April 2021.

³ Method for achieving a linear absolute reduction in GHG emissions in the target year relative to the base year.

⁴ As it foresees the use of carbon credits to achieve the commitment, the SBTi has formalized that it will not proceed with validating our Scope 3 target, nor will it separately validate the goal of Scopes 1 and 2 target.



Initiatives in iron ore

In addition to having the highest quality in the world, the Hot Briquetted Iron (HBI) produced by Vale has a great competitive advantage, as it helps to reduce coal consumption in our customers' blast-furnace processes due to the fact that it requires a much lower temperature to produce steel. Meanwhile, using natural gas in HBI production generates approximately 60% less emissions when compared to pig iron, with green hydrogen eliminating emissions altogether.

In 2023, we made important strides on our HBI strategy with the launch of the Torto dam in the Brucutu complex in Barão de Cocais and São Gonçalo do Rio Abaixo (MG). This expanded our production of agglomerated products to approximately 40 million metric tons and enhanced our mix of high-quality products, which now include sand produced from tailings. The efforts to increase our iron ore production capacity include a pipeline of projects to be implemented between 2024 and 2026, such as in our operations in Carajás (PA), Capanema (MG), and Vargem Grande (MG).

Innovation in the development of iron ore briquette

We first began developing iron ore briquettes approximately 20 years ago at our Ferrous Metals Technology Center, in Nova Lima, as part of a broader pipeline of iron ore products and investments in innovation.

The briquetting process eliminates the blast-furnace sintering stage in steel production, which helps our clients to reduce their GHG emissions by up to 10% compared to standard production, supporting our efforts to reduce Scope 3 emissions. Simultaneously, it eliminates the use of water across the entire production process. Briquettes are produced via low-temperature agglomeration of high-grade iron ore using an agglomerant solution

that imparts the desired mechanical strength to the final product. The product also emits approximately 80% less CO₂ compared to pellets, supporting our efforts to reduce Scope 1 emissions.

In April, we made our first shipment of 8,000 metric tons of briquettes produced in our first international blast-furnace trial run. The product was shipped from the Porto do Agu to the Port of Rotterdam, in the Netherlands, to evaluate its performance with a European customer and assess its behavior during overseas transportation. Throughout 2023, another 70,000 metric tons were processed in a test run in Brazil in six different blast furnaces in a 126-day trial.

The first briquette plants at our Tubarão site in Vitória (ES) became operational in 2023. These plants were built by retrofitting pelletizing plants 1 and 2, a USD 240 million project that supported 2,300 jobs. These plants have a combined annual production capacity of 100 million metric tons of briquettes.

Vale's briquette product promises to be an important lever in the decarbonization of the steel industry, offering a sustainable solution to mitigate emissions while meeting the sector's growing demand for innovative solutions.

Mega Hubs

The decarbonization of the steel industry demands a new type of business model, with the integration of several players, seeking not only new, cleaner and more competitive energy sources to power existing steel plants, but also redesigning the planet's industrial map. The Mega Hub allows steel industries to relocate their most emission-intensive production processes, close to competitive energy sources. Centers with logistical services, iron ore processing and the production of agglomerated products are being designed in places such as Oman, the United Arab Emirates, Saudi Arabia, the United States and Brazil.

Intermediate products, such as “hot-briquetted iron” (HBI), are transported for final processing in plants in their countries of consumption. Companies, countries, investors and suppliers are part of the Mega Hub agreements.

In 2023, we also signed a Memorandum of Understanding with the Porto do Açu, which owns the largest deepwater port-industry complex in Latin America, to conduct a study toward the development of a Brazilian Mega Hub to produce HBI. Initially, this facility will be fed with pellets, although it may incorporate a briquette plant in the future. The study will assess the feasibility of producing HBI using natural gas supplied at the Porto do Açu, and the possibility of retrofitting the plant at a later date to use green hydrogen, which would reduce carbon emissions in HBI production to near zero.

Shipping initiatives

Second only to indirect emissions from iron and steel production, the emissions produced in shipping our products account for 0.5% of our Scope 3 emissions. Like the steel industry, shipping is recognized as a hard-to-abate industry due to its dependence on fossil fuels.

Throughout 2023, we made further progress on energy efficiency projects for ships carrying our agglomerated iron ore products, including industrial-scale trials of rotor sails to optimize propulsion and minimize bunker consumption. In addition, Vale has established strategic partnerships within the shipping industry that have supported significant advances in the adoption of less carbon-intensive fuels and disruptive ship-transportation technology.

These initiatives are all being developed as part of our Ecoshipping program. This program was created by Vale's shipping department to support our goal to reduce our carbon footprint in line with discussions within the International Maritime Organization (IMO).

Carbon footprint

The market is increasingly demanding companies to report carbon emissions at the product level. In response to this, Vale has adopted the requirements of the GHG Protocol's Product Life Cycle Accounting and Reporting Standard and ISO 14067.

We use the cradle-to-gate approach to estimate product emissions. This approach accounts for emissions from mining, processing and haulage, pelletizing and briquetting, and production of materials (Scope 3 – upstream).

Vale has made significant progress in mapping the carbon footprint of its Iron Solutions products, increasing the coverage by volume to 75.6% (Europe 98.8% – for sales in 2023). All nickel, copper and cobalt products have their carbon footprints estimated and guaranteed by third parties.

Climate-related risks and opportunities

As part of our TCFD-compliant Climate Change Strategy, we have worked with the Vale Institute of Technology to quantify the most significant climate-related risks and opportunities in our operations. We use scenarios¹ to predict the impacts of projected future climate change on our operations.

In addition, we monitor potential developments in climate regulations, emerging technologies, markets, and public policies.

Furthermore, stakeholder engagement in industry forums helps us to anticipate trends and emerging regulations, enhancing preparedness and resilience to the global threat that is climate change.

Our risk assessment was performed using a risk matrix that covers both physical risks (acute and chronic) and energy-transition risks, including regulatory developments, litigation, changes in technological and product requirements, and market and reputation risks.

We also recognize the impacts of climate change on water resources, especially given the increasing frequency of extreme weather events. Changes in rainfall patterns can result in extreme weather events (such as floods or droughts) that can directly impact our operations. In response, we have conducted a water stress assessment covering the watersheds hosting our operations and have established more ambitious reduction targets for areas with high and critical water stress. For further details, see the section on [Water Efficiency](#).






Photo: Anderson Bibico

The world's first large ore carrier world equipped with rotor sails, with a capacity of 325,000 metric tons.

¹ Developed by the Intergovernmental Panel on Climate Change (IPCC) to project different greenhouse gas (GHG) emissions trajectories and their climate impacts, Vale uses the RCP4.5 (moderate), RCP8.5 (high) e SSP5-8 (high, including a higher degree of certainty about future economic and technological development) scenarios.

Impact of climate scenarios on selected commodity markets

	Demand impacts	Drivers	Challenges
<div><div>Nickel</div></div>	<div><div>1. Growth</div><div>2. Growth</div><div>3. Reduction</div><div>4. Maintenance</div></div>	<div><div>1. Sales of electric vehicles</div><div>2. Energy storage batteries</div><div>3. Recycling and disposal of electric vehicle batteries</div><div>4. Demand for stainless steel</div></div>	<div><div>• Deal with demand growth in a sustainable way</div><div>• Need for recycling and reuse of nickel present in batteries</div><div>• Lack of commercial nickel deposits/ projects</div><div>• Reduction of emissions related to nickel mining</div><div>• Discovery and commercialization of new deposits</div></div>
<div><div>Copper</div></div>	<div><div>1. Growth</div><div>2. Growth</div><div>3. Growth</div><div>4. Reduction</div></div>	<div><div>1. Sales of electric vehicles</div><div>2. Generation of solar and wind energy</div><div>3. Transmission lines for access to energy</div><div>4. Advances in the recycling of copper waste</div></div>	<div><div>• Deal with growth in demand in a sustainable way</div><div>• Need to increase the waste limit in the use of copper waste</div><div>• Environmental challenges in many countries with copper mining</div><div>• Discovery and commercialization of new deposits</div></div>
<div><div>Iron</div></div>	<div><div>1. Growth</div><div>2. Reduction</div><div>3. Reduction</div><div>4. Reduction</div></div>	<div><div>1. Infrastructure focused on the energy transition</div><div>2. Drop in the car fleet</div><div>3. Efficiencies in construction</div><div>4. Recycling and use of waste</div></div>	<div><div>• Deal with growth in demand in a sustainable way</div><div>• Need to increase the waste limit in the use of copper waste</div><div>• Environmental challenges in many countries with copper mining</div><div>• Discovery and commercialization of new deposits</div></div>

Physical Risks

In the scenario of extreme weather events impacting Vale, transition risks include higher financial costs, the need for new technologies and increased competition and reputational challenges. Physical risks include extreme weather events that can directly affect our operations.


Vale has developed the “Vale Climate Forecast” methodology which provides a continuous updates on the diagnosis of risks and impacts on our assets caused by climate change in the short, medium, and long-term. The methodology focuses on current operational impacts such as product shipments, as well as long-term planning aimed at assessing asset resilience. The assessments result in the likelihood of experiencing changes in rainfall patterns and intensity, temperature variation, floods, droughts, water scarcity, sea level rise, and an increased incidence and intensity of atmospheric discharges (lightning), which may adversely affect Vale’s operations, its employees, and members of the community.

In partnership with ITV, Vale developed a short-term risk forecasting tool, implemented in the Northern Corridor in 2022, covering terminals, railroads and mines at the Ponta da Madeira Maritime Terminal, in São Luís (MA). Daily, precipitation prediction are disseminated throughout the port,

aiding decision-making in the loading and distribution operations of iron ore and other products, optimizing plans and minimizing risks.

Regarding medium and long-term climate analyses, since 2021, we have been seeking to understand the exposure of our assets to physical climate risks. Over the last few years, we have advanced in analyzing operations in Canada, Brazil, and Indonesia. We are also committed to understand the exposure of the communities around our operations.

Due to the complexity of assessing physical risks and the continuous nature of the risk identification and management process, future assessments may show material impacts on the company’s results and operations. In recent years, we have observed that external events occasionally arise due to the impact of severe weather conditions on our mining and logistics operations.

For further information, see our [Climate Change Report](#) 

Energy transition challenges

Our decarbonization strategy is one of our primary objectives, which includes our initiatives aiming to contribute to society across the social, environmental, and business sustainability dimensions.

As both suppliers and consumers, we operate within an industry where the energy transition has become crucial for future prosperity. The transition metals we produce –such as nickel and copper– are used to produce essential products for the energy transition, such as batteries. Our years of expertise in these products has helped us to build logistics capabilities, therefore we have sought partners in areas where these metals are most abundant –our operations in Brazil, Canada, and Indonesia– to expand production while advancing sustainable mining practices.

Given their importance for the transition to a low-carbon economy, the demand for nickel and copper is expected to continue to rise, once they are essential base metals that are required for many of the technologies that enable the transition to a low-carbon economy. High-performance batteries, for example, contain an increasing amount of nickel, while wind turbines and solar panels require substantial quantities of copper.

**We estimate
that the global
demand for nickel
will increase by**

**44%
by 2030**

**6.2
million
metric tons**

**By mitigating
climate risks to
the physical and
economic well-being
of communities,
low-carbon mining
reflects our broader
commitment to
achieve a fair
transition.**

We anticipate that the global demand for nickel will increase by 44% by 2023, compared to demand in 2022, reaching 6.2 million metric tons. By this our nickel production volume is projected to surpass the current value of 175,000 metric tons per year to more than 230,000 metric tons, with the most growth expected in Indonesia and Canada. Copper demand, in turn, is forecast to rise by about 20% in the same period, reaching 37 million metric tons. Our production output for copper is expected to increase from 350,000 metric tons in 2023 to 900,000 metric tons in the next decade.

Just Transition

By mitigating climate risks to the physical and economic well-being of communities, low-carbon mining reflects our broader commitment to achieve a fair transition—one in which financial, material, and human resources are shifted to an economy that works for people and the planet.

In this context, we not only aim to mitigate CO₂ emissions in our value chain, but we are also committed to supporting local communities—particularly the most vulnerable—in becoming more resilient to the risks and impacts of climate change. This is, at the same time, ensuring respect for their human rights and leaving behind a positive social legacy. Empowering our employees to deal with new technologies is also a key priority.

High-grade nickel

With the upcoming nickel sulfate plant outside China—in Québec, Vale Base Metals will become a major supplier for relevant companies in the automotive sector such as General Motors, Ford, and Tesla, positioning itself as a bridge between sustainable mining and the energy transition in electric vehicle manufacturing. This plant, scheduled to begin operating in 2025, with deliveries scheduled for the second half of 2026, will have a production capacity of 25,000 metric tons per year, which is enough to fuel approximately 350,000 EVs (electric vehicles) annually, making it one of the largest in the world. This is part of a broader ambition to act as partners in building an increasingly sustainable supply chain, creating value by minimizing emissions.

The 2022 carbon footprint of Class 1 nickel produced by Vale's Long Harbor facility in the Canadian province of Newfoundland and Labrador is 6.2 metric tons of CO₂ equivalent per metric ton produced. This figure is equivalent to half the average footprint reported by the Nickel Institute for this category of nickel production (these findings have been independently assured by Intertek).

Copper Cliff Sudbury Nickel Refinery in Ontario, Canada



Photo: Marcelo Coelho

“The iron and steel sectors are a pillar of China’s national economy; energy conservation and carbon reduction have become urgent imperatives to meet China’s carbon peak targets by 2030 and achieve carbon neutrality by 2060. The mining industry plays a crucial role in supporting our sector’s decarbonization and transition to a low-carbon economy. Following our company’s new development concept that “clear waters and lush mountains are invaluable assets,” Delong Steel has committed to building a low-carbon steel plant to support China’s high-quality development ambitions. We are excited to see innovative iron ore solutions developed by Vale, including briquettes and Mega Hubs. We envision a promising future in our partnership with Vale to transform steelmaking into a low-carbon or even carbon-zero industry, thus making a collective contribution to addressing global climate change.”

Sr. Kan Yonghai, Vice President of Shanghai Delong Steel Group and Executive President of New Tianjin Steel Group.



Photo: Marcus Desimoni – Nitro

3 A focus on discipline

GRI 3-3 [Governance and compliance]

In this chapter

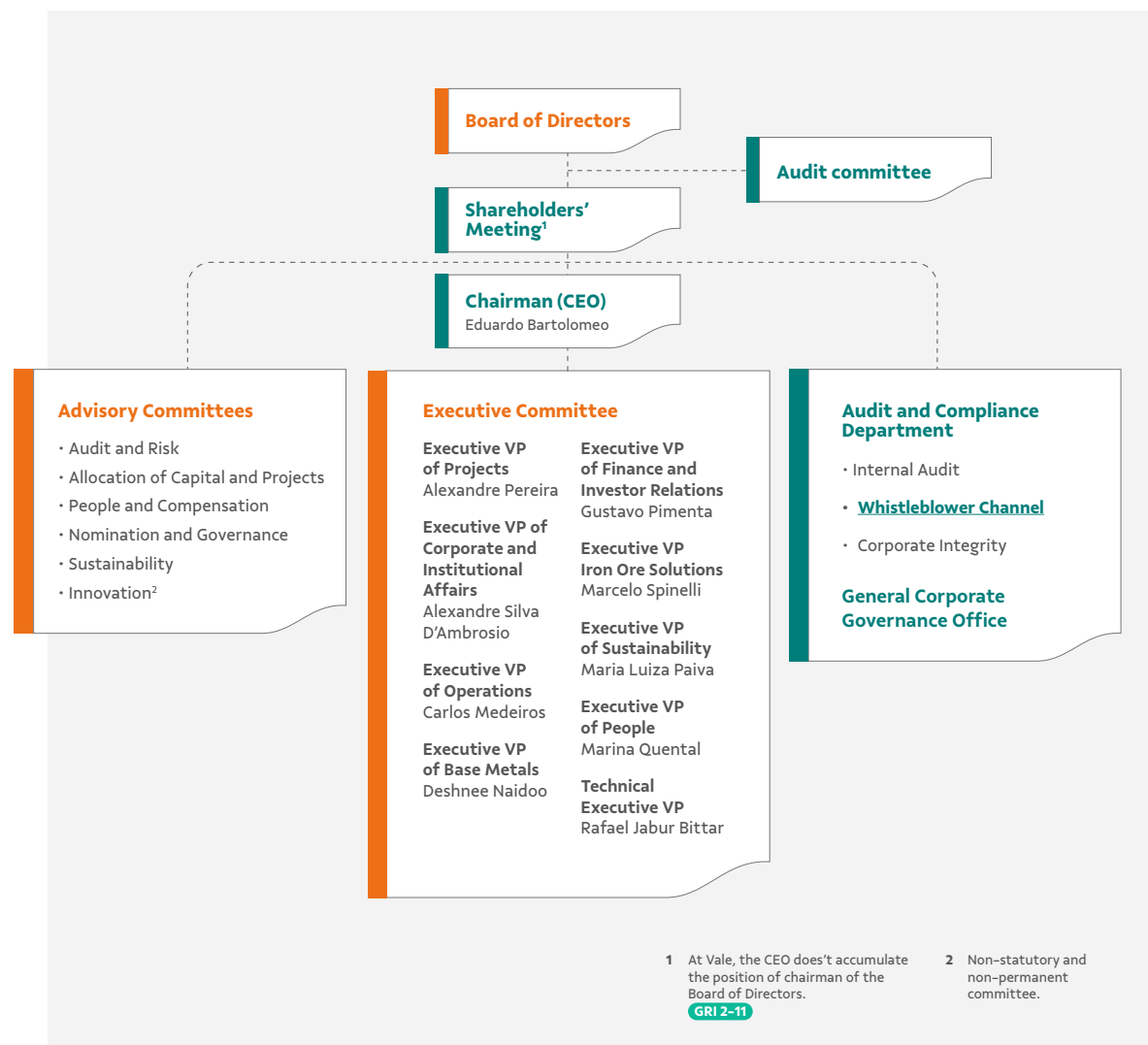
Corporate governance

Risk management

Ethics and Compliance

Economic Performance

Integral to our cultural transformation is the continuous improvement of our governance and risk management processes dealing with the policies and practices that enable us to fulfill our purpose as an organization. Our discipline in this goal should be reflected in efficient resource allocation, perceived shareholder and investor value, and competitive advantage.



Corporate governance

GRI 2-9 | 2-11 | 2-13

In **December 2022**, we implemented a restructuring within the Executive Committee, linked to Vale's presidency (see the organizational chart), introducing four executive vice presidencies covering the areas of Iron Ore Solutions, Operations, Projects, and Technical. In turn, the responsibilities of the executive vice presidencies of Strategy and Business Transformation, Global Business Solutions, and Safety and Operational Excellence were integrated into this new structure.

These changes aim to intensify the focus on our core assets, streamlining the capacity for innovation in products and solutions aimed at the global energy transition. The current redesign is the result of a strategic move that simplifies our portfolio, focusing exclusively on businesses and geographies where we hold clear competitive advantages.

The Board of Directors establishes the guidelines and general policies that guide our operations and oversees the execution of these guidelines through meetings and reports presented by the Executive Committee. Our governance system seeks to reinforce the clarity of roles, transparency, and stability that guide activities. To strengthen the decision-making process, in addition to the Board, the structure also includes Advisory Committees composed solely of board members, as shown in the figure.

The transition to the Corporation model is characterized by capital dispersal and the absence of defined control. This restructuring of the Company was also reflected in the restructuring of the Company's Bylaws and the Rules of Procedure of its governance bodies.

³ Mr. Manuel Lino Silva de Sousa Oliveira was appointed to this position by independent board members in June 2023, as established in the Bylaws.

Board of Directors

GRI 2-10 | 2-12 | 2-13 | 2-14 | 2-17 | 2-18

The Board of Directors is responsible for the strategic direction and overall guidance of the Company's business and is tasked with evaluating its financial performance, appointing and evaluating members of the Executive Committee, and deciding on corporate policies, among other responsibilities. The Board's mission is to safeguard the Company's assets and maximize the return on shareholders' investment in the long term, operating within the highest ethical principles to ensure the Company's sustainability is in line with our purpose.

According to our **bylaws**, the Board consists of 11 to 13 members, with a unified renewable term of two years, with the possibility of re-election. The bylaws prohibit the Company's CEO from simultaneously serving as the Chairman of the Board. The board currently consists of 12 members, seven of whom are independent, and the majority of whom have experience in mining (or related industries), ESG, finance, and cultural transformation. Of the 12 members, one represents the employees as a whole and the others are elected by shareholders based on nominations made by the Nomination and Governance Committee. The Board currently maintains five statutory and permanent committees and one non-statutory and non-permanent committee.

The Board has a Lead Independent Director (LID)³ in accordance with best corporate governance practices. The LID serves as an alternative point of contact with the Company's shareholders, seeking to understand their expectations and perceptions regarding Vale. Additionally, they support the Chairman of the Board, contributing to the continuous improvement of the Board's performance. These responsibilities are detailed in Vale's Board of Directors' rules of procedure.

“Building a solid ESG Journey has contributed to the development of the territories in which we operate and our overall value chain, as well as re-establishing Vale’s reputation. Vale’s commitments made to society seek tangible and intangible results and are recurrent agendas in the different governance bodies. In 2023, the Board of Directors assessed Vale’s new target for reducing water use, monitored progress on targets already established, such as lifting people out of extreme poverty and reducing emissions (scopes 1, 2 and 3), as well as monitored the strategy for social and environmental business risks and opportunities.

As members of the Board of Directors and Coordinator of the Sustainability Committee, our role is to contribute with diverse visions and be proactive in accelerating Vale’s ability to generate equitable actions for society as a whole and for our stakeholders: investors, employees, suppliers and communities, in line with the best global corporate governance practices.”

Rachel Maia, Board Member and Coordinator of Vale’s Sustainability Committee.

Advisory committees

The Advisory Committees’ roles are to provide specialized guidance to the Board in specific areas. The committees prepare an annual work plan encompassing the priority issues defined by the Board, which should be addressed throughout the year, in line with Vale’s business strategies. In addition, new demands for discussion topics may be incorporated, originating both internally, within the committees themselves, and from the Board of Directors or the Executive Committee.

We also have a Conduct and Integrity Committee to promote the Ethics & Compliance Program. This committee supports compliance with the ethical principles of the Code of Conduct and the development and revision of guidelines and provides guidance on the application of disciplinary measures for confirmed cases of misconduct in order to ensure fair and equitable treatment.

Performance assessment

A comprehensive and constructive assessment of the Board of Directors and other bodies is essential for nurturing sound corporate governance. Our Board conducts an annual performance assessment, with the support of the Nomination and Governance Committee, to analyze and recommend the evaluation methodology. Based on the results obtained, a development plan is drawn up for the Board, focusing on the evolution of our governance.

At the end of 2023, the latest performance assessment process of the Board and the Advisory Committees was initiated, which includes both the assessment of the Board as a whole and individual assessments of its members (self-assessment and peer assessment). The assessment should be completed in the first half of the first months of 2024.

[Learn more about the members of the Board of Directors here.](#)

Executive leadership

GRI 2-13

It is up to our leadership to execute the business strategy defined by the Board of Directors (CA), prepare plans and ensure Vale’s efficient operational and financial performance. The CA elects the members of the Executive Committee. The President nominates and submits candidates for the positions of Vice President to the People and Remuneration Committee.

The Executive Committee is made up of the President and nine Executive Vice-Presidents, eight of whom are statutory.

GRI 2-9 | 2-10 | 2-12

Fiscal Council

The Fiscal Council is Vale’s permanent supervisory body, which monitors and verifies the actions of Directors and compliance with their legal and statutory duties, seeking the best organizational performance based on the principles of transparency, equity and accountability, in line with current Brazilian legislation, with the terms of Vale’s Bylaws and its own Internal Regulations. Its responsibilities include supervising administrators, reviewing annual management reports and financial statements and maintaining direct communication with external and internal audits.

In 2023, the Supervisory Board reviewed the quarterly and annual financial statements prepared, discussing them with the external auditor; supervised the actions of the Administrators by analyzing the minutes, verifying compliance with their statutory and legal duties in accordance with the different applicable laws in force; as well as fulfilling other regulatory duties and analyzing topics relevant to the Company’s business. The quarterly and annual Financial Statements are approved and authorized for disclosure by the Board of Directors.

Executive Committee

The Executive Committee is charged with implementing the business strategy outlined by the Board and aiming to ensure efficient operational and financial performance. Members are elected by the Board, with the President being responsible for presenting candidates for Vice President positions for approval. Following changes at the end of 2022, the Executive Committee currently consists of the President and nine Executive Vice Presidents, eight of whom are statutory.

[Learn more about the members of the Executive Committee, their formation, and the composition of Advisory Committees.](#)

Executive Management compensation

GRI 2-19 | 2-20

According to the Company’s Bylaws, the annual overall compensation of the Board members, Executive Committee, Audit Committee, and Advisory Committees is determined by the shareholders during the Annual General Meeting. The responsibility for distributing the compensation approved at the Annual General Meeting among the Executive Committee members falls on the Board, with the support of the People and Compensation Committee.

The variable compensation of the Executive Committee members encompasses various metrics, including those centered on environmental, social, and governance (ESG) issues, both in short-term and long-term compensation.

Short-term compensation

In 2022, performance goals were established in the following proportions, respectively: 65%–75% collective goals and 25%–35% individual goals, according to the scope of action.

We focused efforts on critical objectives related to safety, risk, and sustainability, as well as to EBITDA¹ indicators and strategic objectives that help the company achieve its ambitions.

¹ Earnings Before Interest, Taxes, Depreciation and Amortization

In the collective block, 30%–40% of our goals are linked to non-financial indicators and ESG topics, and 35% are linked to financial goals.

Since 2020, the areas of Health, Safety, Geotechnics, and Repair and Compliance (currently named Audit and Compliance) have not had financial and production results on their goals dashboard, highlighting the importance attached to Risk Management.

In 2023, we included goals related to capital allocation, safety events related to processes, indicators of Black people in leadership positions, and volume guidance, in addition to maintaining the cost indicator, among others.

Long-term compensation

The long-term compensation plans offered by Vale include the Value Shares Plan (VSP) and the Matching Program.

Since 2022, ESG-related indicators have been included in the VSP, currently accounting for 25% of the weight.

In 2021, the VSP began compensating its executives through common shares of the company, replacing cash remuneration linked to the share price. Additionally, the program incorporated the payment of “virtual dividends” at the end of each cycle.

In 2023, the VSP eliminated the trigger linked to the Total Shareholder Return (TSR) indicator, further focusing attention on ESG-related key performance indicators. Furthermore, it was decided to incorporate

the ROIC (Return on Invested Capital) metric into the VSP in 2024. With a 25% participation, this has been established as an internal value creation goal. This change envisages greater alignment with investors and Vale’s strategic objectives.

The Matching Program remains a retention initiative, operating as a partial deferral of the bonus through the allocation of Vale’s issued shares. By purchasing company shares with their own funds, executives become eligible to receive bonuses in shares at the end of a three-year cycle.

The Matching Program also includes the payment of “virtual dividends,” which are paid by the company immediately after the distribution of dividends and/or Interest on Equity (JCP) by Vale to shareholders.

Risk management

GRI 2-16

Our risk management is based on our [Risk Management Policy](#), which establishes methodologies, guidelines, response strategies, governance, and responsibilities for dealing with present and emerging risks identified by the company.

We adopt the Lines of Defense model, referencing global standards for risk management such as ISO 31000, ISO 55000, COSO-ERM, and, for

operational safety, the Risk-Based Process Safety (RBPS) framework.

One of our main tools is the Integrated Risk Map, which is a non-exhaustive instrument containing a set of potential risk topics, thus encompassing the risks that need to be assessed and monitored in all our units.

In 2023, we implemented the concept of tolerance for the company’s key risk indicators; that is, we established acceptable ranges of variation for each of the risk indicators, focusing primarily on the company’s priority risk topics. These ranges were defined based on our strategy and the company’s risk appetite.

Additionally, in continuation of the review and approval of the risk management policy and standard, completed in 2022, we updated our training and internal documentation detailing the procedures for the application of this standard. At Vale, those responsible for monitoring risks are required to undergo risk management training provided by the company.

Risk framework and management

Risk factors

Our business, operations, and performance are subject to various risks and uncertainties that may impact the achievement of our objectives, reputation, financial situation, and operational results.

The main risks identified by the company include:

- Geotechnical structures, such as mines and dams
- Operations, including Health, safety, and the environment
- Production planning (including licenses)
- Talent management
- Strategy
- Sustainability (including climate change)
- Cybersecurity
- Finance
- Institutional Relations and Communication (including changes in laws and regulations)
- Compliance

Learn more in our [20-F Form](#).

Risk governance

Vale has an integrated risk management governance model based on the Lines of Defense approach, which helps to optimize communications to inform decision-making and enhance alignment across strategy, performance, and risk management.

Additionally, we have the following risk management advisory committees:

Audit and Risk Committee: an advisory body to the Board of Directors responsible for supervising the scope of action and effectiveness of risk management.

Executive Risk Committees: created to advise the Executive Committee; they act preventively and support in monitoring risks and necessary resolutions.

There are five Executive Risk Committees, each with a distinct scope of action: the Operational Risk Committee, the Geotechnical Risk Committee, the Strategic, Financial, and Cyber Risk Committee, the Compliance, Institutional Relations and Communication Risk Committee, and the Sustainability Risk Committee.

GRI 2-12

Operational risk management program

The Hazard Identification and Risk Assessment (HIRA) program was created with the goal of mapping and assessing operational safety risks of high-consequence or high-hazard safety risks, identifying and defining key performance indicators, and establishing appropriate controls and mitigation plans.

The first implementation cycle of HIRA achieved a global assessment of 100% of all mines, processing plants, railroads, and ports between 2019 and 2021, and 100% of tailings dams in 2022. A second cycle began in 2022, which will address scenarios covered in the first cycle and add business interruption scenarios to the analysis. This process is part of Element #4 of our Management System (VPS) and will be continuously executed in cycles of three to five years.

We aim to reduce operational risk by implementing new controls, enhancing existing controls, and monitoring their effectiveness. The results of the HIRA program include the installation of interlocking for level control in diesel storage tanks at the Serra Sul Explosive Emulsion Plant to prevent overflow and consequent environmental contamination and damage to people and facilities. Our response plans include high-risk scenarios and identify the resources needed to mitigate the impacts.

1 Risk Perception and Management aims to support Vale’s business in such a way that risks are properly monitored, resulting in effective management, so that threats are timely identified and properly managed. The normative documents and guidelines that support the implementation of the Element are supported by the best national and international practices, such as ISO 31000, ISO 55000, COSO-ERM (Enterprise Risk Management) and ICMM (International Council on Mining & Metals).

We aim to have a clear view of the main risks we are exposed to, cost-benefit relationships in mitigation plans, and controls implemented to closely monitor the impact of operational risks and efficiently allocate capital to reduce them.

We monitor and manage operational safety events. P events are those that generate an unplanned or uncontrolled release of energy or hazardous material involving operating equipment or assets, which can impact the environment, people, the community, and the company's assets. P1 events have greater consequences than P2 events. The classification of operational safety events is based on the Standard that establishes how Operational Health, Safety, Environment, Community, and Operational Events Management should be conducted. As shown in the graph below, there was a reduction in the number of operational process safety events (P1+P2) in 2023.

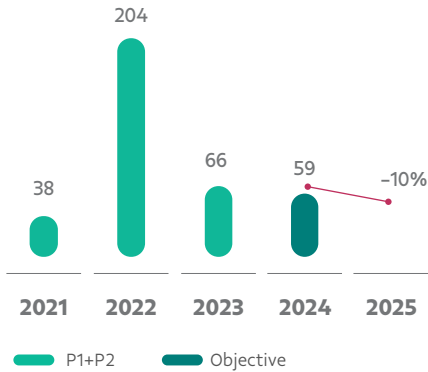
The reduction in operational process safety events can be attributed to:

Evolution of the assessment of the most significant risks (HIRA) and implementing actions to reduce or eliminate risks;

Improvement of the management and maintenance of critical control integrity;

Enhancement of the understanding of the concept of P-events contributing to preventive action;

Vale's P1+P2 events¹



¹ P1+P2 event data does not include Vale Base Metals.

Progress in the deployment and dissemination of concepts, and in the use of auxiliary tools such as the Pre-Startup Safety Review (PSSR);

Difference in rainfall between 2022 and 2023, which significantly contributed to the reduction of events associated with geotechnical assets (e.g., slope collapses).

In 2024, among other actions, we aim to conduct an educational communication campaign to raise awareness among our employees about the importance of recording operational process safety events.

Emerging risks

Emerging risks are typically influenced by external factors and are therefore difficult to predict as there is a high

degree of uncertainty regarding their development, severity, and probability of occurrence.

In 2023, we updated our prioritized list of potential emerging risks. This process involved a multidisciplinary team participating in various discussion forums, drawing from different sources of information such as market research, benchmarking, and specialized reports. We also implemented risk indicators for each of the emerging risks, aiming to contribute to their monitoring.

Examples of emerging risks for Vale's business include:

Risk of transition to a low-carbon economy

- Product substitution due to new technologies and processes
- Regulatory changes (including carbon pricing)
- Climate-related litigation and reputational impacts

Geopolitical tensions and economic sanctions

- Restrictions on product marketing as a result of international sanctions and/or geopolitical tensions

Learn more about in our [ESG page](#).

Ethics and Compliance

GRI 205-1 | 205-2

The Vale Ethics & Compliance Program is structured with a goal of instilling a culture of ethics and integrity via seven pillars aimed at preventing, detecting, and correcting misconduct. These pillars are: (1) Governance, (2) Guidelines, (3) Communication and Training, (4) Risk Analysis, (5) Monitoring and Control, (6) Whistleblowing Channel, and (7) Consequence Management.

Vale's Audit and Compliance department provides oversight of the Ethics & Compliance Program. Reporting directly to the Board of Directors, and with further oversight from the Audit and Risk Committee, this board works in close collaboration with the Conduct and Integrity Committee. This structure, reflected in the Governance pillar of the Ethics & Compliance Program, ensures the necessary autonomy and independence.

The Program's main document is the [Code of Conduct](#), which is approved by the Board. Starting in 2023, the frequency of the renewal of employee commitment to ethics became annual. Additionally, Vale works with suppliers committed to operating their businesses responsibly and ethically, following the Principles of Conduct for Third Parties.

For more information, see [Responsible Sourcing](#).

The Code of Conduct translates Vale's values into ethical principles that should put into practice in everyday decisions, both small and large. In 2023, the Ethics & Compliance Program included customized training to address ethics and compliance issues. An example of this was an online course in which

employees could simulate real-life situations to estimate the outcomes, practicing ethics in a practical manner.

Available in eight languages, the course included video material filmed in the first person, allowing for an immersive experience and interaction with the content. Over 63,000 people participated in the course.

With a specific focus on preventing cases of corruption involving public officials, training sessions were also held for this group, exploring real cases that demonstrate the importance of ethical behavior. Once engaged and trained on Vale's anti-corruption rules, employees know how and when to request a Risk Analysis from the Ethics & Compliance Program. Regional Corporate Integrity teams conduct customized analyses and provide information to guide and support business decision-making.

A risk assessment consisting of a methodology for continuously assessing the risk of corruption among public officials was developed. This assessment takes into account business aspects, the external environment, and the history of adherence to the Ethics & Compliance Program. This work generated an Exposure Map of Processes Sensitive to the Risk of Corruption, for each country in which we operate, which allows us to carry out customized communication, training, and monitoring actions.

Based on data from the Internal Audit, Corporate Integrity, and Whistleblowing Channel areas—all of which are part of the Audit and Compliance Board—an internal influence agenda was developed to enable operational leadership to better understand the improvement opportunities identified in each location, thus enabling preventive action to be taken.

In 2023, the number of reports received through our Whistleblowing Channel. This increase can be attributed to the increased communication to employees about the culture of respect and actions to be taken in the event of misconduct. We received 8,633 reports and closed 8,834 records, including reports received before the beginning of 2023. This number of reports received represents an increase of about 28% compared to 2022. In 2023, 64% of the reports investigated and confirmed by the Whistleblowing Channel were related to interpersonal relationships; this category includes reports of inappropriate behavior, improper management, moral harassment, sexual harassment, and discrimination.

Vale’s Whistleblowing Channel

GRI 2-16 | 2-25 | 2-26 | 406-1

Our Whistleblowing Channel provides a dedicated platform for individuals, both within and outside the organization, to report any suspected or confirmed violations of our Code of Conduct. Reports are handled by an independent firm and submitted for investigation by an internal team. All information is handled confidentially to prevent any intimidation or retaliation against the whistleblower.

Where a reported instance of misconduct is confirmed, our response aims to be equitable, transparent, and compliant with our Consequence Management

Policy. All violations confirmed by the Whistleblowing Channel in 2023 triggered correction plans. A total of 3,726 corrective actions and disciplinary measures were established, including 242 terminations. In addition to termination actions, measures such as contractor demobilization, feedback, warnings, suspensions, process reviews, and other actions were taken.

In February 2023, the Respect Channel for Basic Metals was launched in Canada. Through a personalized service, the channel was created to make employees and contractors feel more comfortable reporting sensitive information related to situations of sexual harassment, moral harassment, or discrimination, thus contributing to the effectiveness of the investigation process. This personalized assistance has been available in Brazil since April 2022 through the Welcome Channel, which focuses on situations of sexual harassment and discrimination.

To learn more about the actions of Vale’s Ethics & Compliance Program, see the [Annual Ethics & Compliance Report](#).

Compliance with laws and regulations

GRI 2-27

In 2023, Vale received 14 fines and 29 non-monetary sanctions related to significant cases¹ of non-compliance with laws and regulations. During the same year, the company paid 127 fines related to non-compliance with laws and regulations, totaling USD 22.572.961,70, as detailed in the following tables and in the [ESG Databook](#).



Fines and non-monetary sanctions received in 2023 related to significant cases¹

Region	Environment		Society		Mining regulations		Labor		Other ¹	
	Non-monetary sanctions	Fines	Non-monetary sanctions	Fines	Non-monetary sanctions	Fines	Non-monetary sanctions	Fines	Non-monetary sanctions	Fines
South America	0	12	1 ²	1	28	0	0	0	0	1
North America	0	0	0	0	0	0	0	1	0	0
Europe	0	0	0	0	0	0	0	0	0	0
Asia	0	0	0	0	0	0	0	0	0	0

Region	Fines paid in 2023					Total monetary value of fines paid in 2023 (USD)				
	Environment	Society	Mining regulations	Labor	Other	Environment	Society	Mining regulations	Labor	Other
South America	9	2 ³	10	76	29	2,747,523.43	17,284,702.84 ²	8,762.32	2,313,911.8	55,907.63
North America	0	0	0	1	0	0	0	0	162.153,68	0
Europe	0	0	0	0	0	0	0	0	0	0
Asia	0	0	0	0	0	0	0	0	0	0

1 For information about the definition of the term “significant” and other legal topics covered by the report, which are included in the “Other” column of the above tables, please refer to the “Glossary – Preparation Basis” tab of the Databook.

2 This refers to a sanction resulting from an administrative liability process—“PAR”—initiated by the Brazilian Federal Audit Court (CGU), which, through a decision published in August 2022, concluded that Vale S.A. failed to provide reliable information in the system of the National Mining Agency (ANM) regarding Dam I in Brumadinho, in the State of Minas Gerais and issued a positive Stability Condition Declaration for this structure for the period from June to September 2018—when, in the view of the aforementioned agency, it should have been negative. The sanction applied was based on Law 12.846/13, although the CGU acknowledged the absence of acts of corruption and the lack of involvement or tolerance by the company’s senior management in the events investigated in the PAR. However, considering that the circumstances investigated constituted a harmful act against the Public Administration by hindering the supervision of the mining regulatory agency, a fine in the amount of BRL 86.2 million was imposed. A writ of mandamus filed by Vale S.A. before the Superior Court of Justice against the administrative decision handed down by the CGU is currently pending, as the company disagrees with the fine imposed and considers Law No. 12,846/2013 to be inapplicable to the case.

3 One of the fines paid in 2023 reported in the “Society” topic refers to the case described in footnote number 2, in the table above.

Economic Performance

In 2023, our adjusted EBITDA¹ from continuing operations was USD 18.0 billion, 9% lower than the USD 19.8 billion of the previous year, mainly due to lower average reference prices for iron ore, copper and nickel during the year.

Our investments followed the upward trend, reaching USD 5.9 billion, 8.7% higher than in 2022. Most of these were directed towards the Iron Ore Solutions projects, especially Capanema and Estrada de Ferro Carajás, and towards improving our Transition Metals mine operations.

Gross and expanded net debt in 2023 were USD 13.9 billion and USD 16.2 billion, respectively. The increase compared to 2022 was mainly due to the increase in the provision of USD 1.2 billion related to the Renova Foundation and a potential global agreement. Our expanded net debt target continues to be USD 10–20 billion.

Value distribution

In line with our commitment to returning value to shareholders, we distributed a total of USD 6.1 billion in dividends and interest on equity in 2023.

In 2023, we continued with our share buyback program, with the purchase of approximately 185 thousand shares worth USD 2.7 billion.

Production and sales at a glance

In 2023, iron ore production reached 321.2 million metric tons, exceeding our guidance of 315 million metric tons, and exceeding the 2022 production by 4.3% than the previous year. This year-on-year increase was the result of ongoing initiatives to improve asset reliability in S11D, solid performance in the Itabira and Vargem Grande complexes, and increased third-party purchases.

We continued to advance pellet production, with a total production of 36.5 million metric tons, supported by increased pellet feed production in Brucutu. In Q4, we commenced operations at the first iron ore briquette plant in Tubarão (ES) (a significant step in Vale's strategy to support decarbonization in the steel industry by increasing the supply of iron ore agglomerates).

The EBITDA of the Iron Ore Solutions business was USD 18.1 billion, with costs (excluding depreciation and amortisation) of USD 15.5 billion. The 6.8% decrease compared to 2022 is mainly explained by the higher cash cost C1 of iron ore fines.

In energy transition metals, EBITDA was 1.95 billion with costs of 1.4 billion. Copper production increased 29% year-on-year, totaling 326.6 kt, slightly above our revised guidance of 325 thousand metric tons, for 2023. The improved performance was

mainly due to the successful ramp-up of Salobo 3 and the improved performance at Sossego. Nickel production decreased by 8% in 2023, totaling 164.9 thousand metric tons, in line with guidance. The production decrease was expected due to the transition to underground mining at Voisey's Bay and the planned refurbishment of the Onça Puma furnace.

Capital allocation

Steps forward in 2023 included the carve-out of Vale Base Metals (VBM), in a process that provides more autonomy for the company's strategic positioning to advance in important nickel and copper growth projects for the energy transition.

In July, we signed two binding investment agreements with Manara Minerals and Engine No. 1, valued collectively at USD 3.4 billion, corresponding to a total stake of 13% in VBM. This strategic partnership aims to accelerate VBM's investment program and contribute to a significant increase in production from 350 thousand metric tons per year to 900 thousand metric tons per year for copper, and from 175 thousand metric tons per year to over 300 thousand metric tons per year for nickel. The initiative aims to also bring benefits such as job creation, economic growth, opportunities for suppliers, and socioeconomic development in the communities located in the vicinity of Vale's operations in Brazil, Canada, and Indonesia.

Additionally, in November, as part of the obligations related to the extension of our mining license in Indonesia, Vale Canada

Limited (VCL) signed an agreement to reduce the investment in PT Vale Indonesia Tbk (PTVI) from 44.3% to 33.9% of issued shares. The transaction is expected to be completed in 2024 and is subject to customary closing conditions.

Vale's main divestment program was also completed in 2023, with the sale of its interest in Companhia Siderúrgica do Pecém (CSP) in March and the sale of its stake in Mineração Rio do Norte S.A. in November. This reduced the Company's exposure to business risks.

Focusing and strengthening the core

2023 in review

Gaining momentum on Iron Ore Solutions

Several agreements signed with clients and partners, focused on developing solutions for carbon emission reduction and delivering high-quality products. These include agreements to supply high-quality agglomerates, joint studies for implementing green hubs and Mega Hubs, and establishing co-located briquetting plants.

Building a unique Energy Transition Metals vehicle

Vale Base Metals Limited ("VBM") creation, the holding entity of Vale's Energy Transition Metals business. VBM has a separate corporate structure, with a dedicated Board of Directors.

Two binding agreements were signed in July, one with Manara Minerals and the

other with Engine No. 1, under which the companies will separately invest in VBM. The total consideration to be paid to VBM is USD 3.4 billion (subject to usual transaction adjustments on closing), for a 13% equity interest, implying a USD 26 billion enterprise value.

Heads of Agreement signed, regarding the divestment obligation of PT Vale Indonesia Tbk ("PTVI"), a significant step towards a mutually beneficial outcome that meets Indonesian divestment obligations and clears the way for renewal of PTVI's mining license beyond 2025.

Advancing our project pipeline

The first iron ore briquette plant started up in November at the Tubarão complex. The second plant is scheduled to start up in 1Q24.

The Torto dam operations at the Brucutu site started up in July, enabling higher pellet feed availability and an improved product mix.

The first throughput test at the Salobo complex was successfully completed in November. The three plants' combined throughput capacity now exceeds 32 Mtpa, progressing towards reaching 36-Mtpa in 4Q24. The achieved production levels allowed the receipt of an additional USD 370 million related to the streaming agreement.

PTVI and the Chinese company Zhejiang Huayou Cobalt Co. signed a definitive agreement with the global automaker Ford Motor Co. for the development of the Pomalaa project in Indonesia.

¹ Earnings Before Interest, Taxes, Depreciation and Amortization.

Promoting sustainable mining

The B3/B4 dam had over 90% of its tailings removed, being reclassified to a level 1 protocol, and its decharacterization was brought forward to 2024.

Conformance with the Global Industry Standard on Tailings Management (GISTM) achieved for all prioritized tailings facilities, within the industry’s timeframe.

Sol do Cerrado solar energy complex reached its full capacity of 766 Megawatts.

Vale Base Metals and BluestOne signed a long-term agreement in October, aimed at waste reuse of 50 ktpy of slag from the Onça Puma site, promoting circular mining.

The creation of Agera, a company focused on developing and expanding our sustainable sand business. Agera will market and distribute the sand produced by processing tailings from Vale’s iron ore operations in Minas Gerais, Brazil.

Reparation

The Brumadinho Integral Reparation Agreement continues to progress with 68% of the agreed-upon commitments completed and in accordance with the settlement deadlines.

In the Mariana reparation, the Renova Foundation accelerated the restitution of housing rights by delivering 575 housing solutions out of a total of 675 forecast.

Value Generated and Distributed (in USD millions)

GRI 201-1

	North America (except Canada)	Canada	South America (except Brazil)	Brazil	Europe	Middle East	Asia	Oceania	TOTAL
Revenues	–	2,099.4	–	3,870.8	32,578.8	0.00	3,235.4	–	41,784.4
Direct Economic Value Generated	–	2,099.4	–	3,870.8	32,578.8	–	3,235.4	–	41,784.4
Operational costs	–	2,718.6	0.1	12,063.8	4,791.4	272.8	1,311.5	–	21,158.2
Employee salaries and benefits	–	657.7	–	2,426.8	36.2	49.6	150.6	–	3,320.9
Research and Development	–	167.1	16.6	416.1	6.7	–	112.0	3.9	722.5
Payments to capital providers	385.3	23.3	–	5,713.8	133.6	–	–	–	6,256.0
Payments to government	6.68	(255)	2.17	5,123.0	(19)	15.47	141.3	0.83	5,015.5
Environmental Expenditures	–	93.76	0.90	800.65	0.04	1.75	16.8	–	913.9
Social Expenditures	0.10	3.46	0.14	660.68	–	1.69	11.2	–	677.3
Distributed Economic Value	392.1	3,409.3	19.9	27,204.9	4,948.5	341.3	1,743.4	4.8	38,064.3
Accumulated Economic Value	(392.10)	(1,309.99)	(19.93)	(23,334.16)	27,630.3	(341.32)	1,492.0	(4.77)	3,720.1

Balance Sheet (in USD million)

Current assets	18,700
Non-current assets	13,587
Fixed assets	61,899
Total assets	94,186
Current liabilities	14,655
Non-current liabilities	38,550
Total liabilities	53,205
Shareholders' equity	40,981
Total liabilities and shareholders' equity	94,186

1 The amount includes spending on Incentive Laws and the Pará Structure Program.

Equity income (loss) by business segment (in USD millions)

	2022	2023
Iron Solutions	213	101
Energy Transition Materials	3	–
Others	30	43
Total	246	144

Socioenvironmental expenditure GRI 203-1

In 2023, Vale invested around USD 1.6 billion in socioenvironmental and institutional expenditures, including those related to Brumadinho. USD 677.3 million was dedicated to social and institutional initiatives, of

which approximately 81% are the company’s own resources and 19% are investments from incentivized resources¹. The main spending was on infrastructure and mobility, traditional communities and Indigenous Peoples, social assistance and protection, and culture. The remaining USD 913.9 million was dedicated to environmental initiatives, considering Vale’s internal and external expenditures, with the main expenses being environmental liabilities, water resources, atmospheric emissions, and environmental conservation and protection.

Taxes

Taxes form the fabric of the relationship between companies and society. The taxes we collect contribute to the growth of local,

national, and global economies, and we treat our tax obligations seriously.

As a company with a global presence, we are subject to numerous tax obligations as prescribed by law. We therefore strive to meet compliance requirements at the local, regional, and global levels through consistent and efficient processes. We are subject to internal audits that examine our compliance with tax declaration and compliance procedures.

For more information, please see [Vale’s Tax Transparency Report](#).



Membership of trade associations

GRI 2-28

Indexes and ratings

	2019	2023
Sustainalytics	54.5	31.2 ¹
ISS Governance	10	1
MSCI	CCC	B
DJSI	45	51
MOODY'S	NA	CIS -2 / Neutral to Low

¹ Result updated in April/24, showing a better result compared to the result of 34.0 in Dec/23 (the lower the score, the better).

Main organizations and associations of which we are members:

- ABEC BRASIL (Brazilian Association of Science Publishers), via ITV
- Brazilian Association of Science (ABC)
- Ação da Cidadania
- Alliance for Amazon Restoration, via the Vale Fund and RNV
- Aspen Network of Development Entrepreneurs (ANDE), via the Vale Fund
- Brazilian Association of Listed Companies (ABRASCA)
- Brazilian Association of Metallurgy, Materials and Mining (ABM)
- Brazilian Association of Port Terminals (ABTP)
- Rio de Janeiro Commercial Association (ACRJ)
- Central Japan-Brazilian Association in Japan (ACNB)
- Brazilian Foreign Trade Association (AEB)
- Brazilian Association of Port Terminals (ATP)
- National Association of Railroad Transport (ANTF)
- Brazil-Canada Chamber of Commerce
- Business at OECD (BIAC)
- Business For Social Responsibility (BSR)

- American Chamber of Commerce for Brazil (AMCHAM RJ)
- Brazilian Chamber of Commerce in Japan (CCBJ)
- France-Brazil Chamber of Commerce
- Centre National de Recherche Technologique Nickel et Son Environnement (CNRT Nickel)
- Brazilian Center for International Relations (CEBRI)
- Reference Centre for Integral Education, via the Vale Foundation
- Childhood Brasil
- Brazil Climate, Forest and Agricultural Coalition, via the Vale Foundation
- Columbia Center on Sustainable Investment (CCSI)
- National Industry Confederation (CNI)
- Brazilian Council of Corporate Volunteering
- Brazil-China Business Council (CEBC)
- Brazilian Business Council for Sustainable Development (CEBDS)
- Brazil-Japan Business Council (CEBRAJ)
- BRICS Business Council (CEBRICS)
- European Association of Metals (Eurometaux)
- Extractive Industries Transparency Initiative (EITI)
- Espírito Santo Industry Federation (FINDES)
- Minas Gerais State Industry Federation (FIEMG)
- Rio de Janeiro State Industry Federation (FIRJAN)
- National Forum of Associate Deans for Research and Graduate Education (FOPROP), via ITV
- Fundação Centro de Estudos do Comércio Exterior (Funcex)
- Global Business Initiative on Human Rights (GBI)
- Brazilian Group of Institutes, Foundations and Companies (GIFE)
- National Pact for the Eradication of Slave Labor (InPacto)
- Instituto Acende Brasil
- Brazilian Mining Institute (IBRAM)
- International Council of Museums Brazil (ICOM)
- International Council on Mining & Metals (ICMM)
- Latimacto – Latin American Venture Philanthropy Network, via the Vale Fund
- Mining Hub
- National Pact for Early Childhood, via the Vale Foundation
- Racial Equity Pact
- Partnership Platform for the Amazon (PPA), via the Vale Fund
- Forest People’s Network, via the Vale Fund
- National Education and Research Network (RNP), via ITV
- UNICEF in the Brazilian Amazon Mark, via the Vale Foundation
- Sustainable Development Solutions Network (SDSN)
- Task Force on Climate-related Financial Disclosures (TCFD)
- Taskforce on Nature-related Financial Disclosures (TNFD)
- The Cobalt Development Institute
- The Indonesian Mining Association (IMA)
- The Mining Association of Canada (MAC)
- The Nickel Institute
- Todos pela Educação, via the Vale Foundation
- Voluntary Principles on Security and Human Rights
- Wise Group
- Women in Mining Brasil
- Women in Mining and Resources Singapore (WIMAR SG)
- World Business Council for Sustainable Development (WBCSD)
- World Economic Forum (WEF)

About This Report: Methodology and Frameworks

The 2023 Vale Integrated Report covers the period from January 1 to December 31, 2023. The information in this report is inclusive of all businesses over which Vale has operational control, as listed in our Form 20-F, excluding any operations that have since been sold.

GRI 2-2 | 2-3

Throughout this report, we present disclosures for, describe our management approach to, and report on our performance against a set of environmental, social, and governance topics as listed in our materiality matrix (see more in Materiality). The information in this report has been prepared in accordance with the GRI Standards. The report also includes disclosures outlined in the International Integrated Reporting Framework, now consolidated under the International Sustainability Standards Board (ISSB), the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, the Sustainability Accounting Standards Board (SASB) Standards, and the International Financial Reporting Standards (IFRS). Vale is currently transitioning to reporting in accordance with these standards, and this will be reflected in the current and future editions of our report.

We also report on our adoption of the [Mining Principles of the International Council of Mining and Metals \(ICMM\)](#), including [ICMM Performance Expectations](#); the [World](#)

[Economic Forum \(WEF\) key metrics](#); and the [United Nations \(UN\) Sustainable Development Goals \(SDGs\)](#).

Vale has implemented the ICMM Mining Principles as a Condition of Membership. We endorse and support the ICMM's efforts at the international level to enhance the transparency of mineral revenues, including through the Extractive Industries Transparency Initiative (EITI). Vale engages constructively in appropriate forums to improve the transparency of mineral revenues.

Regarding the conversion adopted for the dollar values published in this report: the values converted from real to US dollar consider the average annual currency rate of BRL 4.995 to USD 1.00, except for the values of financial disclosures, and environmental and social expenditures, that monthly exchange rates were used.

More information about our results is available at:

- [20-F, Management Report, Fiscal Transparency, Reference Form and Financial Statements](#)
- [Governance Report](#)
- [ESG Portal](#)
- [Reparation Balance](#)
- [Other editions of Vale's sustainability reports](#)

Subsequent event

March 2024, a court in the Netherlands granted a preliminary injunction freezing our shares in Vale Holdings B.V., our wholly-owned subsidiary incorporated in the Netherlands, in guarantee of an amount of approximately EUR 920 million. The freezing orders were issued in

anticipation of a potential legal action to be brought against us by individuals and entities that claim to have been affected by the collapse of Samarco's Fundão dam in 2015. We will review the terms of this action and will present our defense, including challenges to the jurisdiction of the Dutch courts.



Photo: Anderson Souza

¹ Exceptions to reporting limits are presented in the RI Preparation Base in the ESG Databook.

Note: This document may include statements about Vale's current expectations about future events or results. All estimates and projections involve various risks and uncertainties. Vale cannot guarantee that such statements will prove to be correct. These risks and uncertainties include, among others, factors related to: (a) countries where Vale operates, especially Brazil and Canada; (b) the global economy; (c) the capital market; (d) the price of ores and metals and their dependence on global industrial production, which is cyclical in nature; (e) the high degree of global competition in the markets where Vale operates; (f) mining and tailings storage operations; and (g) the estimation of mineral resources and reserves, the exploration of mineral reserves and the resources and the development of mining facilities, our ability to obtain or renew new licenses, the depletion and depletion of mines and mineral reserves and resources. For additional information on factors that may cause results to differ from those estimated by Vale, please consult the reports filed by Vale with the U.S. Securities and Exchange Commission (SEC), the Securities and Exchange Commission (CVM) and, in particular, the factors discussed in sections "Estimates and Projections" and "Risk Factors" in Vale's Annual Report – Form 20-F.

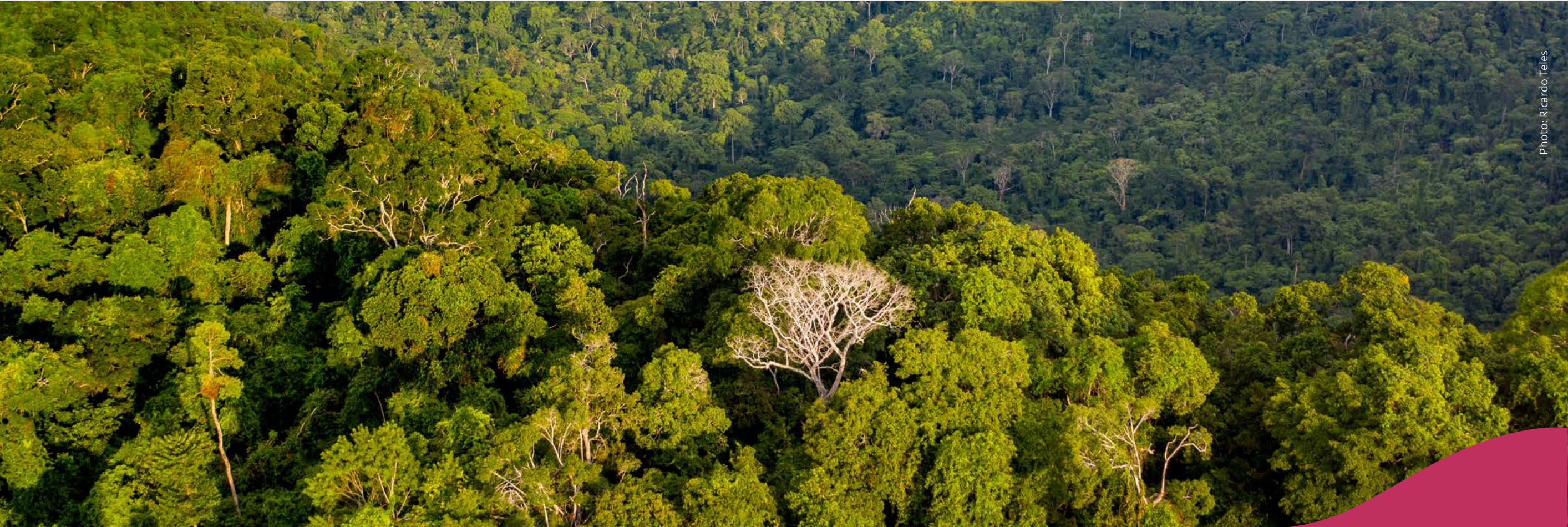


Photo: Ricardo Teles

4 External readers

External readers

I was quite surprised when I was invited to be a Peer Reviewer for Vale's 2023 Integrated Report. I was inclined to turn down the offer at first, because, as a climate activist deeply engaged in grassroots struggles, I'm fully aware of the impacts Vale has on vulnerable populations and the world. However, I talked to a close friend who said to me: Amanda, you've always said you want to be a bridge between civil society, governments and corporations. Isn't this a once-in-a-lifetime opportunity? This question prompted me to reflect deeply, leading me to discuss the matter with friends, mentors and fellow activists. After much thought, I decided to accept the invitation and emphasize the importance of dialog.

My heart raced when I started reading the document, as I remembered an incident from the previous December at COP 28 in Dubai, the United Nations Climate Change Conference. We were in the midst of a panel on "Brazil's National Energy Transition Policy from multiple perspectives: public sector, private sector and civil society" when an Indigenous leader and a dam breach activist suddenly interrupted the proceedings to protest.

"You talk about the energy transition, you talk about preserving the Planet, but it is you who are putting lives in jeopardy, it is you who are threatening our lands," the Indigenous leader exclaimed.

Despite Vale's meaningful progress toward sustainable mining and the promotion of low-carbon solutions, we must NEVER forget the tragedies in Brumadinho and Mariana and the impacts of intensive mining activities. The Integrated Report solemnly acknowledges these events and discusses various mitigating and compensatory initiatives to reduce damages, although much more remains to be done.

To become a global benchmark in practices that minimize adverse impacts and enhance positive outcomes for nature and people, Vale must improve its engagement with civil society, especially with those affected by dam breaches and directly impacted by its activities. The document presents a consistent plan for managing risks and impacts, monitoring the water quality of the Rio Doce river, providing compensation, financial aid, and reconstruction plans and infrastructure, but this needs to be done in partnership with representatives of the most affected groups, moving beyond listening to narratives and towards concrete collaborative actions.

"I'm saddened because I really want Vale to come into my territory, listen, and see my reality. I'm here, willing to talk on equal terms, without intermediaries (...). Billions are invested, but little or no change happens on the ground. Where are the promised roads and basic sanitation? The communication channels are open, but are they really hearing us? " (Testimony from a resident affected by the dam breach)

After the Indigenous leader's speech at COP, a fellow activist from Espírito Santo state, living in a territory affected by the sediments from the Mariana dam breach, expressed her indignation:

"For 8 years now, we've been saying that our children are dying from eating contaminated food, because the soil and our fish are contaminated. And when we talk about compensation, we're not just talking about money. We're talking about our great Watu (Doce river), which is dying in agony. You talk about inclusive energy transition, but for whom, gentlemen? At what cost? On the bodies of our original brothers and sisters? On our black bodies?"

Dear Integrated Report reader, this letter might make you uneasy, but if we are trying to envision a sustainable world, truly implementing the United Nations Sustainable Development Goals and leaving no one behind, we must address sensitive issues and seek solutions that are beneficial and create shared value for EVERYONE.

I also therefore recognize the efforts Vale has made to leave a positive legacy Whether you're an activist, analyst, investor, entrepreneur or government official, I imagine that, like me, you are interested in building a sustainable world. An important highlight from the Report is the support for the Vale Technology Institute (ITV), a nonprofit institution dedicated to science, technology and research. It's crucial that Vale prioritize partnerships with research institutions and technical experts and offer scholarships to Indigenous People, quilombolas and traditional community members, to ramp up the production of technical expertise and the appreciation of traditional knowledge. Only by investing in green technology, increasing our climate ambitions and the decarbonizing processes and operations can we promote climate justice actions for the most vulnerable within this production chain.

As the perception research on the organization's sustainability performance shows, "Vale is very important for the economic development of the region," but it's imperative that the mining company invests in building an emancipatory economy for the workers in the cities where it operates, fostering an inclusive green economy, easing social inequalities and establishing multidisciplinary procedures that are environmentally responsible.

Dear Integrated Report reader, I wish to make a commitment with you. The transformation of society will not be confined to an idealistic vision of providing a brief platform for a climate and anti-racist activist to speak. Inspired by Bell Hooks, the author asserts that we must radically transform power relations and ways of life, which is impossible without

critiquing the various forms of oppression Writing this letter will be in vain if rampant exploitation, the myth of democracy, competition, profit at all costs, environmental degradation, the depletion of natural resources, systemic violence, and the force of hierarchical white and patriarchal power continues unabated.

I want to conclude this letter with the final words my activist friend said during her protest at COP to the Vale representative at the table: "If democracy symbolizes the people and power emanates from the people, we are the majority and we want change (...)!"

I hope this serves as a first step towards dialog and fosters joint construction. My acceptance of Vale's invitation stemmed from curiosity, self-reflection, and the possibility of environmentally responsible integration. I hope we can initiate new actions within the larger halls of power, thereby achieving truly inclusive, collaborative and sustainable solutions.

Thank you! <3

Amanda Costa,

Climate activist, young councillor for the UN Global Compact and executive director of the Sustainable Perifa Institute.

External readers

I am pleased to have the opportunity to review and provide comment on Vale's 2023 Integrated Report.

Overall, the Report is remarkably comprehensive, covering key economic figures as well as a properly broad range of environmental, social and governance factors. As integrated reports gain more traction on the part of global companies like Vale, this is a good example of how to cover a breadth of topics that should be of interest to stakeholders with diverse interests and priorities.

The Report also reflects a candid window into the company's thinking, actions and impacts. The letters from Chairman of the Board Daniel Stierer and CEO Eduardo Bartolomeo, in particular as they relate to the tragic mine collapses the companies has experienced in recent years and the culture change that has been instigated as a result is one important example of that candor. In a world more and more focused – and appropriately so – on misleading information, this candor is important.

The Report is designed not only to provide perspective about Vale's thinking, but crucially, its activities and impacts. There are several specific examples of subjects that, in my view, are particularly important. In no particular order, they include the commitment to double materiality, details about the very wide external engagement conducted by Vale on key subjects, conduct of several human rights due diligence assessments and supplier assessments, the ongoing "decharacterization" of mines presenting risks to the company and surrounding communities, application of the principles of the Task Force for Nature-Related Financial Disclosures (TNFD), increased activity to protect nature and biodiversity, and the section covering climate. The appointment of a lead independent director, as noted in the Chairman's letter, is also a positive step on governance.

In nearly every area, the Report shows good progress on areas of the greatest importance to Vale and all its stakeholders. It is especially good to see improvements in the area of health and safety, particularly given the large-scale challenges the company has experienced in recent years. The content of the Report related to the impact of climate risks on Vale's business is welcome.

There are two other areas that merit attention for being particularly interesting. First, the discussion of reparations shows an ongoing commitment to being transparent about the nature and scope of its efforts to respond to Brumadinho, for example, is a topic of central importance that seems to be progressing. Second, the strategic reasons why Vale has an important role to play in the energy transition by producing critical materials was good to see in the Report. It is also worth noting that that should have been earlier and more prominent in the discussion of climate, so that the context and importance of such actions could be made clearer.

In addition, there are three broad areas in which the Report could be strengthened: (1) provide additional context so that the meaning of the information that is contained in the Report is better understood: (2) fewer "testimonials" and a more diverse array of voices to provide a wider range of perspectives, and (3) connecting the dots between activities and impacts, so that the significance of the considerable array of activities presented in the Report is more evident.

More detail on these three areas follows.

Context: In several places, the impact of the information provided could be strengthened by inclusion of additional context. One example is the section on "decharacterization," where the debate over whether the pace of activity is fast enough to address important physical risks.

Acknowledging the fact that some would like to see this move more quickly, along with the company's perspective on why and how the pace is sufficient would provide a significantly greater sense of understanding for readers. With respect to water, it would also be helpful to understand how Vale's performance compares to industry benchmarks and peers. On governance of climate – and sustainability overall – more information of the composition and objectives of the Sustainability Committee would provide additional needed context. Finally, given that some important emissions have increased due to growth in production, an understanding of how Vale intends to balance such increases with the need for emissions reductions is an important question that merits more attention.

Activities and Impacts: Similarly, the sheer volume of information in the Report is substantial. In several places in the Report, however, the value of the information is diminished by the absence or insufficiency of the impacts of the actions being described. For example, it would be very helpful to understand how the human rights due diligence (HRDD) assessments led to changes in process, as well as improved protections for human rights in and around Vale's operations. Similarly, it is not clear how the considerable efforts on waste management have impacted performance in that area. In Just Transition, the broad objective is stated well, and additional information about how the company is addressing that crucial question would also strengthen the Report.

Testimonials: Several dozen testimonials are included in the Report. In some parts of the Report, too many were offered, such that they were duplicative. More importantly,

the value of such elements in the Report would be strengthened if more voices offering constructive challenge were also included. By reducing the number of such inputs, as well as diversifying the nature of the comments, the value of this element of the Report would increase.

Overall, I commend Vale for this Report, which offers all interested parties a window into its considerable activities to address its most material issues. I am confident that future Reports will be refined to deliver even greater insight and meaning for the company's employees, investors, communities and other important stakeholders.

Aron Cramer,

President and CEO, BSR



Photo: Felipe Borges

5 Assurance

Independent auditor's limited assurance report on the non-financial information included in the 2023 Integrated Report **GRI 2-5**

(A free translation of the original in Portuguese)

**To the Board of Directors and Stockholders
Vale S.A.
Rio de Janeiro – RJ**

Introduction

We have been engaged by Vale S.A. ("Company" or "Vale") to present our limited assurance report on the non-financial information included in the 2023 Integrated Report of Vale and certain selected information from the attachment Databook ESG (hereinafter collectively referred to as "2023 Integrated Report") for the year ended December 31, 2023.

Our limited assurance does not cover prior-period information, or any other information disclosed together with the 2023 Integrated Report, including any images, audio files or videos.

Responsibilities of Vale's management

The management of Vale is responsible for:

- selecting or establishing adequate criteria for the preparation and presentation of the information included in the 2023 Integrated Report;
- preparing the information in accordance with the GRI Standards and with the basis of preparation developed by the Company, and with Guidance CPC 09 – Integrated Reporting, issued by the Federal Accounting Council (CFC), equivalent to the Basic Conceptual Framework for Integrated Reporting, prepared by the International Integrated Reporting Council (IIRC);
- designing, implementing and maintaining internal controls over the significant information used in the preparation of the 2023 Integrated Report, which is free from material misstatement, whether due to fraud or error.

Our independence and quality control

We comply with the independence and other ethical requirements of the Federal Accounting Council (CFC) in NBCs PG 100 and 200 and NBC PA 291, which are based on the principles of integrity, objectivity and professional competence, and which also consider the confidentiality and behavior of professionals.

We apply the Brazilian and international quality control standards established in NBC PA 01, issued by the CFC, and thus maintain an appropriate quality control system that includes policies and procedures related to compliance with ethical requirements, professional standards, legal requirements and regulatory requirements.

Independent auditor's responsibility

Our responsibility is to express a conclusion on the non-financial information included in the 2023 Integrated Report and certain selected information from the attachment Databook ESG 2023, based on our limited assurance engagement carried out in accordance with the Technical Communication CTO 01, "Issuance of an Assurance Report related to Sustainability and Social Responsibility", issued by the Federal Accounting Council (CFC), based on the Brazilian standard NBC TO 3000, "Assurance Engagements Other than Audit and Review", also issued by the CFC, which is equivalent to the international standard ISAE 3000, "Assurance engagements other than audits or reviews of historical financial information", issued by the International Auditing and Assurance Standards Board (IAASB). Those standards require that we comply with ethical requirements, including independence requirements, and other responsibilities of these standards, including those regarding the application of the Brazilian Quality Control Standard (NBC PA 01) and, therefore, the maintenance of a comprehensive quality control system, including documented policies and procedures regarding the compliance with ethical requirements, professional standards and relevant legal and regulatory requirements.

Moreover, the aforementioned standards require that the work be planned and performed to obtain limited assurance that the non-financial information included in the 2023 Integrated Report, taken as a whole, is free from material misstatement.

A limited assurance engagement conducted in accordance with the Brazilian standard NBC TO 3000 and ISAE 3000 mainly consists of making inquiries of management and other professionals of Vale involved in the preparation of the information, as well as applying analytical procedures to obtain evidence that allows us to issue a limited assurance conclusion on the information, taken as a whole. A limited assurance engagement also requires the performance of additional procedures when the independent auditor becomes aware of matters that lead him to believe that the information disclosed in the 2023 Integrated Report taken as a whole might present material misstatements.

The procedures selected are based on our understanding of the aspects related to the compilation, materiality, and presentation of the information included in the 2023 Integrated Report, other circumstances of the engagement and our analysis of the activities and processes associated with the material information disclosed in the 2023 Integrated Report in which significant misstatements might exist. The procedures comprised:

- (a) planning the work, taking into consideration the materiality and the volume of quantitative and qualitative information and the operating and internal control systems that were used to prepare the information included in the 2023 Integrated Report;
- (b) understanding the calculation methodology and the procedures adopted for the compilation of indicators through inquiries of the managers responsible for the preparation of the information;
- (c) applying analytical procedures to quantitative information and making inquiries regarding the qualitative information and its correlation with the indicators disclosed in the 2023 Integrated Report; and
- (d) when non-financial data relate to financial indicators, comparing these indicators with the financial statements and/or accounting records.

The limited assurance engagement also included the analysis of the compliance with the GRI Standards, the principles for the Integrated Reporting, pursuant to Guidance CPC 09 – Integrated Reporting, and the criteria established in the basis of preparation developed by the Company.

Our procedures did not include assessing the adequacy of the design or operating effectiveness of the controls, testing the data on which the estimates are based or separately developing our own estimate to compare with Vale's estimate.

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our limited assurance conclusion.

Scope and limitations

The procedures applied in a limited assurance engagement vary in nature and timing, and are less detailed than those applied in a reasonable assurance engagement. Consequently, the level of assurance obtained in a limited assurance engagement is substantially lower than the level that would be obtained in a reasonable assurance engagement. If we had performed a reasonable assurance engagement, we might have identified other matters and possible misstatements in the information included in the 2023 Integrated Report. Therefore, we do not express an opinion on this information.

Non-financial data are subject to more inherent limitations than financial data, due to the nature and diversity of the methods used to determine, calculate and estimate these data. Qualitative interpretations of the relevance, materiality, and accuracy of the data are subject to individual assumptions and judgments. Furthermore, we did not consider in our engagement the data reported for prior periods, nor future projections and goals.

The preparation and presentation of non-financial information and indicators followed the definitions of the basis of preparation developed by the Company and the GRI Standards and, therefore, the information included in the 2023 Integrated Report does not aim to provide assurance with regard to the compliance with social, economic, environmental or engineering laws and regulations. However, the aforementioned standards establish the presentation and disclosure of possible cases of non-compliance with such regulations when sanctions or significant fines are applied. Our assurance report should be read and understood in this context, inherent to the criteria selected and previously mentioned in this paragraph.

The absence of a significant set of established practices on which to base the evaluation and measurement of non-financial information allows for different but acceptable evaluation and measurement techniques, which can affect comparability between entities and over time.

The contents included in the scope of this assurance engagement are presented in the Basis for Preparation of the 2023 Integrated Report.

Conclusion

Based on the procedures performed, described herein, and on the evidence obtained, no matter has come to our attention that causes us to believe that the non-financial information included in the 2023 Integrated Report of Vale has not been prepared, in all material respects, in accordance with the criteria established in the basis of preparation and with the GRI Standards and with the Guidance CPC 09 – Integrated Reporting.

São Paulo, April 12, 2024

PricewaterhouseCoopers

Auditores Independentes Ltda.
CRC 2SP000160/O-5

Maurício Colombari

Contador CRC 1SP195838/O-3

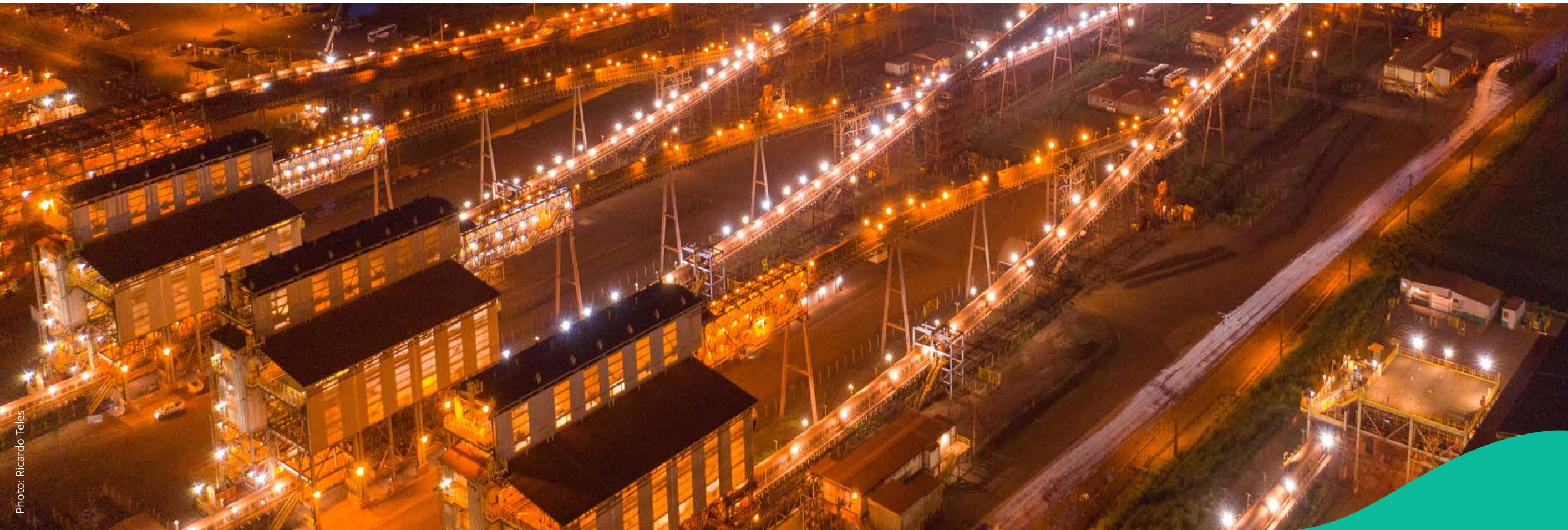


Photo: Ricardo Teles

6 GRI Content Index

GRI Content Index

Statement of use Vale has reported in accordance with the GRI Standards for the period from January 1 to December 31, 2023.

GRI1 used GRI1: Foundation 2021

GRI Standard	Disclosure	Page number(s) and/or URL and/or direct answers	Material / Non-Material	Omission		
				Requirement(s) omitted	Reason	Explanation
General Disclosures						
GRI 2: General Disclosures 2021	2-1 Organizational details	Pages 6 and 9.	Mandatory			
	2-2 Entities included in the organization’s sustainability reporting	Page 92. The financial statements can be checked at link . All entities controlled by Vale are covered in the Integrated Reporting.	Mandatory			
	2-3 Reporting period, frequency and contact point	Annual. Further information can be found on pages 5 and 92.	Mandatory			
	2-4 Restatements of information	Pages 32 and 37.	Mandatory			
	2-5 External assurance	Page 99. Vale’s external verification process is required by its membership of the International Council on Mining and Metals (ICMM) and the GRI Sustainability Reporting Standards.	Mandatory			
	2-6 Activities, value chain and other business relationships	Pages 9 and 45. Further information can be found in the 2023 Reference Form – section item 6. Issuer’s history / 6.3 – Brief history and 7.3 Production / sales / markets.	Mandatory			
	2-7 Employees	Page 23. More information can be found in the “Social Data” tab of the ESG Databook .	Mandatory			
	2-8 Workers who are not employees	Page 23. More information can be found in the “Social Data” tab of the ESG Databook .	Mandatory			
	2-9 Governance structure and composition	Pages 84 and 85. Further information can be found in Board of Directors’ Internal Regulations .	Mandatory			
	2-10 Nomination and selection of the highest governance body	Pages 84 and 85. Further information can be found in the Form 20F 2023 – section: Management and employees.	Mandatory			
	2-11 Chair of the highest governance body	Page 84. The CEO does not accumulate the position of Chairman of the Board of Directors.	Mandatory			



GRI Standard	Disclosure	Page number(s) and/or URL and/or direct answers	Material / Non-Material	Omission Requirement(s) omitted	Reason	Explanation
General Disclosures						
GRI 2: General Disclosures 2021	2-12 Role of the highest governance body in overseeing the management of impacts	Pages 14, 16, 84, 85 and 86. Further information can be found in 2023 General Meetings of Shareholders and Internal Regulations of the Sustainability Committee – Chapter V – Meetings .	Mandatory			
	2-13 Delegation of responsibility for managing impacts	Pages 84 and 85. Further information can be found in Board of Directors’ Internal Regulations .	Mandatory			
	2-14 Role of the highest governance body in sustainability reporting	Page 84. The CEO does not accumulate the position of Chairman of the Board of Directors.	Mandatory			
	2-15 Conflicts of interest	The absence of conflicts of interest is one of the ethical principles of the Code of Conduct . We repudiate and reject any action, influence or decision motivated by interests contrary to Vale’s standards. More information can be found in the Related Parties Transactions and Conflicts of Interest Policy .	Mandatory			
	2-16 Communication of critical concerns	Pages 39, 86 and 88. Further information can be found in the Form 20F 2023 and in the 2023 Reference Form , both on section: “Risk Factors”.	Mandatory			
	2-17 Collective knowledge of the highest governance body	Page 84. Further information can be found in 2023 General Meetings of Shareholders .	Mandatory			
	2-18 Evaluation of the performance of the highest governance body	Page 84. Additional information regarding the content is disclosed in the Company’s annual Reference Form and should be consulted in the chapter “Administrative Structure”, until the 2022 document and as of the 2023 document in the chapter “General Assembly and Management”.	Mandatory			
	2-19 Remuneration policies	Page 85. Further information can be found in the Company’s annual Reference Form under the chapters Management Compensation and Compensation Policy/Practice.	Mandatory			
	2-20 Process to determine remuneration	Page 85. Further information can be found in the Company’s annual Reference Form under the chapters Management Compensation and Compensation Policy/Practice.	Mandatory			



			Omission			
GRI Standard	Disclosure	Page number(s) and/or URL and/or direct answers	Material / Non-Material	Requirement(s) omitted	Reason	Explanation
General Disclosures						
GRI 2: General Disclosures 2021	2-21 Annual total compensation ratio	<p>The ratio between the highest individual compensation and the median individual compensation of Vale employees, for the fiscal year ending 2023, is 515 times, according to the accrual accounting view. Compared to 2022, there has been a reduction in the total annual compensation of the organization’s highest paid individual.</p> <p>More information on the methodology used for the calculation can be found in the Reference Form, in section “10.3. Employee remuneration policies and practices”</p>	Mandatory			
	2-22 Statement on sustainable development strategy	Pages 3, 4, 5, 11, 12 and 19.	Mandatory			
	2-23 Policy commitments	Pages 12 and 31. Further information can be found in the Form 20F 2023 , section: 4. Risk Factors.	Mandatory			
	2-24 Embedding policy commitments	Pages 12 and 26.	Mandatory			
	2-25 Processes to remediate negative impacts	Pages 14, 16, 39 and 88.	Mandatory			
	2-26 Mechanisms for seeking advice and raising concerns	Page 88.	Mandatory			
	2-27 Compliance with laws and regulations	Page 88.	Mandatory			
	2-28 Membership associations	Page 91.	Mandatory			
	2-29 Approach to stakeholder engagement	Page 14.	Mandatory			
	2-30 Collective bargaining agreements	Page 27.	Mandatory			
GRI 3: Material Topics 2021	3-1 Process to determine material topics	Page 16. Further information can be found at Vale’s ESG Portal .	Mandatory			
GRI 3: Material Topics 2021	3-2 List of material topics	Page 16. There have been no significant changes in the material topics since the last Integrated Report.	Mandatory			
Material topics						
Dams						
GRI 3: Material Topics 2021	3-3 Management of material topics	Page 47. Further information can be found at Vale’s ESG Portal .	Mandatory			
GRI G4 2013: Mining and Metals Sector Disclosures	MM3 Total amounts of overburden, rock, tailings, and sludges and their associated risks	Page 50. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
Biodiversity						
GRI 3: Material Topics 2021	3-3 Management of material topics	Pages 57 and 58. Further information can be found at Vale’s ESG Portal .	Mandatory			



Material topics

GRI 304: Biodiversity 2016	304–1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
	304–2 Significant impacts of activities, products and services on biodiversity	Pages 57 and 59. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
	304–3 Habitats protected or restored	Pages 57 and 60. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
	304–4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	Pages 57 and 59 More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
GRI G4 2013: Mining and Metals Sector Disclosures	MM1 Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated	Page 57. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
	MM2 The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place	Pages 57 and 59. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
Ecoefficiency						
GRI 3: Material Topics 2021	3–3 Management of material topics	Page 63. Further information can be found at Vale’s ESG Portal .	Mandatory			
GRI 303: Water and Effluents 2018	303–1 Interactions with water as a shared resource	Page 63. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
GRI 303: Water and Effluents 2018	303–2 Management of water discharge-related impacts	ESG Databook : “Environment Data” tab.	Material			
	303–3 Water withdrawal	Page 63 and 65. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
	303–4 Water discharge	Page 63 and 65. More information can be found in the “Environment Data” tab of the ESG Databook .	Material	303–4–d–iii	Unavailable/incomplete information	We follow the regulations in place, maintaining our controls, the violations are investigated and reported to the responsible authorities, and the appropriate action plans are established. However, the definitions of “non-conformities” are under discussion, making it impossible to make any statements.
GRI 303: Water and Effluents 2018	303–5 Water consumption	Page 63 and 65. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			
GRI 305: Emissions 2016	305–6 Emissions of ozone-depleting substances (ODS)	ESG Databook : “Environment Data” tab.	Material			
	305–7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	Page 66. More information can be found in the “Environment Data” tab of the ESG Databook .	Material			



Material topics

Mine closure and future use

GRI 3: Material Topics 2021	3–3 Management of material topics	Page 69. Further information can be found at Vale’s ESG Portal .	Mandatory
GRI G4 2013: Mining and Metals Sector Disclosures	MM10 Number and percentage of operations with closure plans	Page 69. More information can be found in the “Environment Data” tab of the ESG Databook .	Material

Climate change

GRI 3: Material Topics 2021	3–3 Management of material topics	Page 72. Further information can be found at Vale’s ESG Portal .	Mandatory
GRI 201: Economic Performance 2016	201–2 Financial implications and other risks and opportunities due to climate change	Page 72. More information can be found in the ESG Databook : “Economic Data” tab, Climate Change Report and Form 20F 2023 .	Material
GRI 302: Energy 2016	302–1 Energy consumption within the organization	Page 74. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	302–2 Energy consumption outside of the organization	More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	302–3 Energy intensity	Page 74. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	302–4 Reduction of energy consumption	Page 74. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
GRI 305: Emissions 2016	305–1 Direct (Scope 1) GHG emissions	Page 73. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	305–2 Energy indirect (Scope 2) GHG emissions	Page 73. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	305–3 Other indirect (Scope 3) GHG emissions	Page 73. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	305–4 GHG emissions intensity	Page 73. More information can be found in the “Environment Data” tab of the ESG Databook .	Material
	305–5 Reduction of GHG emissions	Page 75. More information can be found in the “Environment Data” tab of the ESG Databook .	Material

Governance and compliance

GRI 3: Material Topics 2021	3–3 Management of material topics	Page 83. Further information can be found at Vale’s ESG Portal .	Mandatory
GRI 201: Economic Performance 2016	201–1 Direct economic value generated and distributed	Page 90. More information can be found in the “Economic Data” tab of the ESG Databook .	Material
	201–4 Financial assistance received from government	ESG Databook : “Economic Data” tab.	Material



Material topics

GRI 205: Anti-corruption 2016	205-1 Operations assessed for risks related to corruption	Page 87. More information can be found in the “Economic Data” tab of the ESG Databook .	Material
	205-2 Communication and training about anti-corruption policies and procedures	Page 87. More information can be found in the “Economic Data” tab of the ESG Databook .	Material
	205-3 Confirmed incidents of corruption and actions taken	ESG Databook : “Economic Data” tab.	Material
GRI 206: Anti-competitive Behavior 2016	206-1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	ESG Databook : “Economic Data” tab.	Material

Human rights

GRI 3: Material Topics 2021	3-3 Management of material topics	Page 30. Further information can be found at Vale’s ESG Portal .	Mandatory
GRI 408: Child Labor 2016	408-1 Operations and suppliers at significant risk for incidents of child labor	Page 31. More information can be found in the “Social Data” tab of the ESG Databook .	Material
GRI 409: Forced or Compulsory Labor 2016	409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labor	Page 31. More information can be found in the “Social Data” tab of the ESG Databook .	Material
GRI 410: Security Practices 2016	410-1 Security personnel trained in human rights policies or procedures	Page 30. More information can be found in the “Social Data” tab of the ESG Databook .	Material

People

GRI 3: Material Topics 2021	3-3 Management of material topics	Pages 22 and 26. Further information can be found at Vale’s ESG Portal .	Mandatory
GRI 202: Market Presence 2016	202-1 Ratios of standard entry level wage by gender compared to local minimum wage	Page 27. More information can be found in the “Economic Data” tab of the ESG Databook .	Non Material
GRI G4: Mining 2013 and Metals Sector Disclosures	MM4 Number of strikes and lock-outs exceeding one week’s duration, by country	Pages 19 and 27.	Material
GRI 201: Economic Performance 2016	201-3 Defined benefit plan obligations and other retirement plans	ESG Databook : “Economic Data” tab. Further information can be found in the Form 20F 2023 – section: Employees.	Material
GRI 401: Employment 2016	401-1 New employee hires and employee turnover	ESG Databook : “Social Data” tab.	Material
	401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	ESG Databook : “Social Data” tab.	Material
	401-3 Parental leave	ESG Databook : “Social Data” tab.	Material



Material topics

GRI 404: Training and Education 2016	404-1 Average hours of training per year per employee	Page 26. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	404-2 Programs for upgrading employee skills and transition assistance programs	Page 26. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	404-3 Percentage of employees receiving regular performance and career development reviews	ESG Databook : “Social Data” tab.	Material			
GRI 405: Diversity and Equal Opportunity 2016	405-1 Diversity of governance bodies and employees	ESG Databook : “Social Data” tab.	Material			
GRI 405: Diversity and Equal Opportunity 2016	405-2 Ratio of basic salary and remuneration of women to men	Page 27. More information can be found in the “Social Data” tab of the ESG Databook .	Material	405-2-a 405-2-b	Information unavailable/incomplete	The information disclosed about the ratio between the base salaries and remuneration received by women and men does not use “significant operational units” as a criterion, because the employees of all the company's units are considered.
GRI 406: Non-discrimination 2016	406-1 Incidents of discrimination and corrective actions taken	Page 88. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
GRI 407: Freedom of Association and Collective Bargaining 2016	407-1 Operations and suppliers in which the right to freedom of association and collective bargaining may be at risk	Page 27. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
Health and safety						
GRI 3: Material Topics 2021	3-3 Management of material topics	Page 27. Further information can be found at Vale’s ESG Portal .	Mandatory			
GRI 403: Occupational Health and Safety 2018	403-1 Occupational health and safety management system	ESG Databook : “Social Data” tab.	Material			
	403-2 Hazard identification, risk assessment, and incident investigation	ESG Databook : “Social Data” tab.	Material			
	403-3 Occupational health services	ESG Databook : “Social Data” tab.	Material			
	403-4 Worker participation, consultation, and communication on occupational health and safety	ESG Databook : “Social Data” tab.	Material			
	403-5 Worker training on occupational health and safety	ESG Databook : “Social Data” tab.	Material			
	403-6 Promotion of worker health	ESG Databook : “Social Data” tab.	Material			



Material topics

GRI 403: Occupational Health and Safety 2018	403-7 Prevention and mitigation of occupational health and safety impacts directly linked by business relationships	ESG Databook : “Social Data” tab.	Material			
	403-8 Workers covered by an occupational health and safety management system	ESG Databook : “Social Data” tab.	Material			
	403-9 Work-related injuries	Page 29. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	403-10 Work-related ill health	Page 29. More information can be found in the “Social Data” tab of the ESG Databook .	Material	403-10-b	Information unavailable/incomplete	Data reported here deals only with own employees, health statistics on third-party employees are managed by the contracting company.

Local communities

GRI 3: Material Topics 2021	3-3 Management of material topics	Page 32. Further information can be found at Vale’s ESG Portal .	Mandatory			
GRI 203: Indirect Economic Impacts 2016	203-1 Infrastructure investments and services supported	Pages 30, 31, 33, 35, 36, 37, 39, 40, 43, 44, 51, 53, 54, 60, 61, 62, 63, 65 and 90. More information can be found in the “Economic Data” tab of the ESG Databook .	Material			
	203-2 Significant indirect economic impacts	ESG Databook : “Economic Data” tab.	Material			
GRI 411: Rights of Indigenous Peoples 2016	411-1 Incidents of violations involving rights of Indigenous Peoples	ESG Databook : “Economic Data” tab.	Material			
GRI 413: Local Communities 2016	413-1 Operations with local community engagement, impact assessments, and development programs	Page 32. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	413-2 Operations with significant actual and potential negative impacts on local communities	Page 32. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
GRI G4 2013: Mining and Metals Sector Disclosures	MM5 Total number of operations taking place in or adjacent to Indigenous Peoples’ territories, and number and percentage of operations or sites where there are formal agreements with Indigenous Peoples’ communities	Page 34 and 37. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	MM6 Number and description of significant disputes relating to land use, customary rights of local communities and Indigenous Peoples	Page 39. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	MM7 The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and Indigenous Peoples, and the outcomes	Page 39. More information can be found in the “Social Data” tab of the ESG Databook .	Material			
	MM9 – Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process	Pages 37, 38 and 52. More information can be found in the “Social Data” tab of the ESG Databook .	Material			

Credits

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Cover

Photo 1: Pile of iron ore at the Serra Sul Complex, S11D, in Canaã dos Carajás, Pará, Brazil. Image: Ricardo Teles.

Photo 2: Employees Caciane Rodrigues, Thimotio Barros, and Andreina Costa, at the Serra Sul Complex, S11D. Image: Alexandre Rezende.

Photo 3: employee Uenice Correa visiting Ana Alice de Queiroz’s beekeeping at Cedere 1, in Parauapebas, Pará, Brazil. Image: Alexandre Rezende.

Photo 4: Locomotive passing through a section of the Carajás Railroad. Photo: Marcelo Coelho

Revision

Catalyzing Content

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