

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

Form 20-F

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d)
OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended: December 31, 2020
Commission file number: 001-15030

VALE S.A.

(Exact name of Registrant as specified in its charter)

Federative Republic of Brazil

(Jurisdiction of incorporation or organization)

Luciano Siani Pires, Chief Financial Officer
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Praia de Botafogo 186 – offices 701 – 1901 – Botafogo
22250-145 Rio de Janeiro, RJ, Brazil
(Address of principal executive offices)

Securities registered or to be registered pursuant to Section 12(b) of the Act:

Title of Each Class	Trading Symbol(s)	Name of Each Exchange on Which Registered
Common shares of Vale, no par value per share American Depositary Shares (evidenced by American Depositary Receipts), each representing one common share of Vale	VALE	New York Stock Exchange* New York Stock Exchange
6.250% Guaranteed Notes due 2026, issued by Vale Overseas	VALE/26	New York Stock Exchange
3.750% Guaranteed Notes due 2030, issued by Vale Overseas	VALE/30	New York Stock Exchange
8.250% Guaranteed Notes due 2034, issued by Vale Overseas	VALE/34	New York Stock Exchange
6.875% Guaranteed Notes due 2036, issued by Vale Overseas	VALE/36	New York Stock Exchange
6.875% Guaranteed Notes due 2039, issued by Vale Overseas	VALE39	New York Stock Exchange
5.625% Notes due 2042, issued by Vale S.A.	VALE42	New York Stock Exchange

* Shares are not listed for trading, but only in connection with the registration of American Depositary Shares pursuant to the requirements of the New York Stock Exchange.

Securities registered or to be registered pursuant to Section 12(g) of the Act: None

Securities for which there is a reporting obligation pursuant to Section 15(d) of the Act: None

The number of outstanding shares of each class of stock of Vale as of December 31, 2020 was:

5,129,910,942 common shares, no par value per share
12 golden shares, no par value per share

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.
Yes No

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.
Yes No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.
Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files).
Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer Accelerated filer Non-accelerated filer Emerging growth company

If an emerging growth company that prepares its financial statements in accordance with U.S. GAAP, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards† provided pursuant to Section 13(a) of the Exchange Act.

†The term "new or revised financial accounting standard" refers to any update issued by the Financial Accounting Standards Board to its Accounting Standards Codification after April 5, 2012.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report.

Indicate by check mark which basis of accounting the registrant has used to prepare the financial statements included in this filing:

U.S. GAAP International Financial Reporting Standards as issued by the International Accounting Standards Board Other

If "Other" has been checked in response to the previous question, indicate by check mark which financial statement item the registrant has elected to follow.

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If this is an annual report, indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act).

Yes No

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I. OVERVIEW

We are one of the largest metals and mining companies in the world, based on market capitalization. We are one of the world's largest producer of iron ore and nickel. We also produce iron ore pellets, manganese ore, ferroalloys, metallurgical and thermal coal, copper, platinum group metals (PGMs), gold, silver and cobalt. We are presently engaged in greenfield mineral exploration in six countries. We operate large logistics systems in Brazil and other regions of the world, including railroads, maritime terminals and ports, which are integrated with our mining operations. In addition, we have a distribution center to support the delivery of iron ore worldwide. Directly and through associates and joint ventures, we also have investments in energy and steel businesses.

In this report, references to "Vale" are to Vale S.A. References to "we," "us" or the "Company" are to Vale and, except where the context otherwise requires, its consolidated subsidiaries. References to our "ADSs" or "American Depositary Shares" are to our common American Depositary Shares (our "common ADSs"), each of which represents one common share of Vale. American Depositary Shares are represented by American Depositary Receipts ("ADRs") issued by the depositary.

Vale S.A. is a stock corporation, or *sociedade por ações*, that was organized on January 11, 1943 under the laws of the Federative Republic of Brazil for an unlimited period of time. Its head office is located at Praia de Botafogo 186 – offices 701-1901 – Botafogo, 22250-145 Rio de Janeiro, RJ, Brazil, and its telephone number is 55-21-3485-5000.

Unless otherwise specified, we use metric units. References to "real," "reais" or "R\$" are to the official currency of Brazil, the *real* (singular) or *reais* (plural). References to "U.S. dollars" or "US\$" are to United States dollars. References to "€" are to Euros.

BUSINESS OVERVIEW

OPERATIONAL SUMMARY

The following table presents the breakdown of total net operating revenues attributable to each of our lines of business with continuing operations.

	Year ended December 31,					
	2020		2019		2018	
	(US\$ million)	(% of total)	(US\$ million)	(% of total)	(US\$ million)	(% of total)
Ferrous minerals:						
Iron ore	27,285	68.2%	23,343	62.1%	20,354	55.7%
Iron ore pellets	4,242	10.6	5,948	15.8	6,651	18.2
Ferroalloys and manganese ..	225	0.6	282	0.8	454	1.2
Other ferrous products and services	326	0.8	432	1.1	474	1.3
Subtotal	32,078	80.2	30,005	79.9	27,933	76.4
Base metals:						
Nickel and other products(1).	4,995	12.5	4,257	11.3	4,610	12.6
Copper(2)	2,175	5.4	1,904	5.1	2,093	5.7
Subtotal	7,170	17.9	6,161	16.4	6,703	18.3
Coal	473	1.2	1,021	2.7	1,643	4.5
Other	297	0.7	383	1.0	296	0.8
Total net operating revenues from continuing operations..	40,018	100%	37,570	100%	36,575	100%

(1) Includes nickel coproducts (copper) and byproducts (precious metals, cobalt and others).

(2) Does not include copper produced in our nickel operations.

Ferrous minerals:

- *Iron ore and iron ore pellets.* We operate four systems in Brazil for producing and distributing iron ore, which we refer to as the Northern, Southeastern, Southern and Midwestern Systems. Each of the Northern and the Southeastern Systems is fully integrated, consisting of mines, railroads, maritime terminals and a port. The Southern System consists of two mining complexes and two maritime terminals. We also have iron ore pellet operations in several locations, some of which are conducted through joint ventures. We currently operate eleven pellet plants in Brazil (three of these plants are currently suspended), and two in Oman. We also have a 50% stake in Samarco Mineração S.A. ("Samarco") and a 25% stake in one pellet company in China.
- *Ferroalloys and manganese.* We conduct our manganese mining operations through Vale S.A. and subsidiaries in Brazil, and we produce several types of manganese ferroalloys through a wholly owned subsidiary in Brazil.
- *Logistics.* We are a leading operator of logistics services in Brazil and other regions of the world, with railroads, maritime terminals, distribution centers and ports. Two of our four iron ore systems include an integrated railroad network linked to port and terminal facilities. We also have an interest in MRS Logística S.A. ("MRS"), which transports our iron ore products from the Southern System mines to our maritime terminals, and VLI S.A. ("VLI"), which provides integrated logistics solutions to general cargo through railroads, inland and maritime terminals in Brazil. We also charter dry bulk vessels to transport the products that we sell on a cost and freight ("CFR") basis to our customers.

Base metals:

- *Nickel.* Our principal nickel mines and processing operations are conducted through our wholly owned subsidiary Vale Canada Limited (“Vale Canada”), which has operations in Canada, Indonesia and New Caledonia. We are currently in the process of selling our operations in New Caledonia. See *Overview—Business Overview—Significant Changes in Our Business—Divestments—Vale New Caledonia put option agreement*. We also have nickel operations in Onça Puma, in the Brazilian state of Pará. We also control and operate nickel refining facilities in the United Kingdom and Japan, and have interests in a nickel refinery in South Korea. Our nickel refining facilities in China and Taiwan are currently under care and maintenance.
- *Copper.* In Brazil, we produce copper concentrates at Sossego and Salobo, in Carajás, in the state of Pará. In Canada, we produce copper concentrates, copper matte and copper cathodes in conjunction with our nickel mining operations at Sudbury and Voisey’s Bay.
- *Cobalt, PGMs and other precious metals.* We produce cobalt as a byproduct of our nickel mining and processing operations and refine it at our Port Colborne facilities, in the Province of Ontario, Canada. We produce refined cobalt in our Long Harbour facilities in Newfoundland and Labrador. We also produce cobalt as a byproduct of our nickel operations in New Caledonia. We produce PGMs as byproducts of our nickel mining and processing operations in Sudbury, Ontario, Canada. The PGMs are concentrated at our Port Colborne facilities. We produce gold and silver as byproducts of our nickel mining and processing operations in Sudbury, Ontario, Canada, and gold as a byproduct of our copper mining at Sossego and Salobo in Brazil.

Coal:

- We conduct our coal operations in Mozambique, through our subsidiary Vale Moçambique S.A. (“Vale Moçambique”), where we are ramping up our metallurgical and thermal coal operations.

BUSINESS STRATEGY

In 2020, we took important steps towards building a better Vale. Our goal is to be a company recognized by society for being: (i) a benchmark in safety, (ii) the best in class reliable operator, (iii) a talent-driven organization, (iv) a leader in low-carbon mining and (v) a reference in creating and sharing value. We are dedicated to repairing Brumadinho and to transforming natural resources into prosperity and sustainable development, based on the following main strategic pillars:

- Safety and operational excellence.
- New pact with society.
- Maximize flight-to-quality in iron ore.
- Base metals transformation.
- Discipline in capital allocation.

Below is a summary of the major developments in our strategy.

Safety and operational excellence

We have the ambition to become a benchmark in safety with clear targets by 2025: (i) no high potential recordable injuries, (ii) 50% reduction of employee exposure to main health risks, (iii) reduction or elimination of very high-risk scenarios. Our process safety program starts with the hazard identification and risk assessment (“HIRA”), hazard investigation and risk assessment, by identifying the most critical process risks, and their respective controls. We have identified about 790 critical risks and more than 8,500 critical controls. Monitoring the integrity of these controls has become a part of our daily maintenance routine. As of March 22, 2021, we implemented HIRA in 95% of our sites.

We are enhancing our tailings and dam management system for adoption of known best practices. This initiative is organized around three pillars: routine, performance and risk assessment (known as RPR Management System). We are committed to adopting the Global Industry Standard on Tailings Management (GISTM) and we expect to be well positioned to be adherent to these standards by the end of 2021. We are strengthening our tailings and dam management system, improving our dams’ conditions and working closely with the engineers of record, we are also decharacterizing our upstream geotechnical structures (including dams, dikes and drained piles) in Brazil.

The implementation of our integrated management system, known as “VPS” (Vale Production System) is strategic for us to become a reliable operator and to support our cultural transformation. The VPS will integrate our processes and systems into one single framework, enabling our company to work with unified objectives and in a standardized way. The VPS fosters the creation of a safer work environment and a more effective problem resolution process within the company. It is composed by three dimensions: leadership, technical and method, which strengthen our organizational culture through people development, standardization of best practices, operational discipline and compliance with routine. With this, we will redefine the path to operational excellence as a more humane, safe and sustainable company. All of our employees are trained to support full engagement.

New pact with society

We are committed to a comprehensive approach towards sustainability and safety, establishing a positive social, economic and environmental legacy in the regions where we operate and going beyond taxes, social projects and the reparation of Brumadinho. Our sustainability goals are in line with the Sustainable Development Goals (SDG) of the United Nations 2030 Agenda and include commitments relating to:

- Fighting climate change.
- Renewable electricity, energy efficiency and energy matrix transformation.
- Reducing GHG emissions of our supply chain and contributing to reduce clients' carbon footprint by offering high quality products.
- Forest protection.
- Water usage reduction.
- Socioeconomic contribution.
- Bridging our gaps of Environmental, Social and Governance ("ESG").

For further information about our ESG practices and commitments, see *Overview—Business overview—Our environmental, social and governance (ESG) framework*.

Maximize flight-to-quality in iron ore

In the iron ore business, we are committed to delivering the highest possible margins under the current market environment, by managing our extensive supply chain and flexible product portfolio to cope with production constraints in the short-term. We are focusing our product line to capture industry trends, improving quality and productivity, controlling costs, strengthening our logistics infrastructure of railroads, ports, and distribution centers, committed to a safe, green and efficient shipping portfolio and enhancing relationships with customers.

- We will continue to promote the Brazilian blend fines (BRBF), a standard product with silica (SiO₂) content limited to 5% and lower alumina (1.5%), offering strong performance in any kind of sintering operation. We produce BRBF by blending fines from Carajás ores and Southern and Southeastern ores, which are complementary ores for our blending strategy. BRBF is produced in our Teluk Rubiah Maritime Terminal in Malaysia and in seventeen ports in China. This process reduces the time needed to reach Asian markets and increases our distribution capillarity by allowing the use of smaller vessels. Our blending strategy also permits the use of iron ore with lower iron concentration from the Southern and Southeastern Systems, allowing more efficient mining plans and increasing the use of dry processing methods, which in turn reduce capital expenditures, extend the life of our mines, reduce use of dams, and reduce water consumption by our operations: a key flexibility to cope with the short-term challenges.
- We continue to improve our portfolio in order to provide solutions to our customers and to adapt to potential market demands. In 2019, we announced the launch of the GF88, a new product to supply the growing market of pellet production in China. This product consists of

Carajás fines (IOCJ), obtained through a grinding process, opening a new market for our high-quality portfolio. We are currently working on the development of low CO₂ iron making technologies and services to support our customers as they make the transition to low CO₂ steelmaking.

- Our goal is to achieve a run-rate capacity of 400 Mtpy by the end of 2022. In the Northern System, our plan is to have high-quality growth with new low-cost assets, ramping up and opening new mining fronts to reach our capacity goal of 230 Mtpy. In the Southeastern System, we are investing in increasing our pellet feed production, developing filtering and dry stacking capacity and recovering approximately 40 Mtpy to our capacity. Finally, in the Southern System we are committed to solving the interference of upstream dams in our operations, recovering approximately 14 Mtpy to our capacity.
- One of our key goals is to increase our flexibility by creating capacity buffers across iron ore operations. We currently expect to achieve over 50 Mtpy capacity buffer in the long-term, by expanding Northern System by opening new mining pits and obtaining new licenses, as Northern System 240 Mtpy and Serra Sul 120 projects and N3 mining front opening in Serra Norte, developing the 14 Mtpy capacity Capanema project in Southeastern System and unlocking capacity in our Vargem Grande complex.
- With the continuous investments in dry staking tailings disposal and the planned increase of the share of dry processing production from 40% in 2014 of our total production to a target of 70% by 2024, our reliance on new dams and dam raisings should decline. Due to tailings disposal restrictions and lower iron ore production in the Southern and Southeastern Systems since the Brumadinho dam rupture, we temporarily reached 73% of dry processing production in 2020. The additional volume to reach 400 Mtpy production level is expected to come from dry processing method or wet processing using the dry staking method. To treat the tailings from wet processing, we are investing in tailings filtration systems to allow us to operate certain of our mines and plants without using tailings dams. We have announced an estimated investment of US\$2.4 billion between 2020 and 2024 in some of our sites, including Vargem Grande complex, Itabira complex and Brucutu, to be operated with tailings filtration systems and dry stacking tailings disposal, which consists of filtering and stacking of partially or totally dewatered tailings, reducing our reliance on tailings dams. In 2020, we invested US\$195 million in tailings filtration system and dry stacking tailings disposal. In March, 2021 we gradually started the operation of the tailings filtration plant located at the Vargem Grande Complex, our first filtration plant to be operated in our sites in the state of Minas Gerais. In line with this goal, we acquired New Steel in January 2019, bringing in innovative technologies for the dry beneficiation of iron ore, and approved an investment of US\$125 million in the world's first industrial-scale dry magnetic fines concentration plant to produce 1.5 Mtpy with the start-up expected for 2022 in the Vargem Grande complex.

Base metals transformation

Nickel. A key aspect of the strategy for our nickel business is to be a leader in providing nickel for a renewable energy transition and go further by improving our sustainable way to operate. We will keep our focus on completing the business turnaround, continuing to review our asset utilization, optimizing our operations and concentrating our efforts to increase productivity and improve returns, while preserving capacity for growth. We are one of the world's largest nickel producers, with large-scale, long-life and low-cost operations, a substantial resource base and diversified mining operations that

produce nickel products from nickel sulfide and laterite sources using advanced technology. Our commercial footprint is global, with a focus on serving our customers directly.

Our nickel products meet the needs of customers in different industries, including those with high-purity nickel needs and electric vehicle battery manufacturers. Most of our production that will be used in these industries comes from our Canadian operations, which benefit from the use of renewable energy and are located in a stable jurisdiction with strong ESG standards. Our main product, Class 1 nickel, places us in a unique position with environment-friendly operations in the North Atlantic, in line with our low-carbon agenda. By the end of 2021, we will start operations in two replacement projects in Canada: the extensions of the Voisey's Bay Mine and Copper Cliff Mine 1. Both projects have high nickel content and also a significant amount of by-products. We also have opportunities to expand our operations at Onça Puma in Brazil, and the option to participate, through joint ventures, in the Pomalaa and Bahodopi projects in Indonesia.

Copper. We have significant opportunities to grow our copper business organically. We have a strong portfolio of copper assets and plans to develop a multi-year copper expansion plan, with Salobo III, Alemão and Cristalino being competitive projects that will support our strategic goal of production capacity of around 500 thousand tons per year. In addition to these projects, we have other opportunities to grow in the future, benefiting from the knowledge and logistics that already exist in the Carajás region, while we also evaluate opportunities to increase copper production in Canada. We are also engaged in greenfield exploration for copper in some of the world's most prolific belts, looking for tier-one assets for future development. The copper business still has the potential to expand, through partnerships, the Hu'u project, a world-class deposit located in Indonesia.

Discipline in capital allocation

We reaffirm our strong commitment to a sound balance sheet and for value creation to our stakeholders.

In September 2020, we repaid in full the outstanding balance of US\$5 billion under our revolving credit lines, which were drawn in March 2020 to secure capital funding in light of the increased risks presented by the COVID-19 pandemic. We continued our deleveraging process and achieved a net cash level of US\$898 million as of December 31, 2020.

We also consider other liabilities in determining the appropriate capital structure for Vale, such as the mark-to-market on derivatives, lease obligations according to IFRS 16, our REFIS tax refinancing program and our provisions to meet our obligations towards Fundacao Renova and the reparation of Brumadinho. See *Overview—Business Overview—Rupture of tailings dam in Brumadinho—Settlements agreements—Global Settlement for Full Reparation*.

As part of our commitment to attain a leaner portfolio, we continued the optimization of our asset portfolio. Accordingly, in December 2020 we entered into a binding put option agreement for the sale of our ownership interest in Vale Nouvelle-Calédonie S.A.S. (VNC), and in January 2021 we entered into a heads of agreement with Mitsui to structure Mitsui's divestment of the Moatize mine and the Nacala Logistics Corridor, as a first step towards our divestment of the coal business. For more details on the initiatives regarding the divestment of assets, please see *Overview—Business Overview—Significant Changes in Our Business—Divestments*.

In July 2020, our Board of Directors reestablished our Shareholder Remuneration Policy, suspended in January 2019. The continuation of our dividend payment policy aims at returning to our shareholders a relevant portion of our cash generation, in a predictable pattern and aligned with our strategic pillar "Discipline in Capital Allocation". Accordingly, we made distributions to shareholders in August 2020 (US\$1.324 billion), September 2020 (US\$2.329 billion) and March 2021 (US\$3.972 billion). For more details on shareholder remuneration, please see *Share Ownership and Trading—Distributions*.

SIGNIFICANT CHANGES IN OUR BUSINESS

We summarize below major events in our business since the beginning of 2020.

Global Settlement for Full Reparation

In February 2021, we entered into a settlement agreement with various public authorities for the reparation and remediation of socio-environmental and social-economic damages resulting from the Brumadinho dam rupture. For a discussion about this settlement agreement and other issues relating to the Brumadinho dam rupture, see *Overview—Business overview—Rupture of tailings dam in Brumadinho*.

Developments related to the pandemic of the coronavirus

In 2020, the outbreak of Coronavirus Disease 2019 (COVID-19) spread throughout the world. We are complying with the health and safety protocols established by the authorities and agencies of each country in which we operate and are monitoring the developments of the situation closely. In January 2020, we created a crisis management structure and governance to manage and deploy our actions in response to the COVID-19 pandemic. We have taken steps and implemented policies to safeguard our employees, businesses and communities surrounding our operations from the threats posed by the COVID-19 pandemic.

Operations. In 2020, some of our operations were temporarily suspended as a result of developments of the COVID-19 pandemic as discussed below. Temporary suspensions had no relevant impact in our results of operation.

- *Itabira Complex.* In May and June 2020, our operations at the Itabira complex were suspended for 12 days by the Labor Superintendence of the State of Minas Gerais (*Superintendência Regional do Trabalho e Emprego—“SRTE”*) due to concerns related to COVID-19 transmission. The SRTE revoked the suspension order once it concluded that our safety measures and procedures were satisfactory. In June 2020, we also reached a judicial agreement with labor prosecutors (*Ministério Público do Trabalho—“MPT”*) and the labor court of the state of Minas Gerais to establish a series of health and safety measures and procedures for our operations in Itabira in connection with the COVID-19 pandemic. In September and November, 2020, we entered into two additional agreements with the MPT, on a voluntary basis, to extend such health and safety measures to all of our mining complexes in Brazil until the end of the COVID-19 pandemic.
- *Teluk Rubiah Maritime Terminal (TRMT).* Between March and May 2020, we temporarily halted our operations in the TRMT in Malaysia for 53 days, as we were temporarily unable to secure the minimum resources to safely operate the terminal. During suspension of the operations, vessels heading to TRMT were redirected and redistributed among our blending facilities in China with no impact on production and sales volume in 2020. In May we resumed the loading operations at TRMT following adequate health and safety protocols.
- *Voisey’s Bay.* In March 2020, we ramped down our Voisey’s Bay mining operation and placed it on care and maintenance as a precaution to help protect the health and well-being of indigenous communities in Labrador in face of the COVID-19 pandemic. We took this preventive action because of the unique remoteness of the area, with fly-in and fly-out operations, and higher exposure to travel. In July 2020, production was resumed at the site,

reaching full capacity in August 2020. The impact on our nickel production of the care and maintenance at Voisey's Bay Mine was mitigated by Long Harbour refinery sustained operations, sourcing nickel concentrate stockpiles already at site.

- *Azul Mine Operations.* In March 2020, we suspended our manganese operations at the Azul Mine in the state of Pará, mainly based on the contingent of employees considered an at-risk group, and to contribute to the levels of key personnel at iron ore production sites in the Northern System. Currently, we expect to maintain operations suspended in 2021.
- *Mozambique Coal Processing Plants.* Due to travel and equipment transportation restrictions resulting from the COVID-19 outbreak, we revisited plans for the Mozambique coal processing plant stoppage for a maintenance revamp. The halting of the processing plants' operations was previously expected to start in the second quarter of 2020, but was rescheduled to November 2020 and started according to the plan. Following works completion, a production run rate of 15 Mtpy and improved business sustainability are expected.

Safety protocols. Since March 2020, we have transitioned a significant number of our employees to a remote work regime as part of the efforts to mitigate the spread of COVID-19. We have also implemented other social distancing measures, including shifts in operational areas, restriction of in-person meetings, test-trace protocol, among others.

At our operational sites, we have implemented different levels of defense to mitigate the risk of transmission of COVID-19. Any person accessing our sites must fill in a digital self-assessment for symptoms and potential exposure to COVID-19. Employees requiring health support and information have access to designated COVID-19 hotlines. Additional point-of-entry screening was implemented at the units globally, and an app to track proximity in case of contact tracing was deployed in several of them.

In Brazil, Indonesia and Mozambique, this screening process included periodic testing of the workforce with the use of thousands of serologic or antigen rapid tests. Local implementation of the plan also included swift deployment and efficient monitoring of physical distancing, use of face protection, access to hand washing or hand sanitizer stations, and cleaning routine within the sites and vehicles. Dining hall routines were adapted to provide individually packed meals. Finally, employees identified as having a higher risk to develop the severe form of the disease were removed from the operations and have remained home with full-benefits awaiting to be vaccinated prior to returning to the sites.

Humanitarian and financial aid. In 2020, we donated US\$109 million to local governments in Brazil, the second largest amount donated by a corporation in Brazil to fight COVID-19. We have also provided resources to governments and institutions in Canada, Indonesia and other countries where we operate. For 2021, we have approved US\$15 million (approximately R\$80 million) to be used in humanitarian aid actions related to COVID-19, including to support to Butantan Institute in the works to expand the Multi-Purpose Center for Vaccine Production, which will have a production capacity of up to 100 million doses per year, and the donation of 50 million syringes and 280,000 PPEs to the Brazilian Ministry of Health. We have also provided temporary financial aid for our suppliers in Brazil. The initiatives included advancing payments to small and medium-sized suppliers in Brazil, reducing payment terms for services and materials. We also provided financial support to construction companies and workers allocated to projects which were halted by us, in order to reduce the flow of people in our sites and increase the safety of our workers.

We continue to monitor the developments of the COVID-19 pandemic. The situation is evolving and could have a material impact on us if there is significant supply chain disruption or customer demand declines.

Divestments

- Vale New Caledonia put option agreement.* In December 2020, our subsidiary Vale Canada Limited (“VCL”) entered into a put option agreement for the sale of its ownership interest in Vale Nouvelle-Calédonie S.A.S. (“VNC”) with Prony Resources, a consortium of current VNC management and employees, supported by both the Caledonian and French authorities and having Trafigura as a minority shareholder. As a result of the proposed transaction, we recognized a loss of US\$882 million in our financial statements for the period ending on December 31, 2020, which includes a provision of US\$500 million related to the commitment to fund the continuity of VNC operations and investments in the conversion of the tailings deposition from wet to dry-stacking. The transaction has been approved by VNC workers council and is supported by the Caledonian and the French governments. Closing is expected for 2021.
- Sale of VLI Shares.* In December 2020, BNDES Participações S.A. (“BNDESPAR”) exercised its option to purchase shares of VLI held by us, representing 8% of VLI’s share capital. We had granted this option to BNDESPAR under a stock purchase option agreement signed in 2015, in connection with an amendment to the indenture of the debentures that were issued to finance the expansion project of the Ferrovia Norte Sul S.A. (“FNS”), currently operated by VLI. In consideration for the purchase of these shares, we received R\$1.223 billion (US\$241 million) on December 11, 2020. Following this transaction, we hold 29.6% of VLI’s total shares.
- Total Divestment of Biopalma.* In November 2020, we sold 100% of the shares of Biopalma da Amazônia S.A.—Reflorestamento, Indústria e Comércio to Brasil Bio Fuels Pará Ltda., a company from the Brasil Bio Fuels S.A. group, resulting in the total divestment of our palm oil business.
- Sale of interest in Longyu.* In August 2020, we concluded the sale of our 25% stake in Longyu Energy Resources Co., Ltd. (Longyu) to Yongmei Group Co., Ltd (Yongmei), for CNY1.065 billion (equivalent to US\$156 million). Longyu produces metallurgical and thermal coal and other related products in the Henan province in China.
- Sale of interest in Zhuhai YPM.* In November 2020, we concluded the sale of our 25% stake in Zhuhai YPM Pellet Co., Ltd. (Zhuhai YPM) to Zhuhai Yueyufeng Iron and Steel Co., Ltd., (YYF), for US\$13 million.
- Transfer of the shares of Potassio Rio Colorado.* In February 2021, we concluded the transfer of the shares of Potassio Rio Colorado to the Province of Mendoza, in Argentina.
- Heads of Agreement with Mitsui.* In January 2021, we signed a heads of agreement (“HOA”) with Mitsui to structure Mitsui’s exit from Vale Moçambique and the Nacala Logistics Corridor (“NLC”). Mitsui holds a 15% interest in Vale Moçambique and a 50% interest in the NLC. The HOA provides that we will acquire Mitsui’s stake in the mine and the logistics assets for US\$1.00 each, and will take full control of the Nacala Corridor project finance. In the event of closing of the transaction, we will also control the NLC and, therefore, consolidate its assets and liabilities. Following the acquisition of Mitsui’s stakes, and therefore simplification of governance and asset management, we will begin the process of divesting

its participation in the coal business, which will be guided by the preservation of the operational continuity of the Moatize mine and the NLC, through the search of a third party interested in those assets.

- *PT Vale Indonesia divestment agreement.* In October 2020, in compliance with the divestment obligation under the contract of work, Vale Canada sold to Inalum, a state-owned mining holding company which oversees the state mining investments, part of its interest in PTVI, for US\$278 million. Following this transaction, we now own approximately 45% of PTVI's share capital.

New projects

- *Capanema project.* In December 2020, our Board of Directors approved the implementation of the Capanema iron ore project in the Southeastern System, located in the municipalities of Santa Bárbara, Ouro Preto and Itabirito, in the state of Minas Gerais, Brazil. This project includes investments in the Capanema mine to resume facilities and acquire new equipment, implement a long-distance belt conveyor (TCLD) and adjustments in the Timbopeba stockyards, totaling expected multiyear investments of US\$495 million, with capacity of 18Mtpy. Start-up is expected for the second half of 2023.
- *New Steel Project (NS04).* In December 2020, our Board of Directors approved the implementation of the NS-04 Project, located at the Vargem Grande complex, in the city of Nova Lima, in the state of Minas Gerais. The project is expected to be the world's first industrial-scale dry magnetic fines concentration, with total expected multi-year investments of US\$125 million, capacity of 1,5Mtpy. Start-up is expected for the second half of 2022.
- *Solar Project—Sol do Cerrado.* In December 2020, we announced the Sol do Cerrado project for the generation of solar energy, in the municipality of Jaíba, in the state of Minas Gerais, Brazil. The project contemplates the construction of a photovoltaic plant, including 17 sub-parks that total an installed capacity of 766 megawatts peak (MWp). It also includes the implementation of an elevator substation, transmission line and connection bay at the 230 kV Jaíba substation, with contracts signed for connection to the Brazilian National Interconnected System. The implementation of the project will require investments of approximately US\$500 million. The project will produce approximately 193 average megawatt (MWa) of energy per year for our operations, corresponding to 13% of our estimated demand in 2025, and its operational start-up is expected for the fourth quarter of 2022. Solar generation, located in the Southeastern region, also optimizes the generation profile of our portfolio, which is based on hydro generation. The project was approved by our Board of Directors and is subject to customary closing conditions, including approval by the National Electric Energy Agency (ANEEL).
- *West III Project (Zhejiang Province, China).* In October 2020, our Board of Directors approved the creation of a joint venture company with Ningbo Zhoushan Port Company Limited ("Ningbo Zhoushan Port"), a subsidiary of Zhejiang Provincial Seaport Investment & Operation Group Co. Ltd. (Ningbo Zhoushan Port Group Co. Ltd.), to build, own and operate the West III Project in Shulanghu Port, Zhoushan City, Zhejiang Province, China. Each of Vale International and Ningbo Zhoushan Port will own a 50%-equity interest in the joint venture. The project consists in expanding the Shulanghu Port facilities, developing a stockyard and loading berths with additional 20 Mtpy capacity. Investments for the project are estimated between US\$110 million and US\$160 million. By participating in the project, we will secure a

total port capacity of 40Mtpy in Shulanghu, which will help us to optimize our overall supply chain costs.

- *Inauguration of a grinding hub in China.* In August 2020, we inaugurated the Shulanghu Grinding Hub, located in the city of Zhoushan, Zhejiang Province, China. We own 100% of the grinding equipment, and the Ningbo Zhoushan Port's subsidiary maintains and operates such grinding equipment in Shulanghu Port for us through a services agreement. This is our first grinding hub in China, having three production lines and totaling a nominal capacity of 3 million tons per year. The first product to be produced at the Grinding Hub is the GF88, a high-grade ground iron ore fine using our Carajás fines (IOCJ) as raw material, which provides an excellent environmental-friendly solution for pellet production and supports steelmaking clients with the challenge of reducing their carbon footprint, part of our scope 3 emissions.
- *Serra Sul 120 Project (Carajás).* In August 2020, our Board of Directors approved the implementation of the Serra Sul 120 Project, located in the municipality of Canaã dos Carajás, in the state of Pará, Brazil. The project consists of increasing the S11D mine-plant capacity by 20 Mtpy, to a total of 120 Mtpy at site. The project has total multiyear investments of US\$1.5 billion and its start-up is expected for the first half of 2024. The project will create an important buffer of productive capacity, ensuring greater operational flexibility to face eventual production or licensing restrictions in the Northern System.
- *JV with Kobe Steel and Mitsui.* In July 2020, we entered into a non-binding heads of agreement to establish the preliminary terms and conditions for the creation of a new venture ("NewVen") to supply low GHG (greenhouse gases) metallic minerals and steel making solutions to the steel industry with Kobe Steel, Ltd and Mitsui & Co., Ltd. The potential creation of the NewVen has the main purpose of delivering low CO2 metallic minerals to the global market, providing new technological solutions to our clients and will use existing and new low-CO2 iron making technology such as the TecnoRed® technology and the Midrex® process.

Resumption of Samarco's operations

In December 2020, Samarco commenced the gradual resumption of its operations, with the integrated restart of iron ore extraction and beneficiation in the Germano complex, located in Mariana, state of Minas Gerais, and pelletizing at the Ubú complex, located in Anchieta, state of Espírito Santo. Samarco's operations are resuming with approximately 7 to 8 Mtpy production capacity, with the use of one of three concentrators to beneficiate iron ore in the Germano complex and one of four pellet plants in the Ubu complex, representing 26% of Samarco's productive capacity. The integrated restart of operations occurs after extensive commissioning tests after the five-year halt. Samarco will use new processes for tailings disposal, reflecting its commitment to a sustainable restart and operational safety.

Through the implementation of the filtration process, Samarco expects to be able to substantially dewater sand tailings, which represent 80% of total tailings by volume, and stack these filtered sand tailings in piles safely. The remaining 20% of tailings are planned to be deposited in Alegria Sul pit, a bedrock self-contained structure, which is safer than a tailings dam. Additionally, Samarco is progressing in the decommissioning of Germano dam, following the safety standards required. Samarco operates a Monitoring and Inspection Center in real time to monitor the stability and safety of its geotechnical structures.

Renewal of railway concessions

We have entered into amendments to the Vitória a Minas railroad (“EFVM”) and the Carajás railroad (“EFC”) concession agreements in order to formalize the renewals of the concessions that would expire in 2027 for an additional period of 30 years. As a result, EFVM and EFC concessions will now expire in 2057. See *Information on the Company—Lines of business—Infrastructure—Logistics*.

OUR ENVIRONMENTAL, SOCIAL AND GOVERNANCE (ESG) FRAMEWORK

We are committed to fully integrating sustainability into our business through a comprehensive approach based on systematic planning and execution, prioritizing risk and impact management, and establishing a positive social, economic and environmental legacy in the places where we operate. Our practices related to ESG are evolving.

We have been increasing our engagement with socially responsible investors and key ESG stakeholders through webinars, roadshows and the development of a dedicated website, the ESG Portal. We have also reviewed studies from leading ESG advisors and index providers (such as ISS, Glass Lewis, MSCI, Sustainalytics, Responsible Mining Index, Dow Jones Sustainability Index), and identified approximately 63 gaps with respect to ESG best practices. Based on this assessment, we mapped out an ESG action plan to address these gaps. After the rupture of the tailings dam in Brumadinho, we decided to strengthen our interactions with ESG stakeholders to discuss a range of strategy, risk and governance-related matters and accelerate our ESG aid initiatives. We are committed to eliminating our ESG gaps by 2030 (our "2030 Commitments").

Our ESG Portal provides greater transparency about our initiatives.

Below are the highlights of our main ESG accomplishments in 2020 and ongoing initiatives:

Environmental

- Climate Change.* We are committed to leading the transition towards a net-zero mining industry. We are committed to contributing with solutions that will help limit the increase in the average global temperature to well below 2°C, as set forth in the Paris Agreement. We endorsed and follow the Task Force on Climate related financial disclosures (TCFD) framework for risks and opportunities related to climate change. We have ambitious goals related to climate change risk management, including targets to reduce scopes 1 and 2 absolute emissions by 33% until 2030, with 2017 as baseline, and to become carbon neutral by 2050. We recognize that we can only lead the mining industry towards a low carbon economy if we induce our value chain on the same direction. Our scope 3 emissions, annually calculated and verified by independent third parties, represents 98% of our total emissions and are not under our direct control. In 2020, we committed to a target to reduce scope 3 net emissions by 15% until 2035, with 2018 as baseline, which are based on development of new products, nature-based solutions, partnership and engagement with clients and suppliers. The scope 3 target will be revised every five year, given the uncertainties regarding low carbon technologies and climate policies. Both targets are aligned with the Paris Agreement ambition.

 - Scopes 1 and 2 decarbonization plan:* We have built a bold roadmap, with clear milestones, to meet the reduction targets in Scopes 1 and 2. We will invest US\$2 billion over the next 10 years to develop low carbon solutions, such as electrification, biofuels use and renewable electricity generation and use. Our current portfolio of initiatives consolidates more than 35 projects, prioritizing the most cost-competitive initiatives to achieve the 2030 target, based on a Marginal Abatement Cost curve (MAC Curve). All investment decisions are submitted to an internal price of US\$50 per ton of CO₂ to encourage investments in greenhouse gas (GHG) reduction, in part by incorporating a scenario of more restrictive regulations, and as a tool to help implement our emission reduction targets. We intend to reduce GHG in our operations by increasing the processes' energy efficiency, and by

developing solutions based on replacing usual energy sources by greener alternatives. These initiatives include, among others, the use of biofuels replacing fossil fuels, electrification of equipment and processes, use of alternative fuels such as electrofuels, carbon capture technologies, and development of alternative processes.

- *Scope 3 decarbonization plan:* More than 90% of our scope 3 emissions occur due to the processing of the iron ore in the steel industry. We have identified two pillars of the scope 3 roadmap: (i) portfolio differentiation, with high quality products and low CO₂ iron making technologies and services for the steel industry; and (ii) partnerships in shipping and in the steel sector. We can offset up to 20% of the target with nature-based solutions.

In 2020, we employed a number of efforts to reduce greenhouse gases emissions and mitigate the climate change, and we spent US\$80.2 million with these initiatives.

- *Energy.* The three pillars of our energy initiatives are: (a) renewable electricity, (b) energy efficiency and (c) energy matrix transformation. Approximately 68% of the electricity consumed by our operations in Brazil is self-generated energy that comes from renewable sources. Our target is to achieve electricity self-sufficiency from renewable sources in Brazil by 2025, and to match 100% of our consumption globally through renewable electricity by 2030.
- *Water.* We are committed to reducing fresh water use in our activities by investing in new technologies, in the expansion of our monitoring network and in other initiatives to control total water collection, especially by promoting water reuse. We are currently developing programs and implementing actions that go beyond compliance with the legal requirements to optimize water use and consumption. Our water reuse represents 80% of total production demand in 2020. We want to reduce by 10% the new water captured and used in processes per ton produced, which means a smaller volume of fresh water captured for the same volume of production. In 2018, we set a target to reduce new water collection by 10% until 2030. This commitment aims to provide a lower freshwater withdrawal per ton produced compared to 2017. Until 2020, we have already reduced its water collection by 8.7%, of the 10% reduction expected by 2030.
- *Forest conservation.* Our ambition is to act as a global catalyst for forest conservation and reforestation. Currently, we help to protect 1,018,405 hectares of forest as a result of compensation measures, voluntary initiatives and partnerships. We are committed to protecting 400,000 hectares and reforesting additional 100,000 hectares by 2030, bolstering our 2018 target. In this sense, in 2020 we added 54,000 hectares of protected forests in conservation units.
- *Waste.* In 2020, we approved our Waste Policy to encourage the transition from our waste management to a circular economy perspective. Such transition is possible due to innovation. In our policy, we also prioritize dry processing, in line with our goal of achieving 70% dry processing by 2024.

Social

- *Human Rights.* We are committed to the United Nations Guiding Principles on Business and Human Rights. We have a Human Rights Policy since 2009. In 2019, our policy was revised

following a public consultation process. Most of the contributions received through the process were taken into account. In 2020, Human Rights became part of Vale's Integrated Global Risk Map. Since then, our operations included their human rights risk assessment, mitigation controls and action plans in our global management system. In 2020, we also reviewed our human rights due diligence strategy and methodology and developed a roadmap for its implementation in the next five years.

- *Gender Balance.* We have announced the goal to double our female workforce by 2030, from 13% to 26% and to increase the female presence in leadership roles from 12% to 20%. We have also disclosed the median salary by gender and seniority level. In 2020, we achieved 16.3% of women representation, a 26% increase in the total number of women in Vale compared to 2019, and we achieved 15.9% of women in senior leadership (executive manager positions and above), a 28% increase in the representation of women in senior leadership positions compared to 2019.
- *Health and Safety.* We are committed to improving the health and safety of our workers. Our long-term goals are: (i) no recordable injuries with potential for fatality or life-altering injuries, (ii) 50% reduction in the exposure of employees to the top 10 health risks by 2025 and (iii) reduction or elimination of the most significant risk scenarios by 2025.
- *Socioeconomic Contribution.* We are committed to positively impacting society, by investing in socioeconomic actions and projects focused on community development. In particular, we are investing in actions that contribute to the development and improvement of urban infrastructure and mobility, traditional communities, education, culture, health, and work and income generation in the regions where we operate. We spent approximately US\$390 million on social initiatives in 2020, of which 56% was spent on voluntary programs, 13% on Brazilian-tax-exempted initiatives, and 31% on mandatory programs.
- *Indigenous People and Traditional Communities.* Our guidelines with respect to indigenous people and traditional communities are built upon the ICMM's position statement on Mining and Indigenous People, the International Labour Organization (ILO) Indigenous and Tribal Peoples Convention (C169), and the United Nations Declaration on the Rights of Indigenous Peoples. We are committed to respecting the principle of Free, Prior and Informed Consent (FPIC), which entails a process of informing, negotiating in good faith and allowing the Indigenous or traditional communities to freely make decisions. We defined as one of our strategic planning pillars the expansion of our engagement with indigenous people. This pillar consists of three main fronts: preservation of cultural memory, support for indigenous people protagonism and implementation of sustainability programs.
- *Community involvement.* In order to engage communities and other local players in the regions where we operate, we have established structured dialogue spaces for creating "Relationship Plans" with the communities in regions we operate. These plans have as their main principles: (i) the social engagement in the definition and prioritization of initiatives to be implemented in the communities; and (ii) the use participatory meetings to monitor the performance, assessing adherence, and effectiveness of the results together with the communities. In 2020, we developed Relationship Plans with more than 450 communities, and carried out more than 430 projects.

We have also structured channels to strengthen our relationship with our stakeholders. Through these channels, we promote dialogue and improve our relationship management processes, anticipating and treating risks, impacts and possible conflicts and rights violations.

In 2020, we received 15,559 community contacts through these channels, where 99.01% were responded and 72.6% were resolved.

Governance

Since 2018, we have been listed on the Novo Mercado segment, the highest level of governance of B3. We have been investing in the improvement of our corporate governance, with benchmarks in national and international best practices, and developing our understanding of investors' perspective on these matters.

- *Board of Directors.* At a shareholders' meeting held on March 12, 2021, our shareholders approved several changes to our bylaws to improve our governance. The main changes are described below.
 - *Majority of independent directors.* Our Board of Directors must be composed of 11 to 13 members and one alternate member, and at least seven of these members must be independent. So, following our next annual shareholders' meeting, scheduled for April 2021, we expect to have a Board of Directors composed of a majority of independent members. We also adopted more stringent requirements for a candidate to be considered independent. Previously, our Board of Directors was composed of 13 members and 13 alternates, and our bylaws required that the higher of three members or 20% of the members of our Board of Directors be independent. For more information on our full standard of independency, see *Management and Employees—Management—Board of Directors*.
 - *Lead Independent Director.* Our Board of Directors must now have a Lead Independent Director (LID), in case the chairperson is not an independent director. The LID will be elected among and by the independent directors. The LID will act together with our Investor Relations department as an alternate point of contact for investors and will be a mediator between the chairperson of our Board of Directors and the remaining directors.
 - *Individual election for directors.* Our shareholders will now vote to elect the members of our Board of Directors on an individual basis (as opposed to voting for a slate of candidates).
 - *Election of the chairperson and vice-chairperson.* Our shareholders will now elect the chairperson and vice-chairperson of our Board of Directors directly. Previously, the chairman and vice-chairman were elected by the directors.
 - *No alternate members.* We will no longer elect alternates members for our Board of Directors (with the exception of the alternate for the director elected by our employees, as required by law).
- *Board Committees.* In 2020, we adopted additional measures to enhance our governance structure, establishing our Audit Committee and our Nomination Committee. The creation of these committees is an important step in the evolution of our corporate governance model. With the Audit Committee, we now have a specialized committee to directly assist the Board of Directors in supervising the internal audit activities, the area of internal controls and the area responsible for preparing Vale's financial statements, among other duties. The Nomination Committee is a permanent committee to directly assist the Board of Directors,

proposing improvements related to the structure, size and composition of the Board, in addition to recommending the skills, profiles and potential nominees for the Board, so that we can continue to benefit from the plurality of arguments and from a decision-making process with quality and care, complying with the law, ethics and corporate governance best practices. In 2021, we have also established our Innovation Committee, which will be responsible for analyzing new technologies and other initiatives to improve our business. Finally, our Personnel, Compensation and Governance Committee is responsible for evaluating the compensation model for members of our executives as well as the proposed annual, global budget for the compensation of executives, among other matters. See *Management and Employees—Management—Advisory Committees to the Board of Directors*.

- **Compensation.** We are committed to aligning our compensation programs to our business strategy and the goal of making Vale a safer company. We implemented a number of changes, such as the adoption of a *malus* clause and a clawback policy under which, upon the occurrence of events of exceptional severity, the Board of Directors may reduce variable compensation of executives or require that executives return amounts received, and the implementation of new share ownership guidelines for executive officers. For 2020, we approved new standards for Executive Officers compensation: for short-term compensation, at least 30% of performance goals will be ESG-driven and directly related to safety, risk management and sustainability targets, and with respect to long-term compensation, at least 20% of performance goals will be based on ESG metrics. Overall, 12% of total remuneration will be linked to ESG metrics.
- **Risk Management.** In 2020, with a focus on continuous improvement of risk management and governance, we created a new risk executive committee to better monitor and discuss sustainability and reputational risks. We now have five executive committees created to advise our management with respect to each of these risks: (i) operational risks, (ii) geotechnical risks, (iii) strategy, finance and cyber risks, (iv) compliance risks and (v) sustainability, institutional relations and reputational risks. We have also revised our Integrated Risk Map to include two new categories: Sustainability & Reputation and People.
- In July 2020, our Board of Directors established a Compliance Office headed by a Chief Compliance Officer (“CCO”), who reports directly to the Board of Directors and is supervised by the Audit Committee. This structure ensures that the CCO has autonomy and is insulated from our other executive structures. The CCO is responsible for supervising the Corporate Integrity, the Internal Audit and also the Whistleblower Channel, of which these two last mentioned areas act as our third line of defense.
- **Expiration of Shareholder Agreement.** In November 2020, the Shareholders’ Agreement among Litela Participações S.A., Litel Participações S.A., Bradespar S.A. Mitsui & Co., Ltd. and BNDES Participações S.A. expired. As a result, these shareholders are no longer required to vote jointly on matters that were previously covered by the agreement.

RUPTURE OF TAILINGS DAM IN BRUMADINHO

On January 25, 2019, a tailings dam ruptured at our Córrego do Feijão mine, in the city of Brumadinho, state of Minas Gerais. The rupture of the dam released a flow of tailings residue, which submerged our administrative area at the Córrego do Feijão mine and reached parts of the communities of Córrego do Feijão and Parque da Cachoeira outside of Brumadinho, and the nearby Paraopeba River. The dam rupture resulted in 270 fatalities, including 11 victims still missing, and caused extensive property and environmental damage in the region.

We will never forget Brumadinho. We reaffirm our respect for the victims and their families, prioritizing the fair and agile reparation of Brumadinho. As we move forward on our path to making our business better, valuing people, safety and reparation, we continue firm in our commitment to become one of the safest and most reliable mining companies in the world.

Reparation and remediation efforts

We have provided humanitarian assistance to victims and their families since the very first moments. Our emergency actions to support impacted people and region included psychological and health care, financial aid, sheltering, food and other essential items, transportation and logistics, emergency safety measures and infrastructure works, animal rescue and care, infrastructure for water supply to the metropolitan region of Belo Horizonte, support to authorities, and donations to municipalities, among other things.

Through February 2021, we had allocated over R\$13 billion to pay for compensation to impacted people, infrastructure works and environmental and socioeconomic reparation actions. The environmental reparation activities extend over 22 municipalities located along the Paraopeba River, and involve sediment containment and removal, monitoring of water quality, and preservation and restoration of fauna and flora.

In 2020, we concluded the works on two pipelines for water withdraw on the Para River, in the city of Para de Minas, as part of the construction of new water supply systems to serve the population of Para de Minas and the metropolitan area of Belo Horizonte. We expect to deliver a third one, on the Paraopeba River, in the first half of 2021. We also completed essential social infrastructure works, with the delivery of a daycare facility and a health care unit to communities in Parque da Cachoeira, and a school for 400 students to the community of Macacos, both in the state of Minas Gerais. In Brumadinho, we are renovating a multi-sport gymnasium complex and all 16 public schools.

In September 2020, we announced the Full Reparation Program, a program for comprehensive reparation of damages caused by the Brumadinho dam rupture. The program results from an open dialogue with authorities and the affected communities, and includes 166 initiatives and projects, including, among others:

- Actions to improve quality of life and create jobs for Brumadinho residents through social projects to transform local realities and bring more dynamism to the local economy. As an example, we provided the installation of 700 km of fiber optic cabling, with wireless access points, increasing the availability of internet network in the region.
- Social service programs for the affected parties.

- Forest recovery, protection of wildlife, fish and plant species, as well as constant water quality monitoring and studies to assess risks to human health.
- Urban and social infrastructure construction projects.
- Other actions designed to bring normality back to evacuated communities.

The Full Reparation Program follows the recommendations contained in the February 2020 report of the Independent Ad Hoc Consulting Committee for Support and Reparation (CIAE-AR), an ad-hoc committee created by our Board of Directors to monitor our measures to support the affected community and to remediate the impacted area. In January 2021, a consulting firm conducted an external assessment and reviewed the actions taken by us and concluded that approximately 82% of the recommendations were addressed and the other 18% are in line with our service and commitment schedule. Additional information is available on our ESG Portal, at www.vale.com/esg. Information in our website is not incorporated by reference in this annual report on Form 20-F.

We know that there is still a lot to be done to fully repair Brumadinho, and we reaffirm our commitment to doing so. For further information on the updated status of our actions taken so far, see the following website: vale.com/repairoverview. Information in our website is not incorporated by reference in this annual report on Form 20-F.

Dam safety measures

We have implemented a number of initiatives to enhance our tailings and dam management process and improve dam safety.

Decharacterization of upstream dams. Our key initiative is the decharacterization of all of our 30 upstream structures in Brazil, including dams, dikes and drained piles. An upstream structure is a structure raised using the upstream raising method, in which the body of the structure is built using the thick tailings deposited in the reservoir, by successively layering them up and in the direction opposite to the water flow (upstream). This is the same construction method as the Brumadinho dam. The term “decharacterization” means functionally reintegrating the structure and its contents into the environment, so that the structure no longer serves its primary purpose of acting as a tailings containment. Recently approved laws and regulations require us to decharacterize all of our upstream structures on a specified timetable, based on projects agreed with authorities.

- The decharacterization of an upstream structures is a complex process and may take a long time to be concluded with the necessary safety precautions. The works related to the decharacterization process may influence the geotechnical stability conditions and increasing the risk of such structures. See *Overview—Risk factors—Risks relating to dam rupture*. We are conducting detailed engineering studies for each structure to be decharacterized, and may need to improve the construction or build additional containment structures (back-up dams) to safely proceed with the decharacterization. For instance, for certain dams, we have to build downstream back-up dams to ensure the retention of tailings in case of a dam rupture. All these projects are subject to further review and eventual approval by the relevant authorities.
- Our decharacterization plan was updated in 2020 and currently comprises 25 geotechnical structures (including 13 dams, 10 dikes and 2 drained piles) built by the upstream raising method. Our plan also includes the construction of seven containment structures (back-up

dams) for certain dams, to retain tailings in case of dam rupture, protecting the area downstream from these dams during the decharacterization works.

- We concluded the decharacterization of five of the original 30 upstream structures between 2019 and early 2021. In 2019, we concluded the decharacterization of the 8B dam in the city of Nova Lima. In 2020, we concluded the decharacterization of Rio do Peixe, II Kalunga and III Kalunga dikes. In 2021, we concluded the decharacterization of Ponces de Rejeitos dam, and we expect to conclude the decharacterization of Fernandinho dam and 4 Pontal and 5 Pontal dikes. In 2020, we have also concluded the construction of two downstream back-up dams, one for the Sul Superior dam and the other for B3/B4 dam, and the first phase of the downstream back-up dams related to Forquilha I, Forquilha II, Forquilha III, Forquilha IV and Grupo dams.
- We also operate tailings dams in Canada and New Caledonia, including compacted outer shell upstream dams in Canada. We are not planning to decharacterize these upstream dams for the time being, since there are no safety, technical or regulatory reasons for doing so. In Mozambique, our single tailings dam is no longer active, and a closure plan is currently at a conceptual stage.
- Our joint venture Samarco owns two upstream tailings dams, both inactive and in compliance with the currently approved design. After the rupture of Samarco's dam in 2015, emergency works were performed in order to ensure the stability required and to comply with the applicable regulation. Samarco is currently implementing a closure plan and long-term monitoring will be defined as part of the decharacterization of both structures. Our investee Mineração Rio do Norte ("MRN") owns 24 tailings dams, 13 of which are active, while the other 11 are inactive. The two upstream dams in such portfolio are inactive and have ongoing decharacterization plans.
- The decharacterization process is important for the long-term risk reduction of the upstream tailings facilities, but the works required for the decharacterization process may impact the geotechnical stability of certain upstream tailings facilities, increasing the risk of rupture of these structures specially during the first phases of this process. To mitigate this risk, we have evacuated the downstream zones of the critical dams and we are building big physical barriers (back-up dams) to contain the tailings in case of failure. To mitigate the risk of life losses, we are considering alternatives to perform the works in these critical dams with remotely-operated equipment and the design is being reviewed with proper redundancy levels.
- In 2020, we spent a total of US\$293 million in connection with the decharacterization of dams. As of December 31, 2020, we had a US\$2.289 billion provision recognized in our balance sheet for the decharacterization of upstream structures.

Monitoring and precautionary measures. We have been closely monitoring our active and inactive dams. Among other measures to improve our tailings and dam management system, we have dedicated teams with enhanced governance and revised processes and standards. We have created three geotechnical monitoring centers since 2019, to continuously monitor the dams and to collect information for better decision making. We have implemented 24-hour video monitoring, emergency sirens, water level monitoring in different areas of dam and satellite and drone image and radar monitoring.

Under applicable Brazilian regulations, we must submit to the authorities a certification of stability (Stability Condition Statement, or "DCE") from an independent expert for each of our dams. For 104 of

our geotechnical structures, the DCE must be submitted semi-annually, on March 31 and September 30 of each year. If we are unable to comply with safety requirements for issuance of the DCE of a certain dam, we need to take certain emergency actions based on the Emergency Action Plan for Mining Dam (“PAEBM”) for this dam, which may include the suspension of related operations, evacuation of the area surrounding the dam and removal of communities.

- In January 2020, we implemented the function of “Engineer of Record” (“EoR”) for our iron ore business, responsible for carrying out regular dam safety inspections for each dam, as well as the issuance of monthly technical reports, in a model of continuous supervision. This is another line of defense for dam safety, under which if a change in the stability of any of our structures is identified, a new audit process may be initiated to issue or revoke a DCE at any moment. We have implemented continuous monitoring through an EoR in all 104 structures.
- As of December 31, 2020, an EoR issued DCEs for 72 structures (61 structures in our ferrous minerals operations and 11 in our base metals operations). We did not obtain DCEs for 32 structures (all of them in our ferrous minerals operations).
- In 2019 and 2020, we relocated 1,415 people residing in the self-rescue zones of the Sul Superior dam (in Barão de Cocais, Minas Gerais), the Vargem Grande dam and the B3/B4 dam at the Mar Azul mine (in the city of Nova Lima, Minas Gerais), the Doutor dam (in Ouro Preto, Minas Gerais) and the Forquilhas 1 and 2 dams (in Itabirito, Minas Gerais).

Additional information on the status of DCEs and emergency levels of our structures is available on our ESG Portal, at www.vale.com/esg. Information in our website is not incorporated by reference in this annual report on Form 20-F.

Review of our active and inactive mining sites. We are reviewing our active and inactive mining sites to improve geotechnical management and ensure compliance with applicable rules. As part of our ongoing review of our mining sites, we may identify other structures that should be classified as dams under applicable regulations, which may trigger additional obligations or precautionary measures. These measures could impact our production, cause the suspension of operations and generate additional costs, which could materially and adversely affect our business.

Stabilization of production. In 2020, we partially resumed our iron ore fines operations that had been suspended in 2019.

Settlement agreements

We have been actively seeking non-judicial alternatives to promote a more expedited reparation and remediation to the impacted people and to settle the various legal proceedings relating to the Brumadinho dam rupture. Below is a summary of key settlement agreements we have entered so far.

Global Settlement for Full Reparation. On February 4, 2021, we entered into a court-supervised settlement agreement with the Government of the State of Minas Gerais, the Public Defender Office of the State of Minas Gerais (*Defensoria Pública de Minas Gerais*), public prosecutors of the State of Minas Gerais (*Ministério Público do Estado de Minas Gerais*—“MPMG”) and federal prosecutors (*Ministério Público Federal*—“MPF”) for the reparation and remediation of socio-environmental and social-economic damages resulting from the Brumadinho dam rupture (the “Global Settlement”). This agreement was mediated by the Court of Appeals of the State of Minas Gerais.

- Under the Global Settlement, we agreed on a number of socio-economic and socio-environmental reparation projects, with an estimated economic amount of R\$37.7 billion. The agreement includes our obligations to (i) fund certain agreed socio-economic and socio-environmental projects that will be managed by the State of Minas or by the courts, subject to a fixed disbursement schedule of predefined amounts, and (ii) implement directly certain projects established in the Global Settlement. The estimated economic value of the Global Settlement includes: (i) disbursements made prior to the settlement date of scope similar to the agreement, in an amount of R\$7.8 billion; (ii) disbursements required for implementation of projects to be managed by the authorities, for a total specified amount of R\$19.2 billion; (iii) estimated costs of the socio-economic reparation projects to be directly implemented by us, subject to a cap of R\$5.7 billion; and (iv) estimated costs of R\$5 billion of environmental recovery projects to be implemented by us. The estimated costs of the projects to be implemented by us are not a cap to our commitments under the Global Settlement.
- Projects contemplated in the agreement are in line with our Full Reparation Program, and include (i) projects demanded by the affected communities, (ii) a program of income transfer to the impacted population, replacing the current payment of emergency aid, (iii) projects for the city of Brumadinho and for the other municipalities of the Paraopeba Basin, (iv) funding for the Government of the State of Minas Gerais to implement an urban mobility program and (v) a public service strengthening program.
- This agreement settles certain public civil actions in which public authorities sought damages and a wide range of injunctive measures against us as a result of the Brumadinho dam rupture. Part of our commitments under the agreement were settled with the release, for the benefit of the authorities, of judicial deposits we had made in the amount of R\$5.4 billion (US\$ 1.039 billion), to be used in the implementation of projects under the Settlement Agreement. Individual claims for severable damages are excluded from the Global Settlement. See—*Other settlement agreements* below and *Additional Information—Legal proceedings*.
- We will be discharged of the obligations established in the Global Settlement upon (a) the full payment of our financial commitments, in accordance with the amounts and payment schedule defined for the projects managed by the State of Minas Gerais and judicial authorities, and (b) the conclusion by Vale of the projects to be implemented directly by us, which mainly include socio-economic and environmental repair projects.
- The Global Settlement also establishes guidelines for the governance and implementation of the Full Reparation Program.

As a result of the Global Settlement and based on our cash outflow expectations, we recognized a provision in the amount of R\$19.924 billion (US\$ 3.872 billion) in our 2020 fiscal year. For a discussion of the impacts of the dam rupture on our business and operations, see *Overview—Risk factors—Risks relating to dam rupture* and see *Operating and Financial Review and Prospects—Overview—Tailing dam rupture in Brumadinho*.

Other settlement agreements. We have entered into other settlement agreements with public authorities to establish the framework for individual indemnification of the victims, in addition to individual settlement agreements with the victims.

- *February 2019 preliminary settlement agreement.* In February 2019, we entered into a preliminary settlement agreement with the state of Minas Gerais and other public authorities pursuant to which we committed to make monthly emergency aid payments to residents of Brumadinho and certain communities located downstream of the dam from January 2019 through February 2021. As of March 18, 2021, the total amount paid as emergency aid was approximately R\$2 billion, and these amounts were recognized within the R\$37.7 billion Global Settlement. Also under the Global Settlement, we will provide R\$4.4 billion to the income transfer program that will replace the monthly emergency aid payments. This program will be administered and operated by the judicial authorities.
- *April 2019 preliminary settlement agreement with Minas Gerais state public defenders.* In April 2019, we entered into an agreement with the public defenders' office of the state of Minas Gerais to establish the framework for out-of-court settlement agreements for damage claims for property and other economic and moral damages (*danos morais*). As of March 18, 2021, we had entered into more than 3,500 indemnification agreements with over 7,670 individuals affected by the dam rupture, providing for payments in the aggregate amount of approximately R\$1,300 million. These standards were also used to determine indemnification payments in other municipalities where evacuations occurred as result of the elevation of the emergency level of certain dams. As of March 4, 2021, we had entered into more than 1,100 indemnification agreements with individuals or groups affected by the evacuation of certain areas, providing for payments in the aggregate amount of approximately R\$500 million.
- *Settlement agreement with public labor prosecutors and labor unions.* In July 2019, we entered into a settlement agreement with the public labor prosecutors to indemnify relatives of the victims of the dam rupture. As of March 18, 2021, we had entered into more than 675 indemnification agreements with individuals or groups pursuant to this settlement agreement, providing for payments to family members of 249 workers (of the 250 deceased workers), in the aggregate amount currently exceeding R\$1,180 million. In March 2020, we entered into a settlement agreement with labor unions, setting forth the indemnification amount to be paid to survivor workers and workers based on the Córrego do Feijão and Jangada Mines. As of March 18, 2021, we had entered into more than 700 indemnification agreements with individuals or groups pursuant to this settlement agreement, providing for payments in the aggregate amount of approximately R\$102 million.
- *Other agreements.* We have entered into other agreements with authorities to cover specific topics, such as support to the municipalities in providing public services and infrastructure, emergency payments to the indigenous communities, specific remediation and compensation measures, external audits and asset integrity studies, provision of technical support for the authorities, with measures to review and reinforce structures and suspension of operations.

Other legal proceedings and investigations relating to the Brumadinho dam rupture continue, and new investigations and legal proceedings may be brought in the future. See *Additional Information—Legal proceedings*.

Cultural transformation

We are promoting a cultural transformation, seeking to bring safety, people and reparation to the center of our decisions. As part of this effort, we believe that five key behaviors must be present throughout the organization:

- Obsession with safety and risk management.
- Open and transparent dialogue.
- Empowerment with responsibility.
- Ownership for the whole.
- Active listening and engaging with society.

In 2019, we began a large-scale implementation of Vale Management System (VPS) to leverage the cultural transformation process. Through the development of people, the standardization of processes and operational discipline, the VPS inserts and reinforces, in the operational routine, the key behaviors and protocols for our strategic matters. See *Overview—Business Overview—Safety and operational excellence*.

In 2020, we conducted a cultural assessment that indicated the need to build a culture of learning together, with humility, discipline, a sense of collectivity, and, mainly, unceasing vigilance about safety. Based on the results of this assessment, we have promoted a number of initiatives to strengthen controls and corporate governance, and to promote changes in our internal organization, our culture, and our ability to identify risks and take action to address them. These initiatives also reflect our responses to the recommendations we received in the report issued in February 2020 by the Independent Ad Hoc Consulting Committee for Investigation (CIAEA). We have established a timeline for actions to comply with the recommendations from the CIAEA, and by 2020 approximately 90% of these recommendations had already been fully addressed. We expect to address the remaining recommendations by December 2022. Additional information on the status of our actions in response to the recommendations from the CIAEA is available on our ESG Portal, at www.vale.com/esg. Information in our website is not incorporated by reference in this annual report on Form 20-F.

We have also developed a project named “purpose of Vale”, which involved 60 leaders who recovered the history and essence of Vale. In 2021, we defined our purpose as: “We exist to improve life and transform the future. Together.” The purpose is a clear orientation for our actions and objectives, and is supported by four pillars: (i) serving society, returning value to all, (ii) making together, (iii) using our mobilizing capacity to make something extraordinary, and (iv) transforming the future, taking care of the present.

RUPTURE OF SAMARCO'S TAILINGS DAM IN MINAS GERAIS

In November 2015, the Fundão tailings dam owned by Samarco ruptured, releasing tailings downstream, flooding certain communities and causing impacts on communities and the environment along the Doce river. The rupture resulted in 19 fatalities and caused property and environmental damage to the affected areas. Samarco is a joint venture equally owned by Vale S.A. and BHP Billiton Brasil Ltda. ("BHPB").

In June 2016, Samarco, Vale and BHPB, in agreement with public authorities, created Fundação Renova, a not-for-profit private foundation, to develop and implement (i) social and economic remediation and compensation programs and (ii) environmental remediation and compensation programs in the region affected by the dam rupture. Fundação Renova has been implementing 42 remediation programs established under the settlement agreements entered into with public authorities, following the governance mechanisms established in these settlement agreements.

- In August 2020, we announced the "*Agenda Integrada*" program, a settlement agreement among Fundação Renova, the states of Minas Gerais and Espírito Santo and an association of mayors of cities along the Doce river, providing for the allocation of R\$882 million to investments in education, infrastructure, and health in the region impacted by the rupture of the Samarco dam.
- In July 2020, the 12th Federal Court in Belo Horizonte issued a decision providing guidelines for compensation to be paid to residents of the city of Baixo Guandu, followed by other decisions setting simplified parameters for the compensation of workers (mainly informal workers), in at least 20 cities and villages in the states of Minas Gerais and Espírito Santo. These parameters may be reflected throughout other cities along the Doce river. As of March 10, 2021, more than 6,500 workers had received payments through this new simplified compensation mechanism.
- For a discussion of the funding of Fundação Renova and the impact on our financial statements, see *Operating and Financial Review and Prospects—Overview—Fundação Renova and Samarco Funding*.
- For a discussion of the legal proceedings resulting from the rupture of Samarco's tailings dam, the settlement agreements we entered into with public authorities and the creation of Fundação Renova, see *Additional Information—Legal proceedings*.
- For further information on the actions taken by Fundação Renova, see the following website: <http://www.vale.com/lesg/en/Pages/RenovaFoundation.aspx>. Information on our website is not incorporated by reference in this annual report on Form 20-F.

Since the rupture of the Fundão dam, Samarco has been subject to extensive litigation and is in a situation of financial distress. Samarco has defaulted in a number of financing agreements and is engaged in discussions with creditors for a potential debt restructuring. See *Overview—Risk factors—Legal, Political, Economic, Social and Regulatory Risks—Legal proceedings and investigations could have a material adverse effect on our business*.

SELECTED FINANCIAL DATA

The tables below present selected consolidated financial information as of and for the years indicated. You should read this information together with our consolidated financial statements in this annual report.

Consolidated statement of income data

	For the year ended December 31,				
	2020	2019	2018	2017	2016
	(US\$ million)				
Net operating revenue	40,018	37,570	36,575	33,967	27,488
Cost of goods sold and services rendered	(19,039)	(21,187)	(22,109)	(21,039)	(17,650)
Selling, general, administrative and other operating expenses, net	(1,306)	(992)	(968)	(951)	(774)
Research and evaluation expenses	(443)	(443)	(373)	(340)	(319)
Pre-operating and operational stoppage	(887)	(1,153)	(271)	(413)	(453)
Brumadinho event	(5,257)	(7,402)	–	–	–
Impairment and disposals of non-current assets	(2,243)	(5,074)	(899)	(294)	(1,240)
Operating income	10,843	1,319	11,955	10,930	7,052
Non-operating income (expenses):					
Financial income (expenses), net	(4,811)	(3,413)	(4,957)	(3,019)	1,843
Equity results and other results in associates and joint ventures	(1,063)	(681)	(182)	(82)	(911)
Income (loss) before income taxes	4,969	(2,775)	6,816	7,829	7,984
Income taxes	(438)	595	172	(1,495)	(2,781)
Net income (loss) from continuing operations	4,531	(2,180)	6,988	6,334	5,203
Net income (loss) attributable to non-controlling interests	(350)	(497)	36	21	(8)
Net income (loss) from continuing operations attributable to Vale's stockholders	4,881	(1,683)	6,952	6,313	5,211
Loss from discontinued operations attributable to Vale's stockholders	–	–	(92)	(806)	(1,229)
Net income (loss) attributable to Vale's stockholders	4,881	(1,683)	6,860	5,507	3,982
Net income (loss) attributable to non-controlling interests	(350)	(497)	36	14	(6)
Net income (loss)	4,531	(2,180)	6,896	5,521	3,976
Total cash paid to stockholders(1)	3,350	–	3,313	1,456	250

(1) Consists of total cash paid to stockholders during the year, whether classified as dividends or interest on stockholders' equity.

Earnings (loss) per share

The table below shows our earnings (loss) per share. The earnings (loss) per share for 2016 have been retrospectively adjusted to reflect the conversion of our Class A preferred shares into common shares, which was concluded in November 2017, as if the conversion had occurred at the beginning of the earliest year presented.

	For the year ended December 31,				
	2020	2019	2018	2017	2016
	(US\$, except as noted)				
Earnings (loss) per common share from continuing operations ..	0.95	(0.33)	1.34	1.21	1.00
Loss per common share from discontinued operations	–	–	(0.02)	(0.16)	(0.23)
Earnings (loss) per common share	0.95	(0.33)	1.32	1.05	0.77
Weighted average number of shares outstanding (in thousands)(1)(2)	5,129,585	5,127,950	5,178,024(3)	5,197,432	5,197,432
Distributions to stockholders per share(2)(4)					
Expressed in US\$	0.65	–	0.64	0.28	0.05
Expressed in R\$	3.63	–	2.39	0.90	0.17

(1) Each common ADS represents one common share.

(2) Restated as if the conversion had occurred at the beginning of the earliest year presented.

Selected Financial Data

- (3) The number of weighted average shares outstanding as of December 31, 2018 has been revised, with no impact on the basic and diluted earnings (loss) per share from continuing operations as of December 31, 2018.
- (4) Our distributions to shareholders may be classified as either dividends or interest on shareholders' equity. In many years, part of each distribution has been classified as interest on shareholders' equity and part has been classified as dividends. For information about distributions paid to shareholders, see *Share Ownership and Trading—Distributions*.

Balance sheet data

	As of December 31,				
	2020	2019	2018	2017	2016
	(US\$ million)				
Current assets	24,403	17,042	15,292	15,367	13,978
Non-current assets held for sale	–	–	–	3,587	8,589
Property, plant and equipment, net and intangible assets	50,444	55,075	56,347	63,371	62,290
Investments in associated companies and joint ventures	2,031	2,798	3,225	3,568	3,696
Non-current assets	15,129	16,798	13,326	13,291	10,461
Total assets	92,007	91,713	88,190	99,184	99,014
Current liabilities	14,594	13,845	9,111	11,935	10,142
Liabilities associated with non-current assets held for sale	–	–	–	1,179	1,090
Long-term liabilities(1)	28,701	25,467	19,784	20,512	19,096
Long-term debt and leases(2)	13,891	13,408	14,463	20,786	27,662
Total liabilities	57,186	52,720	43,358	54,412	57,990
Stockholders' equity:					
Capital stock	61,614	61,614	61,614	61,614	61,614
Additional paid-in capital	(2,056)	(2,110)	(1,122)	(1,106)	(851)
Retained earnings and revenue reserves	(23,814)	(19,437)	(16,507)	(17,050)	(21,721)
Total Vale shareholders' equity	35,744	40,067	43,985	43,458	39,042
Non-controlling interests	(923)	(1,074)	847	1,314	1,982
Total stockholders' equity	34,821	38,993	44,832	44,772	41,024
Total liabilities and stockholders' equity	92,007	91,713	88,190	99,184	99,014

- (1) Excludes long-term debt and lease liability.
- (2) Excludes current portion of long-term debt and lease liability.

FORWARD-LOOKING STATEMENTS

This annual report contains statements that may constitute forward-looking statements within the meaning of the safe harbor provisions of the U.S. Private Securities Litigation Reform Act of 1995. Many of those forward-looking statements can be identified by the use of forward-looking words such as “anticipate,” “believe,” “could,” “expect,” “should,” “plan,” “intend,” “estimate” and “potential,” among others. Those statements appear in a number of places and include statements regarding our intent, belief or current expectations with respect to:

- the impact of the rupture of the tailings dam in Brumadinho in 2019, the rupture of Samarco’s tailings dam in 2015, and related remediation measures on our operations, cash flows and financial position;
- the implementation of our dam decharacterization plan;
- the outcome of the various investigations, regulatory, governmental and legal proceedings in which we are involved;
- the duration and severity of the recent coronavirus (COVID-19) outbreak and its impacts on our business;
- our direction and future operation;
- the implementation of our financing strategy and capital expenditure plans;
- the exploration of mineral reserves and development of mining facilities;
- the depletion and exhaustion of mines and mineral reserves;
- trends in commodity prices, supply and demand for commodities;
- the future impact of competition and regulation;
- the payment of dividends or interest on shareholders’ equity;
- compliance with financial covenants;
- industry trends, including the direction of prices and expected levels of supply and demand;
- the implementation of our principal operating strategies, including our potential participation in acquisition, divestiture or joint venture transactions or other investment opportunities;
- our ability to comply with our ESG targets and commitments;
- other factors or trends affecting our financial condition or results of operations; and
- the factors discussed under *Overview—Risk factors*.

We caution you that forward-looking statements are not guarantees of future performance and involve risks and uncertainties. Actual results may differ materially from those in forward-looking statements as a result of various factors. These risks and uncertainties include factors relating to (i) economic, political and social issues in the countries in which we operate, including factors relating to the coronavirus pandemic outbreak, (ii) the global economy, (iii) commodity prices, (iv) financial and capital markets, (v) the mining and metals businesses, which are cyclical in nature, and their dependence upon global industrial production, which is also cyclical, (vi) regulation and taxation, (vii) operational incidents or accidents, and (viii) the high degree of global competition in the markets in which we operate. For additional information on factors that could cause our actual results to differ from expectations reflected in forward-looking statements, see *Overview—Risk factors*. Forward-looking statements speak only as of the date they are made, and we do not undertake any obligation to update them in light of new information or future developments. All forward-looking statements attributed to us or a person acting on our behalf are expressly qualified in their entirety by this cautionary statement, and you should not place undue reliance on any forward-looking statement.

RISK FACTORS

Developments relating to the pandemic of the coronavirus may have a material adverse impact on our financial conditions or results of operations.

In December 2019, the outbreak of a contagious disease, the Coronavirus Disease 2019 (COVID-19), spread throughout the world. In March 2020, the World Health Organization (WHO) declared COVID-19 outbreak pandemic. The disease has caused multiple fatalities worldwide, including in Brazil and Canada, where we have our main operations. The impact on the global economy and financial markets has been significant and the overall consequences are still uncertain. It is unclear how the COVID-19 pandemic will evolve throughout 2021 and the following years.

- In 2020 and continuing in 2021, governmental authorities in various jurisdictions imposed lockdowns or other restrictions to contain the virus, and several businesses suspended or reduced operations. We, our customers, suppliers and service providers may face restrictions imposed by regulators and authorities. These restrictions may result in difficulties related to employee absences, and—consequently- in insufficient personnel at some sites, disruption of our supply chain, deterioration of our customers' financial health, higher costs and expenses associated with the suspension of contractors' work on non-essential projects, operational difficulties such as the postponement of the resumption of our production capacity due to delayed inspections, assessments or authorizations, among other operational difficulties. We may need to adopt further contingency measures or eventually suspend additional operations, which may have a material adverse impact on our production and sales, result in additional costs and expenses, and eventually adversely impact our financial conditions or results of operations.
- In 2020, we have ramped down some operations and revisited plans for others. See *Overview—Business overview—Significant changes in our business*. While these operations have resumed, we may face similar situations in the future.
- We have transitioned a significant number of our employees to a remote work regime in an effort to mitigate the spread of COVID-19. Remote working may amplify certain risks to our businesses due to increased demand for information technology resources combined with increased risk of phishing scams and other cybersecurity attacks, increased risk of unauthorized dissemination of sensitive personal or confidential information and increased risk of business interruptions. We may also be more exposed to lawsuits from our employees alleging unpaid overtime or other labor-related claims. These risks may result in additional costs and expenses, affect our ability to operate effective internal control over financial reporting and adversely affect our reputation.
- As a result of the current coronavirus pandemic outbreak, business activities worldwide, including construction and manufacturing activities that are two of the main drivers of demand for iron ore and other metals, have been significantly impacted and a general recovery of such industries may take long. If the coronavirus outbreak continues and efforts to contain the pandemic, whether governmental or otherwise, further limit business activity, or limit our ability to transport our products to customers generally, for an extended period of time, the demand for our products could be adversely impacted. All these factors could also have a material adverse impact on our financial conditions or results of operations.

RISKS RELATING TO DAM RUPTURE

The rupture of a dam or similar structure may cause severe damages.

We own a significant number of dams and other geotechnical structures. Some of these structures were built using the “upstream” raising method, which presents stability risks, especially related to liquefaction. The rupture of any of these structures could cause loss of life and severe personal, property and environmental damages, and could have adverse effects on our business and reputation, as evidenced by the consequences of the dam rupture in Brumadinho. Some of our joint ventures and investees, including Samarco and Mineração Rio do Norte S.A. (MRN), also own dam and similar structures, including structures built using the upstream raising method.

Recently approved laws and regulations require us to decharacterize all of our upstream dams on a specified timetable. We are still determining the appropriate measures for the decharacterization of each upstream dam, but some of those dams already have decharacterization projects with timelines until 2029, as agreed with authorities given the dams technical characteristics, such as volumes of tailings contained. The implementation of the decharacterization plan will require significant expenditures, and the decharacterization process may take a long time. As of December 31, 2020, our provision for the conclusion of the decharacterization plan of our structures is US\$2.289 billion and of Samarco’s structure is US\$221 million, subject to revision depending on further adjustments to the decharacterization projects.

The works related to the decharacterization process may impact the geotechnical stability of certain upstream tailings facilities, increasing the risk of rupture of these structures specially during the first phases of this process. In extreme cases, this process, when associated with other conditions, may contribute to the rupture of structures. The evacuation of the downstream zones of the critical dams, the construction of physical barriers (back-up dams) to contain the tailings in case of failure and other safety measures we take may not be sufficient to prevent damages.

The rupture of our tailings dam in Brumadinho has adversely affected our business, financial condition and reputation, and the overall impact of the dam rupture on us is still uncertain.

In January 2019, the dam rupture in Brumadinho resulted in 270 fatalities or presumed fatalities, in addition to personal, property and environmental damages. See *Overview—Business overview—Rupture of tailings dam in Brumadinho*. This event has adversely affected and will continue to adversely affect our operations.

- *Liabilities and legal proceedings.* We continue to be a defendant in a number of legal proceedings and investigations related to the dam rupture, including criminal investigations in Brazil and securities litigation in the United States. Additional proceedings and investigations may be initiated in the future. Adverse results in these proceedings may have a material adverse effect on our business and financial condition. See *Overview—Business overview—Rupture of tailings dam in Brumadinho* and *Additional Information—Legal proceedings*.
- *Suspension of operations.* Following the dam rupture, we have suspended various operations, which have adversely impacted and may continue to adversely impact our production and cash flows. It is possible that certain of these operations may not be resumed. See *Operating and Financial Review and Prospects—Tailing dam rupture in Brumadinho*.

- *Impact on our financial performance.* The dam rupture continues to have a significant impact on our financial performance, which include reduced revenues due to the suspension of operations, increased expenditures for assistance and remediation, impairments of fixed assets, provisions for costs of decharacterization, restoration and recovery, and provisions for legal proceedings. See *Operating and Financial Review and Prospects—Overview—Tailings dam rupture in Brumadinho*.
- *Increase in production costs and capital investments.* We have made investments and adjustments in our operations and may need to make additional investments and adjustments to increase production, mitigate the impact of suspended operations or comply with additional safety requirements. We may also have to use alternative disposal methods to continue operating certain of our mines and plants, particularly those that rely on tailings dams. These alternative methods may be more expensive or require significant capital investments in our mines and plants. As a result, we expect our costs to increase, which may have a material adverse effect on our business and financial condition.
- *Additional regulation and restrictions on mining operations.* Rules on mining activities and ancillary activities, such as dam safety, have become stricter following the Brumadinho dam rupture. Additional rules may be approved. The licensing process for our operations has become longer and subject to more uncertainties. Also, external experts may be reluctant to attest to the stability and safety of our dams, as a result of increasing risks of liability. If any of our dams is unable to comply with the safety requirements or if we are unable to obtain the required certification for any of our dams, we may need to suspend operations, evacuate the area surrounding this dam, relocate communities and take other emergency actions. These measures are costly, may adversely impact our business and financial condition and may cause further damage to our reputation.
- *Additional environmental impacts.* The entire environmental consequences of the Brumadinho dam rupture remain uncertain, and additional damages may be identified in the future. Also, failure to implement our decharacterization plan and measures to prevent further accidents could also lead to additional environmental damages, additional impacts on our operations, and additional claims, investigations and proceedings against us.
- *Reserves.* New regulations applicable to dam licensing and operations have caused, and may further cause, decreases in our reported reserves or reclassification of proven reserves as probable reserves.
- *Increased cost of insurance.* Our cost of insurance is expected to rise, and we may not be able to obtain insurance for certain risks.
- *Increased taxation and other obligations.* We may be subject to new or increased taxes or other obligations to fund remediation measures and compensate direct and indirect impacts of dam ruptures.

EXTERNAL RISKS

Our business is exposed to the cyclicity of global economic activity and requires significant investments of capital.

As a mining company, we are a supplier of industrial raw materials. Industrial production is cyclical and volatile, which affects demand for minerals and metals. At the same time, investment in mining requires a

substantial amount of funds in order to replenish reserves, expand and maintain production capacity, build infrastructure, preserve the environment, prevent fatalities and occupational hazards and minimize social impacts. Sensitivity to industrial production, together with the need for significant long-term capital investments, are important sources of risk for our financial performance and growth prospects.

We may not be able to adjust production volume in a timely or cost-efficient manner in response to changes in demand. Lower utilization of capacity during periods of weak demand may expose us to higher unit production costs since a significant portion of our cost structure is fixed in the short-term due to the capital intensity of mining operations. In addition, efforts to reduce costs during periods of weak demand could be limited by labor regulations or previous labor or government agreements. Conversely, during periods of high demand, our ability to rapidly increase production capacity is limited, which could prevent us from meeting demand for our products. We may be unable to complete expansions and greenfield projects in time to take advantage of rising demand for iron ore, nickel or other products. When demand exceeds our production capacity, we may meet excess customer demand by purchasing iron ore fines, iron ore pellets or nickel from third parties processing and reselling it, which would increase our costs and narrow our operating margins. If we are unable to satisfy excess customer demand in this way, we may lose customers. In addition, operating close to full capacity may expose us to higher costs, including demurrage fees due to capacity restraints in our logistics systems.

The prices for our products are subject to volatility, which may adversely affect our business.

Global prices for metals are subject to significant fluctuations and are affected by many factors, including actual and expected global macroeconomic and political conditions, regional and sectorial factors, levels of supply and demand, the availability and cost of substitutes, inventory levels, technological developments, regulatory and international trade matters, investments by commodity funds and others and actions of participants in the commodity markets. Sustained low market prices for the products we sell may result in the suspension of certain of our projects and operations, decrease in our mineral reserves, impairment of assets, and may adversely affect our cash flows, financial position and results of operations. We expect that the price of our products may be subject to additional volatility in 2021 due to the impact of the COVID-19 pandemic and relief measures.

Demand for our iron ore, coal and nickel products depends on global demand for steel. Iron ore and iron ore pellets, which together accounted for 79% of our 2020 net operating revenues, are used to produce carbon steel. Nickel, which accounted for 8% of our 2020 net operating revenues, is used mainly to produce stainless and alloy steels. The prices of different steels products and the performance of the global steel industry are highly cyclical and volatile, and these business cycles in the steel industry affect demand and prices for our products. In addition, vertical backward integration of the steel and stainless steel industries and the use of scrap could reduce the global seaborne trade of iron ore and primary nickel. The demand for copper is affected by the demand for copper wire, and a sustained decline in the construction industry could have a negative impact on our copper business.

We are mostly affected by movements in iron ore prices. For example, a price reduction of US\$1 per dry metric ton unit (“dmt”) in the average iron ore price would have reduced our operating income for the year ended December 31, 2020 by approximately US\$265 million. Average iron ore prices significantly changed in the last five years, from US\$58.5 per dmt in 2016, US\$71.3 per dmt in 2017, US\$69.5 per dmt in 2018, US\$93.4 per dmt in 2019 and US\$108.9 per dmt in 2020, according to the average Platts IODEX (62% Fe CFR China). On January 5, 2021, the year-to-date average Platts IODEX iron ore price was US\$164.5 per dmt. See *Operating and Financial Review and Prospects—Overview—Major factors affecting prices*.

Adverse economic developments in China could have a negative impact on our revenues, cash flow and profitability.

China has been the main driver of global demand for minerals and metals over recent decades. In 2020, Chinese demand represented 80% of global demand for seaborne iron ore, 60% of global demand for nickel and 54% of global demand for copper. The percentage of our net operating revenues attributable to sales to customers in China was 58% in 2020. Therefore, any contraction of China's economic growth could result in lower demand for our products, leading to lower revenues, cash flow and profitability. Poor performance in the Chinese real estate sector, the largest consumer of carbon steel in China, would also negatively impact our results. These risks may be intensified in 2021 due to the impact of the COVID-19 pandemic.

Changes in exchange rates for the currencies in which we conduct operations could adversely affect our financial condition and results of operations.

A substantial portion of our revenues, trade receivables and our debt is denominated in U.S. dollars, and given that our functional currency is the Brazilian *real*, changes in exchange rates may result in (i) losses or gains on our net U.S. dollar-denominated indebtedness and accounts receivable and (ii) fair value losses or gains on currency derivatives we use to stabilize our cash flow in U.S. dollars. In 2020, we had net foreign exchange losses of US\$ 523 million, while we had net foreign exchange gains of US\$39 million in 2019. In addition, changing values of the Brazilian *real*, the Canadian dollar, the Euro, the Indonesian rupiah, the Chinese *yuan* and other currencies against the U.S. dollar affects our results since most of our costs of goods sold is denominated in currencies other than the U.S. dollar, principally the *real* (39.5% in 2020) and the Canadian dollar (6.2% in 2020), while our revenues are mostly U.S. dollar-denominated. We expect currency fluctuations to continue to affect our financial income, expense and cash flow generation.

Significant volatility in currency prices, among other factors, may also result in disruption of foreign exchange markets, which could limit our ability to transfer or to convert certain currencies into U.S. dollars and other currencies for the purpose of making timely payments of interest and principal on our indebtedness. The central banks and governments of the countries in which we operate may institute restrictive exchange rate policies in the future and impose taxes on foreign exchange transactions.

FINANCIAL RISKS

Lower cash flows, resulting from suspension of operations or decreased prices of our products, may adversely affect our credit ratings and the cost and availability of financing.

The suspension of operations or a decline in the prices of our products may adversely affect our future cash flows, credit ratings and our ability to secure financing at attractive rates. It may also negatively affect our ability to fund our capital investments, including disbursements required to remediate and compensate damages resulting from the dam rupture in Brumadinho, provide the financial assurances required to obtain licenses in certain jurisdictions, pay dividends and comply with the financial covenants in some of our long-term debt instruments. See *Operating and Financial Review and Prospects—Liquidity and capital resources*.

Uncertainties relating to the discontinuation and replacement of LIBOR may adversely affect us.

In July 2017, the U.K. Financial Conduct Authority (FCA), which regulates the London Interbank Offered Rate ("LIBOR"), announced the effective discontinuation of LIBOR. After December 31, 2021, the FCA will

no longer require panel banks to submit quotes for LIBOR settings other than overnight and 12-month U.S. dollar LIBOR and, after June 30, 2023, the FCA will no longer require panel banks to submit quotes for any U.S. dollar LIBOR settings. We are currently evaluating the potential impact of the eventual replacement of the LIBOR interest. As of the date hereof, it is not possible to predict the effect of the discontinuation of LIBOR or its replacement by alternative reference rates or of any other reforms to the LIBOR that may be enacted in the United Kingdom or elsewhere. Uncertainty related to the discontinuation, as to the nature of alternative reference rates and as to potential changes or other reforms to LIBOR may have a material adverse effect on our financial condition and results of operations.

LEGAL, POLITICAL, ECONOMIC, SOCIAL AND REGULATORY RISKS

Legal proceedings and investigations could have a material adverse effect on our business.

We are involved in legal proceedings in which adverse parties have sought injunctions to suspend certain of our operations or claimed substantial amounts against us. Also, under Brazilian law, a broad range of conduct that could be considered to be in violation of Brazilian environmental, labor or tax laws can be considered criminal offenses. Accordingly, our executive officers and employees could be subject to criminal investigations and criminal proceedings in connection with allegations of violation of environmental, labor or tax laws, and we or our subsidiaries could be subject to criminal investigations and criminal proceedings in connection with allegations of violation of environmental laws.

Defending ourselves in these legal proceedings may be costly and time consuming. Possible consequences of adverse results in some legal proceedings include suspension of operations, payment of significant amounts, triggering of creditor remedies and damage to our reputation, which could have a material adverse effect on our results of operations or financial condition. See *Additional Information—Legal proceedings*.

In addition to the investigations and legal proceedings relating to the Brumadinho dam failure, as a shareholder of Samarco, we also face the consequences of the failure of the Fundão tailings dam in November 2015. We are involved in multiple legal proceedings and investigations relating to the rupture of the Fundão tailings dam. Tax authorities or other creditors of Samarco may attempt to recover from us amounts due by Samarco, if Samarco is unable to fulfill its obligations or is unable to restructure its debt. Failure to contain the remaining tailings in Samarco's dams could cause additional environmental damages, additional impacts on our operations, and additional claims, fines and proceedings against Samarco and against us. We have been funding Fundação Renova to support certain remediation measures undertaken by Samarco and also providing funds directly to Samarco, to preserve its operations. If Samarco is unable to generate sufficient cash flows to fund the remediation measures required under these agreements, we will be required to continue funding these remediation measures. See *Overview—Business overview—Rupture of Samarco's tailings dam in Minas Gerais*. See *Additional Information—Legal proceedings*.

Political, economic and social conditions in the countries in which we have operations or projects, particularly in Brazil, could adversely impact our business.

Our financial performance may be negatively affected by regulatory, political, economic and social conditions in countries in which we have significant operations or projects. In many of these jurisdictions, we are exposed to various risks such as political instability, bribery, cyber-attacks, extortion, corruption, robbery, sabotage, kidnapping, civil strife, acts of war, guerilla activities, piracy in international shipping routes and terrorism. These issues may adversely affect the economic and other conditions under which we operate in ways that could have a materially negative effect on our business.

In Brazil, where a significant part of our operations is concentrated, the federal government's economic policies may have important effects on Brazilian companies, including us, and on market conditions and prices of securities of Brazilian companies. Our financial condition and results of operations may be adversely affected, for instance, by the following factors and the Brazilian federal government's response to these factors:

- exchange rate movements and volatility;
- inflation and high interest rates;
- financing of the current account deficit;
- liquidity of domestic capital and lending markets;
- tax policy;
- pension, tax and other reforms;
- political instability resulting from allegations of corruption involving political parties, elected officials or other public officials; and
- other political, diplomatic, social and economic developments in or affecting Brazil.

Historically, the country's political situation has influenced the performance of the Brazilian economy, and political crises have affected the confidence of investors and the general public, which resulted in economic deceleration, downgrading of credit ratings of the Brazilian government and Brazilian issuers, and heightened volatility in the securities issued abroad by Brazilian companies. Political instability may aggravate economic uncertainties in Brazil and increase volatility of securities of Brazilian issuers. Future economic, social and political developments in Brazil may impair our business, financial condition or results of operations, or cause the market value of our securities to decline.

Our governance, internal controls and compliance processes may fail to prevent breaches of legal, regulatory accounting, ethical or governance standards.

We operate in a global environment, and our activities extend over multiple jurisdictions and complex regulatory frameworks, with increasing enforcement activities worldwide. We are required to comply with a wide range of laws and regulations in the countries where we operate or do business, including anti-corruption, international sanctions, anti-money laundering and related laws and regulations. Our governance and compliance processes, which include the review of internal control over financial reporting, may not timely identify or prevent future breaches of legal, regulatory, accounting, governance or ethical standards. We may be subject to breaches of our code of conduct, anti-corruption policies or other internal policies, or breaches of business conduct protocols and to instances of fraudulent behavior, corrupt practices and dishonesty by our employees, contractors or other agents. This risk is heightened by the fact that we have a large number contracts with local and foreign suppliers, as well as by the geographic distribution of our operations and the wide variety of counterparties involved in our business. Our failure to comply with applicable laws and other standards could subject us to investigations by authorities, litigation, fines, loss of operating licenses, disgorgement of profits, involuntary dissolution and reputational harm.

Disagreements with local communities could adversely impact our business and reputation.

Disputes with communities where we operate may arise from time to time. Accidents or incidents involving mines, industrial facilities and related infrastructure, such as the rupture of the tailings dam in Brumadinho, may significantly impact the communities where we operate. In some instances, our operations and mineral reserves are located on or near lands owned or used by indigenous peoples or other groups of stakeholders. Some of our mining and other operations are located in territories where title may be subject to disputes or uncertainties, or in areas claimed for agriculture or land reform purposes, which may lead to disagreements with landowners, organized social movements, local communities and the government. In some jurisdictions, we may be required to consult and negotiate with these groups as part of the process to obtain licenses required to operate, to mitigate impact on our operations or to obtain access to their lands. Disagreements or disputes with local communities and groups, including indigenous peoples, organized social movements and local communities, could cause delays in obtaining licenses, increases in planned budget, delays or interruptions to our operations. These issues may adversely affect our reputation or otherwise hamper our ability to develop our reserves and conduct our operations. See *Information on the Company—Regulatory matters* and *Additional Information—Legal proceedings*.

We could be adversely affected by changes in government policies or by trends such as resource nationalism, including the imposition of new taxes or royalties on mining activities.

Mining is subject to government regulation, including taxes and royalties, which can have a significant financial impact on our operations. In the countries where we are present, we are subject to potential renegotiation, nullification or forced modification of existing contracts and licenses, expropriation or nationalization of property, foreign exchange controls, capital ownership requirements, changes in local laws, regulations and policies and audits and reassessments. We are also subject to new taxes or raising of existing taxes and royalty rates, reduction of tax exemptions and benefits, renegotiation of tax stabilization agreements or changes on the basis on which taxes are calculated in a manner that is unfavorable to us. Governments that have committed to provide a stable taxation or regulatory environment may alter those commitments or shorten their duration. We also face the risk of having to submit to the jurisdiction of a foreign court or arbitration panel or having to enforce a judgment against a sovereign nation within its own territory. See *Information on the Company—Regulatory matters—Royalties and other taxes on mining activities*.

We are also required to meet domestic beneficiation requirements in certain countries, such as local processing rules, export taxes or restrictions or charges on unprocessed ores. The imposition of or increase in such requirements, taxes or charges can significantly increase the risk profile and costs of operations in those jurisdictions. We and the mining industry are subject to rising trends of resource nationalism in certain countries in which we operate that can result in constraints on our operations, increased taxation or even expropriations and nationalizations.

As a supplier of iron ore, nickel and other raw materials to the global integrated steel industry and to other metal-consuming sectors such as battery production and other specified, industrial end-uses we are subject to additional risk from the imposition of duties, tariffs, import and export controls and other trade barriers impacting our products and the products our customers produce. Global trade is subject to a growing trend of increased trade barriers, which could exacerbate commodities' price volatility and in turn result in instability in the prices of our products.

Concessions, authorizations, licenses and permits are subject to expiration, limitation on renewal and various other risks and uncertainties.

Our operations depend on authorizations and concessions from governmental regulatory agencies in the countries in which we operate. We are subject to laws and regulations in many jurisdictions that can change at any time, and changes in laws and regulations may require modifications to our technologies and operations and result in unanticipated capital expenditures.

Some of our mining concessions are subject to fixed expiration dates and might only be renewed a limited number of times for a limited period of time. Apart from mining concessions, we may need to obtain various authorizations, licenses and permits from governmental or other regulatory bodies in connection with the planning, maintenance, operation and closure of our mines and related logistics infrastructure, which may be subject to fixed expiration dates or periodic review or renewal. There is no assurance that renewals will be granted as and when sought, and there is no assurance that new conditions will not be imposed in connection with renewal. Fees for mining concessions might increase substantially due to the passage of time from the original issuance of each individual exploration license. If so, the costs of holding or renewing our mining concessions may render our business objectives not viable. Accordingly, we need to continually assess the mineral potential of each mining concession, particularly at the time of renewal, to determine if the costs of maintaining the concession are justified by the results of operations to date, and we might elect to let some of our concessions lapse. There can be no assurance that concessions will be obtained on terms favorable to us, or at all, for our future intended mining or exploration targets.

In a number of jurisdictions where we have exploration projects, we may be required to retrocede to the state a certain portion of the area covered by the exploration license as a condition to renewing the license or obtaining a mining concession. This requirement can lead to a substantial loss of part of the mineral deposit originally identified in our feasibility studies. For more information on mining concessions and other similar rights, see *Information on the Company—Regulatory matters*.

Changes in Brazilian fiscal policies and tax laws could have an adverse effect on our financial condition and results and on investments in our securities.

The Brazilian government has frequently implemented and may continue to implement changes in its fiscal policies, including, but not limited to tax rates, fees, sectoral charges and occasionally the collection of temporary contributions. Changes in tax laws and in the interpretation of tax laws by Brazilian tax authorities and courts may occur and may result in tax increases and revocation of tax exemptions. Brazilian legislators are currently considering a comprehensive tax reform, which may include the elimination or unification of certain taxes, the creation of new taxes, the revocation of income tax exemptions on the distribution of profits and dividends and changes relating to interest on net equity. The approval of these legislative proposals or changes in fiscal policies, tax laws and interpretations may impact our tax obligations and may have a material adverse effect on our financial condition and results, and on investments in our securities.

OPERATIONAL RISKS

Our projects are subject to risks that may result in increased costs or delay in their implementation.

We are investing to maintain and further increase our production capacity and logistics capabilities. We regularly review the economic viability of our projects. As a result of this review, we may decide to postpone, suspend or interrupt the implementation of certain projects. Our projects are also subject to a

number of risks that may adversely affect our growth prospects and profitability, including the following: (i) we may not be able to obtain financing at attractive rates; (ii) we may encounter delays or higher than expected costs in obtaining the necessary equipment or services and in implementing new technologies to build and operate a project; (iii) our efforts to develop projects on schedule may be hampered by a lack of infrastructure, including reliable telecommunications services and power supply; (iv) suppliers and contractors may fail to meet their contractual obligations to us; (v) we may face unexpected weather conditions or other force majeure events; (vi) we may fail to obtain or renew the required permits and licenses to build a project, or we may experience delays or higher than expected costs in obtaining or renewing them; (vii) changes in market conditions or regulations may make a project less profitable than expected at the time we initiated work on it; (viii) there may be accidents or incidents during project implementation; and (ix) we may face shortages of skilled personnel.

Operational problems could materially and adversely affect our business and financial performance.

Ineffective project management and operational breakdowns might require us to suspend or curtail operations, which could generally reduce our productivity. Operational breakdowns could entail failure of critical plant and machinery. There can be no assurance that ineffective project management or other operational problems will not occur. Any damages to our projects or delays in our operations caused by ineffective project management or operational breakdowns could materially and adversely affect our business and results of operations.

Our business is subject to a number of operational risks that may adversely affect our results of operations, such as: (i) unexpected weather conditions or other force majeure events; (ii) adverse mining conditions delaying or hampering our ability to produce the expected quantity of minerals and to meet specifications required by customers, which can trigger price adjustments; (iii) accidents or incidents involving our mines, industrial facilities and related infrastructure, such as dams, plants, railway and railway bridges, ports and ships; (iv) delays or interruptions in the transportation of our products, including with railroads, ports and ships; (v) tropical diseases, HIV/AIDS, viral outbreaks such as the coronavirus, and other contagious diseases in regions where some of our operations or projects are located, which pose health and safety risks to our employees; (vi) labor disputes that may disrupt our operations from time to time; (vii) changes in market conditions or regulations may affect the economic prospects of an operation and make it inconsistent with our business strategy; (viii) failure to obtain the renewal of required permits and licenses, or delays or higher than expected costs in obtaining them; and (ix) disruptions to or unavailability of critical information technology systems or services resulting from accidents or malicious acts.

Failures in our cybersecurity controls, information technology, operational technology and telecommunications systems may adversely affect our business and reputation.

We rely heavily on cybersecurity controls, information technology, operational technology and telecommunications systems for the operation of many of our business processes. Failures in those controls and systems, whether caused by obsolescence, technical failures, negligence, accident or cyber-attacks, may result in the disclosure or theft of sensitive information, loss of data integrity, misappropriation of funds and disruptions to or interruption in our business operations, and impact our ability to disclose financial results. We may be the target of attempts to gain unauthorized access to information technology and operational technology systems through the internet, including sophisticated and coordinated attempts often referred to as advanced persistent threats. Disruption of critical cybersecurity controls, information technology, operational technology, or telecommunications systems, as well as data breaches, may harm our reputation and have a material adverse effect on our operational performance, earnings and financial condition.

We are subject to laws and regulations relating to data protection and data privacy, including the European Union's General Data Protection Regulation (GDPR) and Brazilian Law No. 13,709 (*Lei Geral de Proteção de Dados* or LGPD). Any noncompliance with those laws and regulations could result in proceedings or actions against us, the imposition of fines or penalties or damage to our reputation, which could have an adverse effect on us and our business, reputation and results of operations.

Our business could be adversely affected by the failure or unavailability of certain critical assets or infrastructure.

We rely on certain critical assets and infrastructure to produce and to transport our products to our customers. These critical assets include mines, industrial facilities, ports, railways, roads and bridges. The failure or unavailability of any critical asset, whether resulting from natural events or operational issues, could have a material adverse effect on our business.

Substantially all of our iron ore production from the Northern system is transported from Carajás, in the Brazilian state of Pará, to the port of Ponta da Madeira, in the Brazilian state of Maranhão, through the Carajás railroad (EFC). Any interruption of the Carajás railroad or of the port of Ponta da Madeira could significantly impact our ability to sell our production from the Northern system. With respect to the Carajás railroad, there is particular risk of interruption at the bridge over the Tocantins river, in which the trains run on a single line railway. In the port of Ponta da Madeira, there is particular risk of interruption at the São Marcos access channel, a deep-water channel that provides access to the port. Also, any failure or interruption of our long-distance conveyor belt (TCLD) used to transport our iron ore production from the S11D mine to the beneficiation plant, could adversely impact our operations at the S11D mine.

Our business could be adversely affected by the performance of our counterparties, contractors, joint venture partners or joint ventures we do not control

Customers, suppliers, contractors, financial institutions, joint venture partners and other third parties may fail to perform existing contracts and obligations, which may unfavorably impact our operations and financial results. The ability of these third parties to perform their obligations may be adversely affected in times of financial stress and economic downturn.

Important parts of our iron ore, pelletizing, nickel, coal, copper, energy and other businesses are held through joint ventures. This may reduce our degree of control, as well as our ability to identify and manage risks. Our forecasts and plans for these joint ventures and consortia assume that our partners will observe their obligations to make capital contributions, purchase products and, in some cases, provide skilled and competent managerial personnel. If any of our partners fails to observe its commitments, the affected joint venture or consortium may not be able to operate in accordance with its business plans, or we may have to increase the level of our investment to implement these plans.

Some of our investments are controlled by partners or have separate and independent management. These investments may not fully comply with our standards, controls and procedures, including our health, safety, environment and community standards. Failure by any of our contractors, partners or joint ventures to adopt adequate standards, controls and procedures could lead to higher costs, reduced production or environmental, litigation, health and safety incidents or accidents, which could adversely affect our results and reputation.

We may not have adequate insurance coverage for some business risks.

Our businesses are generally subject to a number of risks and hazards, which could have impact on people, assets and the environment. The insurance we maintain against risks that are typical in our business may

not provide adequate coverage. Insurance against some risks (including liabilities for environmental damages, damages resulting from dams breaches, spills or leakage of hazardous substances and interruption of certain business activities) may not be available at a reasonable cost, or at all. Even when it is available, we may self-insure where we determine that is more cost-effective to do so. As a result, accidents or other negative developments involving our mining, production or transportation facilities may not be covered by insurance, and could have a material adverse effect on our operations.

Labor disputes may disrupt our operations from time to time.

A substantial number of our employees, and some of the employees of our subcontractors, are represented by labor unions and are covered by collective bargaining or other labor agreements, which are subject to periodic negotiation. Strikes and other labor disruptions at any of our operations could adversely affect the operation of facilities and the timing of completion and cost of our capital projects. For more information about labor relations, see *Management and Employees—Employees*. Moreover, we could be adversely affected by labor disruptions involving unrelated parties that may provide us with goods or services.

Higher energy costs or energy shortages would adversely affect our business.

Costs of fuel oil, gas and electricity are a significant component of our cost of production, representing 9.0% of our total cost of goods sold in 2020. To fulfill our energy needs, we rely on the following sources: oil byproducts, which represented 36% of total energy needs in 2020, electricity (31%), natural gas (13%), coal (16%) and other energy sources (4%).

Electricity costs represented 3.8% of our total cost of goods sold in 2020. If we are unable to secure reliable access to electricity at acceptable prices, we may be forced to curtail production or may experience higher production costs, either of which would adversely affect our results of operations. We face the risk of energy shortages in the countries where we have operations and projects, especially Brazil, due to lack of infrastructure or weather conditions, such as floods or droughts. Future shortages, and government efforts to respond to or prevent shortages, may adversely impact the cost or supply of electricity for our operations.

HEALTH, SAFETY, ENVIRONMENTAL AND SOCIAL RISKS

Our business is subject to environmental, health and safety incidents.

Our operations involve the use, handling, storage, discharge and disposal of hazardous substances into the environment and the use of natural resources, resulting in significant risks and hazards, including fire, explosion, toxic gas leaks, spilling of polluting substances or other hazardous materials, rockfalls, incidents involving dams, failure of other operational structures, as well as activities involving mobile equipment, vehicles or machinery and other potentially fatal incidents and accidents. Incidents may occur due to deficiencies in identifying and assessing risks or in implementing sound risk management, and once these risks materialize, they could result in significant environmental and social impacts, damage to or destruction of mines or production facilities, personal injury, illness and fatalities, involving employees, contractors or community members near our operations, as well as delays in production, monetary losses and possible legal liability. Additionally, our employees may be exposed to tropical and contagious diseases that may affect their health and safety. Notwithstanding our standards, policies, controls and monitoring procedures, our operations remain subject to incidents or accidents that could adversely impact our business, stakeholders or reputation.

Our business may be adversely affected by social, environmental and health and safety regulation, including regulations pertaining to climate change.

Nearly all aspects of our activities, products and services associated with capital projects and operations around the world are subject to social, environmental and health and safety regulations, which may expose us to increased liability or increased costs. These regulations require us to have environmental licenses, permits and authorizations for our operations and projects, and to conduct environmental and social impact assessments, including a hazard identification and risk analysis, in order to get approval for our projects and permission for initiating construction and continuing operating. Significant changes to existing operations are also subject to these requirements. Difficulties in obtaining or renewing permits may lead to construction delays, cost increases, and may adversely impact our production volumes. Social, environmental and health and safety regulations also impose standards, procedures, monitoring and operational controls on activities relating to mineral research, mining, beneficiation, pelletizing activities, railway and marine services, ports, decharacterization, decommissioning, distribution and marketing of our products. Such regulation may give rise to significant costs and liabilities. Litigation relating to these or other related matters may adversely affect our financial condition or cause harm to our reputation.

Social, environmental and health and safety regulations in many countries in which we operate have become stricter in recent years, and it is possible that more regulation or more stringent enforcement of existing regulations will adversely affect us by imposing restrictions on our activities, products, and assets, creating new requirements for the issuance or renewal of environmental licenses and labor authorizations, resulting in licensing and operation delays, raising our costs or requiring us to engage in expensive reclamation efforts. All these factors may affect our practices and result in costs or expense increase, require us to new capital expenditures, restrict or suspend operations, write down or write off assets or reserves.

For a discussion of more stringent rules relating to licensing and operations of dams following the tailings dam rupture in Brumadinho, see *Information on the Company—Regulatory matters—Brazilian regulation of mining dams*. For a discussion of national policies and international regulations regarding climate change, which may affect a number of our businesses in various countries, see *Information on the Company—Regulatory matters—Environmental regulations*. For a discussion of the 2020 regulatory initiatives of Standard of the International Maritime Organization (“IMO”) prohibiting high sulfur fuel oil, as well as IMO’s goals on greenhouse gas reductions in the industry, see *Information on the Company—Regulatory matters—Environmental regulations*.

Natural disasters may cause severe damage to our operations and projects in the countries where we operate and may have a negative impact on our sales to countries affected by such disasters.

Natural disasters, such as wind storms, droughts, floods, earthquakes and tsunamis may adversely affect our operations and projects in the countries where we operate and may cause a contraction in sales to countries adversely affected due to, among other factors, power outages and the destruction of industrial facilities and infrastructure. The physical impact of climate change on our business remains uncertain, but we are likely to experience changes in rainfall patterns, increased temperatures, floods, droughts, water shortages, sea level rising, increased incidence and intensity of atmospheric discharges (lightning) as a result of climate change, which may adversely affect our operations. On some occasions in recent years, we have determined that force majeure events have occurred because of the effect of severe weather on our mining and logistics activities.

RISKS RELATING TO OUR MINERAL RESERVES

Our reserve estimates may materially differ from mineral quantities that we are actually able to recover; our estimates of mine life may prove inaccurate; more stringent regulations, market price fluctuations and changes in operating and capital costs may render certain ore reserves uneconomical to mine; we may not be able to replenish our reserves.

There are numerous uncertainties inherent in estimating quantities of reserves and in projecting potential future rates of mineral production, including factors beyond our control. Reduction in our reserves may affect our future production and cash generation, impact depreciation and amortization rates, and result in asset write-downs or write-offs, which may have an adverse effect on our financial performance. Below are the key risks relating to our reserves:

- Reserve reporting and estimates of mine life involves estimating deposits of minerals that cannot be measured in an exact manner, and the accuracy of any reserve estimate is a function of the quality of available data, engineering, market prices of minerals and metals, more stringent regulations, costs estimates, investments, geotechnics analysis, geological interpretation and judgment. No assurance can be given that the indicated amount of ore will be recovered or that it will be recovered at the rates we anticipate. We review our reserve estimates from time to time in light of updated information and changes in regulatory framework, which may result in a reduction of our reported reserves. See *Information on the Company—Reserves and—Regulatory matters*.
- Our inability to obtain licenses for new operations, supporting structures or activities (such as dams), or to renew our existing licenses, can cause a reduction of our reserves.
- Once mineral deposits are discovered, it can take several years from the initial phases of drilling until production is possible, during which the economic feasibility of production may change. If a project proves not to be economically feasible by the time we are able to exploit it, we may incur substantial losses and be obliged to take write-downs. In addition, potential changes or complications involving metallurgical and other technological processes arising during the life of a project may result in delays and cost overruns that may render the project not economically feasible.
- We engage in mineral exploration, which is highly uncertain in nature, involves many risks and frequently is non-productive. Our exploration programs, which involve significant expenditures, may fail to result in the expansion or replacement of reserves depleted by current production. If we do not develop new reserves, we will not be able to sustain our current level of production beyond the remaining lives of our existing mines.
- Reserves are gradually depleted in the ordinary course of a given open pit or underground mining operation. As mining progresses, distances to the primary crusher and to waste deposits become longer, pits become steeper, mines may move from being open pit to underground, and underground operations become deeper. In addition, for some types of reserves, mineralization grade decreases and hardness increases at greater depths. As a result, over time, we usually experience rising unit extraction costs with respect to each mine, or we may need to make additional investments, including adaptation or construction of processing plants and expansion or construction of tailings dams. Several of our mines have been operating for long periods, and we will likely experience rising extraction costs per unit in the future at these operations in particular.

- Beginning with the fiscal year ending December 31, 2021, we will be required to comply with the new SEC reporting rules on mining activities. We are currently reviewing our reported mining reserves, and we may need to adjust our reported reserves to be able to report in compliance with the new rules.

RISKS RELATING TO OUR CORPORATE STRUCTURE

The Brazilian Government has certain veto rights.

The Brazilian government owns 12 golden shares of Vale, granting it limited veto power over certain company actions, such as changes to our name, the location of our headquarters and our corporate purpose as it relates to mining activities. For a detailed description of the Brazilian government's veto powers, see *Additional information—Bylaws—Common shares and golden shares*.

It could be difficult for investors to enforce any judgment obtained outside Brazil against us or any of our associates.

Our investors may be located in jurisdictions outside Brazil and could seek to bring actions against us or our directors or officers in the courts of their home jurisdictions. We are a Brazilian company, and the majority of our officers and directors are residents of Brazil. The vast majority of our assets and the assets of our officers and directors are likely to be located in jurisdictions other than the home jurisdictions of our foreign investors. It might not be possible for investors outside Brazil to effect service of process within their home jurisdictions on us or on our officers or directors who reside outside their home jurisdictions. In addition, a final conclusive foreign judgment will be enforceable in the courts of Brazil without a re-examination of the merits only if previously confirmed by the Brazilian Superior Court of Justice (*Superior Tribunal de Justiça*—"STJ"), and confirmation will only be granted if the foreign judgment: (i) fulfills all formalities required for its enforceability under the laws of the country where it was issued; (ii) was issued by a competent court after due service of process on the defendant, as required under applicable law; (iii) is not subject to appeal; (iv) does not conflict with a final and unappealable decision issued by a Brazilian court; (v) was authenticated by a Brazilian consulate in the country in which it was issued or is duly apostilled in accordance with the Convention for Abolishing the Requirement of Legalization for Foreign Public Documents and is accompanied by a sworn translation into Portuguese, unless this procedure was exempted by an international treaty entered into by Brazil; (vi) it does not cover matters subject to the exclusive jurisdiction of the Brazilian courts; and (vii) is not contrary to Brazilian national sovereignty, public policy or good morals. Therefore, investors might not be able to recover against us or our directors and officers on judgments of the courts of their home jurisdictions predicated upon the laws of such jurisdictions.

RISKS RELATING TO OUR DEPOSITARY SHARES

If ADR holders exchange ADSs for the underlying shares, they risk losing the ability to remit foreign currency abroad.

The custodian for the shares underlying our ADSs maintains a registration with the Central Bank of Brazil permitting the custodian to remit U.S. dollars outside Brazil for payments of dividends and other distributions relating to the shares underlying our ADSs or upon the disposition of the underlying shares. If an ADR holder exchanges its ADSs for the underlying shares, it will be entitled to rely on the custodian's registration for only five business days from the date of exchange. Thereafter, an ADR holder may not be able to obtain and remit foreign currency abroad upon the disposition of, or distributions relating to, the underlying shares unless it obtains its own registration under applicable regulation. See *Additional*

Information—Exchange controls and other limitations affecting security holders. If an ADR holder attempts to obtain its own registration, it may incur expenses or suffer delays in the application process, which could delay the receipt of dividends or other distributions relating to the underlying shares or the return of capital in a timely manner.

The custodian's registration or any registration obtained could be affected by future legislative changes, and additional restrictions applicable to ADR holders, the disposition of the underlying shares, or the repatriation of the proceeds from disposition and taxation of dividends could be imposed in the future.

ADR holders may not have all the rights of our shareholders, and may be unable to exercise voting rights or preemptive rights relating to the shares underlying their ADSs.

ADR holders may not have the same rights that are attributed to our shareholders by Brazilian law or our bylaws, and the rights of ADR holders may be subject to certain limitations provided in the deposit agreement or by the securities intermediaries through which ADR holders hold their securities.

- ADR holders do not have the rights of shareholders. They have only the contractual rights set forth for their benefit under the deposit agreements. ADR holders are not permitted to attend shareholders' meetings, and they may only vote by providing instructions to the depository. In practice, the ability of a holder of ADRs to instruct the depository as to voting will depend on the timing and procedures for providing instructions to the depository either directly or through the holder's custodian and clearing system. With respect to ADSs for which instructions are not received, the depository may, subject to certain limitations, grant a proxy to a person designated by us.
- The ability of ADR holders to exercise preemptive rights is not assured, particularly if the applicable law in the holder's jurisdiction (for example, the Securities Act in the United States) requires that either a registration statement be effective or an exemption from registration be available with respect to those rights, as is in the case in the United States. We are not obligated to extend the offer of preemptive rights to holders of ADRs, to file a registration statement in the United States, or to make any other similar filing in any other jurisdiction, relating to preemptive rights or to undertake steps that may be needed to make exemptions from registration available, and we cannot assure holders that we will file any registration statement or take such steps.

The legal protections for holders of our securities differ from one jurisdiction to another and may be inconsistent, unfamiliar or less effective than investors anticipate.

We are a global company with securities traded in several different markets and investors located in many different countries. The legal regime for the protection of investors varies around the world, sometimes in important ways, and investors in our securities should recognize that the protections and remedies available to them may be different from those to which they are accustomed in their home markets. We are subject to securities legislation in several countries, which have different rules, supervision and enforcement practices. The only corporate law applicable to our parent company is the law of Brazil, with its specific substantive rules and judicial procedures. We are subject to corporate governance rules in several jurisdictions where our securities are listed, but as a foreign private issuer, we are not required to follow many of the corporate governance rules that apply to U.S. domestic issuers with securities listed on the New York Stock Exchange, and we are not subject to the U.S. proxy rules.

II. INFORMATION ON THE COMPANY

LINES OF BUSINESS

Our principal lines of business consist of mining and related logistics. This section presents information about operations, production, sales and competition and is organized as follows

1. Ferrous minerals

- 1.1 Iron ore and iron ore pellets
 - 1.1.1 Iron ore operations
 - 1.1.2 Iron ore production
 - 1.1.3 Iron ore pellets operations
 - 1.1.4 Iron ore pellets production
 - 1.1.5 Customers, sales and marketing
 - 1.1.6 Competition

- 1.2 Manganese ore and ferroalloys
 - 1.2.1 Manganese ore operations and production
 - 1.2.2 Ferroalloys operations and production
 - 1.2.3 Manganese ore and ferroalloys: sales and competition

2. Base metals

- 2.1 Nickel
 - 2.1.1 Operations
 - 2.1.2 Production
 - 2.1.3 Customers and sales
 - 2.1.4 Competition
- 2.2 Copper
 - 2.2.1 Operations
 - 2.2.2 Production
 - 2.2.3 Customers and sales
 - 2.2.4 Competition
- 2.3 PGMs and other precious metals
- 2.4 Cobalt

3. Coal

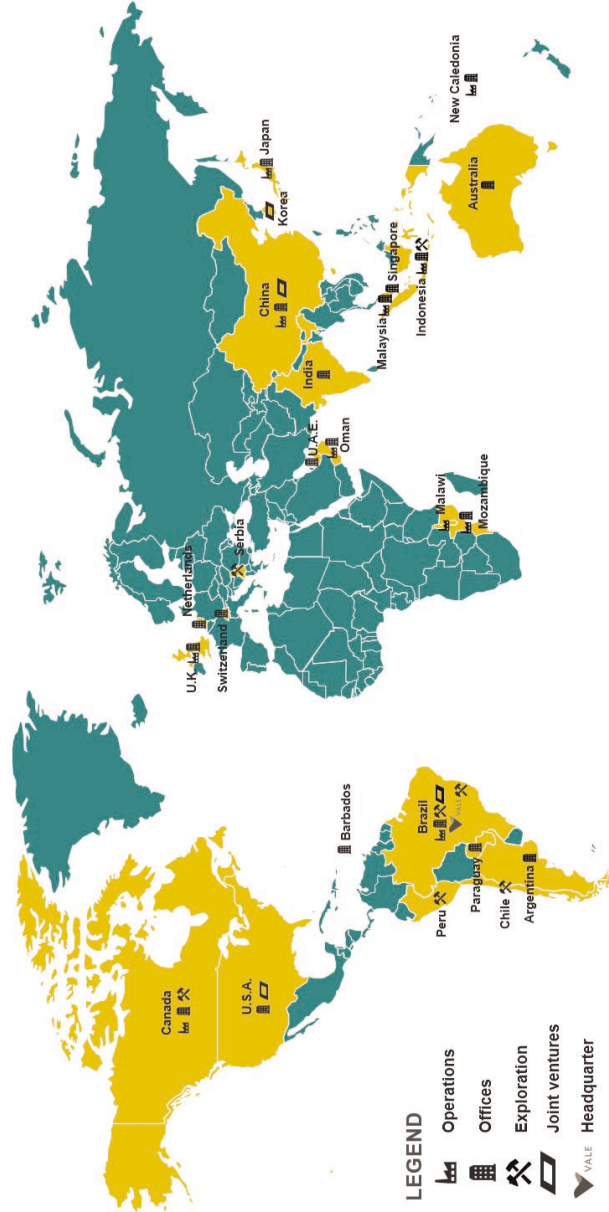
- 3.1 Operations
- 3.2 Production
- 3.3 Customers and sales
- 3.4 Competition

4. Infrastructure related to our business

- 4.1 Logistics
 - 4.1.1 Railroads
 - 4.1.2 Ports and maritime terminals
 - 4.1.3 Shipping
- 4.2 Energy

5. Other investments

Lines of Business



1. FERROUS MINERALS

Our ferrous minerals business includes iron ore mining, iron ore pellet production, manganese ore mining and ferroalloy production. Each of these activities is described below.

1.1 Iron ore and iron ore pellets

1.1.1 Iron ore operations

We conduct our iron ore business in Brazil primarily at the parent-company level, and through our subsidiaries Mineração Corumbaense Reunida S.A. (“MCR”) and Minerações Brasileiras Reunidas S.A.—MBR (“MBR”). Our mines, all of which are open pit, and their related operations are mainly concentrated in three systems: the Southeastern, Southern and Northern Systems, each with its own transportation and shipping capabilities. We also conduct mining operations in the Midwestern System. We conduct each of our iron ore operations in Brazil under concessions from the federal government granted for an indefinite period, subject to the life of mines.

Company/Mining System	Location	Description/History	Mineralization	Operations	Power source	Access/Transportation
Vale Northern System	Carajás, state of Pará	Divided into Serra Norte, Serra Sul and Serra Leste (Northern, Southern and Eastern ranges). Since 1984, we have been conducting mining activities in the Northern range, which is divided into three main mining areas (N4W, N4E and N5) and two major beneficiation plants. In 2014, we started a mine and beneficiation plant in Serra Leste. Our operations in Serra Sul, where our S11D mine is located, started in 2016.	High-grade hematite ore type (iron grade around 65%).	Open-pit mining operations. In Serra Norte, one of the major plants applies the natural moisture beneficiation process, consisting of crushing and screening, and the other applies both the natural moisture and the wet beneficiation process in distinct lines. The wet beneficiation process consists simply of sizing operations, including screening, hydrocycloning, crushing and filtration. Output from this site consists of sinter feed, pellet feed and lump ore. Serra Leste and Serra Sul natural moisture beneficiation process consists of crushing and screening. Serra Sul and Serra Leste produce only sinter feed.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Carajás railroad (EFC) transports the iron ore to the Ponta da Madeira maritime terminal in the Brazilian state of Maranhão. Serra Leste iron ore is transported by trucks from the mine site to EFC railroad. The Serra Sul ore is shipped via a 101-kilometers long railroad spur to the EFC railroad.
Southeastern System	Iron Quadrangle, state of Minas Gerais	Three mining complexes: Itabira (two mines, with three major beneficiation plants), Minas Centrais (two mines, with two major beneficiation plants and one secondary plant) and Mariana (three mines, with three major beneficiation plants).	Ore reserves with high ratios of itabirite ore relative to hematite ore type. Itabirite ore type has iron grade of 35-60%. Part of the ore is concentrated to achieve shipping grade and part is shipped and blended in Asia with the high-grade ore from our Northern System.	Open-pit mining operations. We generally process the run-of-mine by means of standard crushing, classification and concentration steps, producing sinter feed, lump ore and pellet feed in the beneficiation plants located at the mining complexes. For status of halted operations see Overview—Business overview—Rupture of tailings dam in Brumadinho.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	EFVM railroad connects these mines to the Tubarão port.
Southern System	Iron Quadrangle, state of Minas Gerais	Two major mining complexes: Vargem Grande (five mines and five major beneficiation plants) and Paraopeba (five mines and three major beneficiation plants). In 2019, we reorganized our Southern System to eliminate the Minas Itabirito complex, and to consider the mines that composed this complex as part of the Vargem Grande and Paraopeba complexes.	Ore reserves with high ratios of itabirite ore type relative to hematite ore type. Itabirite ore has iron grade of 35-60%. Part of the ore is concentrated to achieve shipping grade and part is shipped and blended in Asia with the high-grade ore from our Northern System.	Open-pit mining operations. We generally process the run-of-mine by means of standard crushing, classification and concentration steps, producing sinter feed, lump ore and pellet feed in the beneficiation plants located at the mining complexes. For status of halted operations see Overview—Business overview—Rupture of tailings dam in Brumadinho.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	MRS transports our iron ore products from the mines to our Guaíba Island and Itaguai maritime terminals in the Brazilian state of Rio de Janeiro. EFVM railroad connects certain mines to the Tubarão port in the state of Espírito Santo.
Midwestern System	State of Mato Grosso do Sul	Two mines and two plants located in the city of Corumbá.	Hematite ore type, which generates lump ore predominantly. Iron grade of 62% on average.	Open-pit mining operations. The beneficiation process for the run-of-mine consists of standard crushing and classification steps, producing lump ore and sinter feed.	Supplied through the national electricity grid. Acquired through power purchase agreements.	Transported by barges traveling along the Paraguay and Paraná rivers to transhippers at the Nueva Palmira port in Uruguay, or delivered to customers at Corumbá.

1.1.2 Iron ore production

The following table sets forth information about our iron ore production.

Mine/Plant	Type	Production for the year ended December 31,			Process recovery 2020(2)
		2020(1)	2019(1)	2018(1)	
		(million metric tons)			(%)
Southeastern System					
Itabira	Open pit	23.9	35.9	41.7	46.0
Minas Centrais	Open pit	15.7	25.9	36.0	69.0
Mariana	Open pit	17.7	11.3	26.7	91.0
Total Southeastern System		57.3	73.1	104.4	
Southern System					
Vargem Grande	Open pit	25.1	13.1	43.1	93.8
Paraopeba	Open pit	23.3	24.7	41.0	73.3
Total Southern System		48.4	37.8	84.1	
Northern System					
Serra Norte and Serra Leste	Open pit	109.4	115.3	135.6	96.2
Serra Sul	Open pit	82.9	73.4	58.0	100.0
Total Northern System		192.3	188.7	193.6	
Midwestern System					
Corumbá	Open pit	2.5	2.4	2.5	66.2
Total Midwestern System		2.5	2.4	2.5	—
Total		300.4	302.0	384.6	

(1) Production figures include third-party ore purchases, run of mine and feed for pelletizing plants. Segredo and João Pereira production are included as part of the Paraopeba Complex.

(2) Percentage of the run-of-mine recovered in the beneficiation process. Process recovery figures do not include third-party ore purchases.

1.1.3 Iron ore pellet operations

We produce iron ore pellets in Brazil and Oman, directly and through joint ventures, as set forth in the table below. Our total estimated nominal capacity is 64.7 Mtpy, including the full capacity of our pelletizing plants in Oman, but not including our joint ventures Samarco and Anyang.

Company/Plant	Description/History	Nominal capacity (Mtpy)	Power source	Other information	Vale's equity interest (%)	Partners
Brazil:						
Vale Tubarão (state of Espírito Santo).....	Three wholly owned pellet plants (Tubarão I, II and VIII) and five leased plants (Itabasco, Hispanobras, Kobrasco and two Nibrasco plants). These plants receive iron ore primarily from our Southeastern System mines and use our logistics infrastructure for distribution.	36.7 (1)	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Operations at the Tubarão I and Tubarão II pellet plants were suspended in October 2019 in response to market conditions.	100.0	—
Fábrica (state of Minas Gerais)	Part of the Southern System. Receives iron ore from the Paraopeba complex and purchases from third parties. Production is mostly transported by MRS and EFM.	4.5	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Operations at the Fábrica plant have been suspended since February 2019, following a determination of the ANM. See Overview—Business overview—Rupture of tailings dam in Brumadinho.	100.0	—
Vargem Grande (state of Minas Gerais).....	Part of the Southern System. Receives iron ore from the Vargem Grande complex. Production is mostly transported by MRS.	7.0	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Operations at the Vargem Grande plant resumed in January 2021. Operations had been suspended since February 2019, following a determination of the ANM.	100.0	—
São Luís (state of Maranhão)	Part of the Northern System. Receives iron ore from the Carajás mines. Production is shipped to customers through our Ponta da Madeira maritime terminal.	7.5	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Operation at the São Luís plant restarted in the second half of 2018. Operations at this plant had been suspended since 2012.	100.0	—
Oman:						
Vale Oman Pelletizing Company LLC.....	Vale's industrial complex. Two pellet plants with a total nominal capacity of 9.0 Mtpy. The pelletizing plant is integrated with our distribution center that has a nominal capacity of 40.0 Mtpy.	9.0	Supplied through the national electricity grid.	The Oman plant is supplied by iron ore from the Iron Quadrangle state of Minas Gerais through the Tubarão port and by iron ore from Carajás through the Ponta da Madeira maritime terminal.	70.0	OQ S.A.O.C.

(1) Our environmental operating licenses for the Tubarão pellet plants provide for a capacity of 36.2 Mtpy.

1.1.4 Iron ore pellets production

The following table sets forth information about our main iron ore pellet production.

Company	Production for the year ended December 31,		
	2020	2019	2018
	(million metric tons)		
Vale(1)	29.7	41.8	55.3
Total	29.7	41.8	55.3

(1) These figures correspond to 100% production from our pellet plants in Oman and the five pellet plants we lease in Brazil, and are not adjusted to reflect our ownership. The operating leases for the Hispanobras pellet plants expire in the third quarter of 2021, for the Itabasco and Nibrasco pellet plants in 2022 and for the Kobrasco pellet plants in 2033.

1.1.5 Customers, sales and marketing

We supply all of our iron ore and iron ore pellets to the steel industry. Prevailing and expected levels of demand for steel products affect demand for our iron ore and iron ore pellets. Demand for steel products is influenced by many factors, such as global manufacturing production, civil construction and infrastructure spending. For further information about demand and prices, see *Operating and Financial Review and Prospects—Overview—Major factors affecting prices*.

In 2020, China accounted for 67% of our iron ore and iron ore pellet shipments, and Asia as a whole accounted for 81%. Europe accounted for 8%, Brazil accounted for 8%, followed by the Middle East with 3%. Our ten largest customers collectively purchased 122 million metric tons of iron ore and iron ore pellets from us, representing 43% of our 2020 iron ore and iron ore pellet sales volumes and 42% of our total iron ore and iron ore pellet revenues. In 2020, one customer of our ferrous minerals segment accounted for 10.1% of our total revenue.

Of our 2020 pellet production, 57% was blast furnace pellets and 43% was direct reduction pellets. Blast furnace and direct reduction are different technologies employed by steel mills to produce steel, each using different types of pellets. In 2020, the Brazilian markets and the Asian market (mainly China and Japan) were the primary markets for our blast furnace pellets, while the Middle East and North America were the primary markets for our direct reduction pellets.

We invest in customer service in order to improve our competitiveness. We work with our customers to understand their objectives and to provide them with iron ore solutions to meet specific customer needs. Using our expertise in mining, agglomeration and iron-making processes, we search for technical solutions that will balance the best use of our world-class mining assets and the satisfaction of our customers. We believe that our ability to provide customers with a total iron ore solution and the quality of our products are both very important advantages helping us improve our competitiveness in relation to competitors that may be more conveniently located geographically. In addition to offering technical assistance to our customers, we have offices in St. Prex (Switzerland), Tokyo (Japan), Singapore, Dubai (UAE), Shanghai and Beijing (China), which support global sales by Vale International, and an office in Brazil, which supports sales to South America. These offices also allow us to stay in close contact with our customers, monitor their requirements and our contract performance, and ensure that our customers receive timely deliveries.

We sell iron ore and iron ore pellets under different arrangements, including long-term contracts with customers and on a spot basis through tenders and trading platforms. Our pricing is generally linked to market price indexes and uses a variety of mechanisms, including current spot prices and average prices over specified periods. In cases where the products are priced before the final price is determinable at delivery, we recognize the sale based on a provisional price with a subsequent adjustment reflecting the final price.

In 2020, we hedged part of our total exposure to bunker oil prices relating to long-term contracts of affreightment connected to our FOB and CFR international and domestic sales.

1.1.6 Competition

The global iron ore and iron ore pellet markets are highly competitive. The main factors affecting competition are price, quality and range of products offered, reliability, operating costs and shipping costs.

- *Asia* - Our main competitors in the Asian market are located in Australia and include subsidiaries and affiliates of BHP Billiton, Rio Tinto Ltd (“Rio Tinto”) and Fortescue Metals Group Ltd. We are competitive in the Asian market for two main reasons. First, steel companies generally seek to obtain the types (or blends) of iron ore and iron ore pellets that can produce the intended final product in the most economic and efficient manner. Our iron ore has low impurity levels and other properties that generally lead to lower processing costs. For example, in addition to its high-grade, the alumina content of our iron ore is very low compared to Australian ores, reducing consumption of coke and increasing productivity in blast furnaces, which is particularly important during periods of high demand and environmental restrictions. When market demand is strong, our quality differential generally becomes more valuable to customers. Second, steel companies often develop sales relationships based on a reliable supply of a specific mix of iron ore and iron ore pellets. Our ownership and operation of logistics facilities in the Northern and Southeastern Systems help us ensure that our products are delivered on time and at a relatively low cost. We rely on long-term contracts of affreightment to secure transport capacity and enhance our ability to offer our products in the Asian market at competitive costs on a CFR basis, despite higher freight costs compared to Australian producers. To support our commercial strategy for our iron ore business, we operate two distribution centers, one in Malaysia and one in Oman and we have long-term agreements with seventeen ports in China, which also serve as distribution centers. In 2015, we launched the Brazilian blend fines (BRBF), a product resulting from blending fines from Carajás, which contain a higher concentration of iron and a lower concentration of silica in the ore, with fines from the Southern and Southeastern Systems, which contain a lower concentration of iron in the ore. In August 2018, Metal Bulletin launched a new index, the 62% Fe low-alumina index, which is based on our BRBF. During 2020, the 62% Fe low-alumina index traded with a premium of US\$1.2 per dmt over the 62% Fe index. The resulting blend offers strong performance in any kind of sintering operation. It is produced in our Teluk Rubiah Maritime Terminal in Malaysia and in the seventeen distribution centers in China, which reduces the time to reach Asian markets and increases our distribution capillarity by using smaller vessels. In 2019, we announced the launch of the GF88, a new product to supply the growing market of pellet production in China, which consists of Carajás fines (IOCJ) obtained through a grinding process, opening a new market for our high quality portfolio.
- *Europe* - Our main competitors in the European market are Luossavaara Kiirunavaara AB (“LKAB”), ArcelorMittal Mines Canada Inc., Iron Ore Company of Canada, a subsidiary of Rio Tinto., Kumba Iron Ore Limited and Société Nationale Industrielle et Minière. We are competitive in the European market for the same reasons as in Asia, and also due to the proximity of our port facilities to European customers.
- *Brazil* - The Brazilian iron ore market is also competitive and includes several small iron ore producers. Some steel companies, including Gerdau S.A. (“Gerdau”), Companhia Siderúrgica Nacional (“CSN”), Vallourec Tubos do Brasil S.A., Usiminas and ArcelorMittal, also have iron ore mining operations. Although pricing is relevant, quality and reliability are important competitive factors as well. We believe that our integrated transportation systems, high-quality ore and technical services make us a strong competitor in the Brazilian market. With respect to pellets, our major competitors are LKAB, Iron Ore Company of Canada, Ferrexpo Plc, ArcelorMittal Mines Canada and Bahrain Steel.

1.2 Manganese ore and ferroalloys

1.2.1 Manganese ore operations and production

We conduct our manganese mining operations in Brazil through Vale S.A. and our wholly owned subsidiaries Vale Manganês S.A. ("Vale Manganês") and MCR. Our mining operations are carried out under concessions from the federal government granted for an indefinite period, subject to the life of the mines. Our mines produce metallurgical ore, used primarily to produce manganese ferroalloys, a raw material used to produce carbon and stainless steel.

Mining complex	Company	Location	Description/History	Mineralization	Operations	Power source	Access/Transportation
Azul	Vale S.A.	State of Pará	Open-pit mining operations and on-site beneficiation plant. Since March 2020, the operations at the Azul mine have been suspended as a result of the COVID-19 pandemic. See <i>Overview—Business Overview—Significant changes in our business—Developments relating to the pandemic of the coronavirus.</i>	High- and medium-grade oxide-ores (24-46% manganese grade).	Crushing, scrubbing and classification steps, producing lumps and fines.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Manganese ore is transported by truck and EFC railroad to the Ponta da Madeira maritime terminal.
Morro da Mina ...	Vale Manganês	State of Minas Gerais	Open-pit mining operations and concentration plant.	Medium- and low-grade silicocarbonate ores (an average content of 28% manganese grade).	Crushing, screening and dense-heavy medium separation DMS / HMS process producing lumps to the Barbacena and Ouro Preto ferroalloy plants.	Supplied through the national electricity grid. Acquired from regional utility companies and through power purchase agreement.	Manganese ore is transported by truck to the Barbacena and Ouro Preto ferroalloy plants.
Urucum	MCR	State of Mato Grosso do Sul	Underground mining operations and on-site beneficiation plant.	High-and medium-grade oxide ores (an average content of 46% manganese grade).	Crushing, scrubbing and classification steps, producing lumps and fines.	Supplied through the national electricity grid. Acquired through power purchase agreements.	Manganese ore is transported by barge traveling along the Paraguay and Paraná rivers to transhippers at the Nueva Palmira port in Uruguay.

The following table sets forth information about our manganese ore production, obtained after beneficiation process, and mass recovery.

Mine	Type	Production for the year ended December 31,			2020 process recovery(1)
		2020	2019	2018	
		(million metric tons)			(%)
Azul.....	Open pit	0.2	1.0	1.0	42.6
Morro da Mina	Open pit	0.1	0.2	0.1	80.0
Urucum	Underground	0.4	0.4	0.7	84.1
Total.....		0.7	1.6	1.8	

(1) Percentage of the run-of-mine recovered in the beneficiation process.

1.2.2 Manganese ferroalloys operations and production

We conduct our manganese ferroalloys business through our wholly owned subsidiary Vale Manganês. The production of manganese ferroalloys consumes significant amounts of electricity, which is provided through power purchase agreements.

We produce several types of manganese ferroalloys, such as high carbon and medium carbon ferro-manganese and ferro-silicon manganese.

Plant	Location	Description/History	Nominal capacity	Power source
Minas Gerais Plants....	Cities of Barbacena and Ouro Preto	Barbacena has six furnaces, two of which are refining furnaces and a briquetting plant. Ouro Preto has three furnaces, two of which are currently not operating due to market conditions.	Barbacena: 66,000 metric tons per year (54,000 metric tons per year of ferro-silicon manganese and 12,000 metric tons per year of ferro-manganese medium carbon). Ouro Preto: 64,000 metric tons per year of ferro-silicon manganese.	Supplied through the national electricity grid. Acquired from Furnas—Centrais Elétricas S.A. or through power purchase agreements.

In September 2020, we shut down our plant located in the city of Simões Filho, state of Bahia, Brazil, which produced manganese ferroalloys, due to a strategic business decision.

The following table sets forth information about our manganese ferroalloys production.

Plant	Production for the year ended December 31(1),		
	2020	2019	2018
	(thousand metric tons)		
Barbacena	51	54	55
Ouro Preto	11	11	10
Simões Filho	11	86	103
Total.....	73	151	168

(1) Production figures reflect hot metal, which is further processed by a crushing and screening facility. Average mass recovery in this process is 85%.

1.2.3 Manganese ore and ferroalloys: sales and competition

The markets for manganese ore and ferroalloys are highly competitive. Competition in the manganese ore market takes place in two segments. High- and medium-grade manganese ore competes on a global seaborne basis, while low-grade ore competes on a regional basis. For some manganese ferroalloys, especially ferromanganese, higher-grade manganese ores are required to achieve competitive quality and cost, while medium- to lower-grade ores may be used in silicomanganese production.

In recent years (especially since 2016), production on a contained metal basis has grown more strongly than gross weight output. This is due to the fact that the average manganese content of global ore production has increased, mainly as a result of a decline in the output of very low-grade ores in China.

The top-six producing countries contained manganese basis are South Africa, Australia, Gabon, Ghana, Brazil and China, which combined accounted for 83% of output in 2019. The geographical distribution of manganese ore output is quite similar to that of global reserves. The most significant trend in manganese ore production over the past two decades has been a huge increase in output in South Africa, and a corresponding decline in Chinese production. In the past two years there has also been a significant increase in output outside of South Africa, much of it in four other African countries (Ghana, Gabon, Cote d'Ivoire and Zambia). Brazil is the fifth-largest producing country; with fairly stable output over most of the past decade, before a substantial increase in 2019.

We compete in the seaborne market with both high- and medium-grade ores from the Azul and Urucum mines, where we benefit from extensive synergies with our iron ore operations, from mine to rail to port to vessel operations. Our main competitors in this segment are South32 (Australia and South Africa) and Eramet (Gabon). Our lower-grade ores, especially those from Morro da Mina, are consumed internally in our ferroalloy smelters.

Unlike manganese ore, the production of manganese alloys is very fragmented. There are only 13 companies with a known alloy-production capacity above 350 ktpy. These companies have an estimated combined global market share of less than 50%. The fragmentation of the industry reflects, amongst other factors, the very large number of producers mainly in China and the substantial over-capacity in that country.

The manganese ferroalloy market is characterized by a large number of participants who compete primarily on the basis of price. Our competitors are located principally in countries that produce manganese ore or carbon steel. Potential entrants and substitutes come from silicon or chrome ferroalloys, which can occasionally shift their furnaces to manganese alloys, and from electrolytic manganese producers. Competitors may be either integrated smelters like us, who feed manganese ore from their own mines, or non-integrated smelters. The principal competitive factors in this market are the costs of manganese ore, electricity, logistics and reductants such as coke, coal and charcoal. We compete with both stand-alone and integrated producers.

Focusing mainly in the Brazilian, South and North American steelmaking customers, our ferroalloys operations also benefit from synergies with our iron ore sales, marketing, procurement and logistics activities. We buy our energy and coke supplies at reasonable market prices both through medium- and long-term contracts. Competitors in the Brazilian market are about a dozen smelters with capacities from five to 90 thousand metric tons per year. We have an advantage in comparison to them in producing manganese alloy with medium carbon, which has greater added value in the market.

2. BASE METALS

2.1 Nickel

2.1.1 Operations

We conduct our nickel operations primarily through our wholly owned subsidiary Vale Canada Limited, which operates two nickel production systems, one in the North Atlantic region and the other in the Asia Pacific region. We also produce copper as a coproduct in our nickel operations in Canada and, through Vale S.A., operate a third nickel production system, Onça Puma, in the South Atlantic region. Our nickel operations are set forth in the following table.

Company/ Mining System	Location	Description/History	Operations	Mining title	Power source	Access/ Transportation
<i>North Atlantic:</i>						
Vale Canada	Canada — Sudbury, Ontario	Integrated mining, milling, smelting and refining operations to process ore into finished nickel with a nominal capacity of 66,000 metric tons of refined nickel per year and additional nickel oxide feed for the refinery in Wales. Mining operations in Sudbury began in 1885. We acquired the Sudbury operations in 2006.	<i>Nickel.</i> Primarily underground mining operations with nickel sulfide ore bodies, which also contain some copper, cobalt, PGMs, gold and silver. Operations also process external feeds from third parties and from our Thompson operation. In addition to producing finished nickel in Sudbury, we ship a nickel oxide intermediate product to our nickel refinery in Wales for processing to final products. <i>Copper.</i> Production of intermediate copper products, such as copper concentrate and copper matte, in addition to a finished product in the form of copper cathodes.	Patented mineral rights with no expiration date; mineral leases expiring between 2021 and 2041; and mining licenses of occupation with indefinite expiration date(1).	Supplied by Ontario's provincial electricity grid and produced directly by Vale via hydro generation.	Located by the Trans-Canada highway and the two major railways that pass through the Sudbury area. Finished products are delivered to the North American market by truck. For overseas customers, the products are loaded into containers and travel intermodally (truck/rail/containership) through both east and west coast Canadian ports.
Vale Canada	Canada — Thompson, Manitoba	Mining and milling operations to process ore into nickel concentrate. We phased out smelting and refining activities in Thompson during 2018. Thompson mineralization was discovered in 1956, and Thompson operations were acquired by us in 2006.	<i>Nickel.</i> Primarily underground mining operations with nickel sulfide ore bodies, which also contain a small amount of copper and cobalt. Since the second half of 2018 (closure of smelting and refining), the majority of the nickel concentrate from Thompson has been refined in Sudbury, but it also has the flexibility to be refined in Long Harbour.	Order in Council leases expiring between 2021 and 2025; mineral leases expiring in 2034(2).	Supplied by Manitoba's provincial utility company.	Intermediate concentrates are delivered in Ontario.
Vale Newfoundland & Labrador Limited	Canada — Voisey's Bay and Long Harbour, Newfoundland and Labrador	Integrated open-pit mining and milling operation at Voisey's Bay producing nickel and copper concentrates with nickel refining at Long Harbour into finished metal products with an expected nominal capacity of approximately 50,000 metric tons of refined nickel per year upon ramp-up. Voisey's Bay's operations started in 2005 and was purchased by us in 2006.	Single open pit mine (Ovoid) with potential extension to underground operations. Deposits are nickel ore bodies, which also contain copper and cobalt. The Long Harbour facility continued to ramp up in 2020 while processing feed from Voisey's Bay concentrate exclusively. Copper concentrate from the open pit mine is sold directly to the market.	Mining lease expiring in 2027, with a right of further renewals for 10-year periods.	Power at Voisey's Bay is 100% supplied through Vale owned diesel generators. Power at the Long Harbour refinery is supplied by the Newfoundland and Labrador provincial utility company.	The nickel and copper concentrates from Voisey's Bay are transported to the port by haulage trucks and then shipped by dry bulk vessels to either overseas markets or to our Long Harbour operations for further refining.
Vale Europe Limited	U.K. — Clydach, Wales	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 40,000 metric tons per year. The Clydach refinery commenced operations in 1902 and was acquired by us in 2006.	Processes nickel oxide (intermediate product), supplied from our Sudbury and Matsusaka/PTVI operations to produce finished nickel in the form of powders and pellets.	—	Supplied through the national electricity grid.	Transported to final customer in the UK and continental Europe by truck. Products for overseas customers are trucked to the ports of Southampton and Liverpool and shipped by ocean container.

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
<i>Asia/Pacific</i>						
PT Vale Indonesia Tbk ("PTVI")	Indonesia — Sorowako, Sulawesi	Open cast mining area and related processing facility (producer of nickel matte, an intermediate product) with a nominal capacity of approximately 80,000 metric tons of nickel in matte per year. PTVI's shares are traded on the Indonesia Stock Exchange. We indirectly hold approximately 45% of PTVI's share capital, Sumitomo Metal Mining Co., Ltd ("Sumitomo") and an affiliate hold approximately 15%. PT Indonesia Asahan Aluminium (Persero) ("Inalum") holds 20% and the public holds approximately 20%. PTVI was established in 1968, commenced its commercial operations in 1978, was listed on the Indonesian stock exchange in 1990 and was acquired by us in 2006.	PTVI mines nickel laterite ore and produces nickel matte, which is shipped primarily to our nickel refinery in Japan. Pursuant to life-of-mine off-take agreements, PTVI sells 80% of its production to our wholly owned subsidiary Vale Canada and 20% of its production to Sumitomo.	Contract of work expiring in 2025, entitled to two consecutive ten-year extensions, in the form of a business license, subject to approval of the Indonesian government.(3)	Produced primarily by PTVI's low-cost hydroelectric power plants on the Larona River (there are currently three facilities). PTVI has thermal generating facilities in order to supplement its hydroelectric power supply with a source of energy that is not subject to hydrological factors.	Trucked approximately 55 km to the river port at Malili and then loaded onto barges in order to load break-bulk vessels for onward shipment.
Vale Nouvelle-Calédonie S.A.S. ("VNC")	New Caledonia — Southern Province	Mining and processing operations (producer of nickel hydroxide and cobalt carbonate). We hold 95% of VNC's shares and the remaining 5% is held by Société de Participation Minière du Sud Calédonien S.A.S. ("SPMSC"). In December 2020, we signed a put option agreement for the sale of our 95% ownership interest in VNC. See <i>Overview—Business Overview—Significant Changes in Our Business—Divestments—Vale New Caledonia put option agreement</i> .	VNC utilizes a high-pressure acid leach process to treat limonitic and saprolitic laterite ores. After April 2020, VNC no longer produced nickel oxide, only keeping production of nickel hydroxide cake. Operations have been suspended since December 2020.	Mining concessions expiring between 2022 and 2051(5).	Supplied through the national electricity grid and by independent producers.	Products are packed into containers and are trucked approximately 4 km to Prony port and shipped by ocean container.
Vale Japan Limited	Japan — Matsusaka	Stand-alone nickel refinery (intermediate and finished nickel), with a nominal capacity of 60,000 metric tons per year of nickel in intermediates. We own 87.2% of the shares, and Sumitomo owns the remaining shares. The refinery was built in 1965 and was acquired by us in 2006.	Processes PTVI nickel matte to produce both nickel oxide (intermediate product) for further processing in our refineries in Asia and the UK, as well as finished nickel products.	—	Supplied through the national electricity grid. Acquired from regional utility companies.	Products trucked over public roads to customers in Japan. For overseas customers, the product is loaded into containers at the plant and shipped from the ports of Yokkaichi and Nagoya.
Vale Taiwan Limited	Taiwan — Kaoshiung	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 18,000 metric tons per year. The refinery commenced production in 1983 and was acquired by us in 2006.	Produced finished nickel for the stainless-steel industry (utility nickel), primarily using intermediate products (nickel oxide) from our Matsusaka and New Caledonian operations. We suspended operations at this plant in 2017 due to market conditions and it currently remains under care and maintenance.	—	Supplied through the national electricity grid. Acquired from regional utility companies.	Trucked over public roads to customers in Taiwan. For overseas customers, the product is loaded into containers at the plant and shipped from the port of Kaoshiung.
Vale Nickel (Dalian) Co., Ltd	China — Dalian, Liaoning	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 32,000 metric tons per year. We own 98.3% of the equity interest and Ningbo Sunhu Chemical Products Co., Ltd. owns the remaining 1.7%. The refinery commenced production in 2008.	Produced finished nickel for the stainless-steel industry (utility nickel), primarily using intermediate products (nickel oxide) from our Matsusaka and New Caledonian operations. We suspended operations at this plant in 2020 due to the halt in the production of nickel oxide at VNC and the plant is currently under care and maintenance.	—	Supplied through the national electricity grid. Acquired from regional utility companies.	Product transported over public roads by truck and by railway to customers in China. It is also shipped in ocean containers to overseas and some domestic customers.

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
<i>South Atlantic</i> Vale/Onça Puma.....	Brazil — Ourilândia do Norte, Pará	Mining and smelting operation producing a high-quality ferronickel for application within the stainless steel industry.	The Onça Puma mine is built to recover nickel from saprolitic ore deposit. The operation produces ferronickel via the rotary kiln-electric furnace process. We are currently operating a single line with one electric furnace and two lines of calcine and rotary kilns, with nominal capacity estimated at 27,000 metric tons per year. We will evaluate opportunities to restart the second line operations in light of market conditions and the associated business case. See <i>Additional Information—Legal proceedings—Legal proceedings seeking suspension of certain operations in the state of Pará—Onça Puma litigation.</i>	Mining concession for indefinite period.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	The ferro-nickel is transported by truck to the Vila do Conde maritime terminal in the Brazilian state of Pará and exported in ocean containers.

- (1) We submitted applications for renewal of leases in Sudbury expiring in 2020 and the approval process is ongoing. All conditions required for the renewal under the Ontario Mining Act have been fulfilled. This process usually takes a number of years, and we can continue to operate while the approval process is ongoing.
- (2) Vale is negotiating with the Government of Manitoba the renewal and conversion of the Order in Council Leases into Mining leases and Claims in accordance with the Mines and Minerals Act of Manitoba, the Mineral Disposition and Mineral Lease Regulation, 1992. As part of the negotiation process, the Government of Manitoba has extended the leases for the negotiation period. The renewal of mineral rights is expected to be completed by end of 2021.
- (3) The contract of work between PTVI and the Indonesian government will expire in 2025, after which date PTVI will continue its operation in the form of a 10-year business license provided certain obligations are satisfied. PTVI can apply for a further 10-year extension to the extent that it is in compliance with predefined requirements. Under the contract of work, PTVI agreed to divest 20% of its shares to Indonesian participants within five years from the issuance of a regulation dated October 2014 (approximately 20% of PTVI's shares are already publicly traded and listed on the Indonesian stock exchange). In October 2020, in compliance with the divestment obligation under the contract of work, Vale Canada and Sumitomo sold to Inalum, a state-owned mining holding company which oversees the state mining investments, part of their interest in PTVI. Following this transaction, we own approximately 45% of PTVI's share capital and Sumitomo owns approximately 15%. Pursuant to a block-voting agreement, Sumitomo has agreed to follow our votes on relevant operational and financial decisions concerning PTVI.
- (4) VNC has requested the renewal of some concessions that were scheduled to expire before 2018. All conditions required for the renewal have been fulfilled. This process usually takes a number of years and we can continue to operate while the approval process is ongoing.

2.1.2 Production

The following table sets forth our annual mine production by operating mine (or, on an aggregate basis in the case of the Sulawesi operating areas operated by PTVI in Indonesia, because it is organized by mining areas rather than individual mines) and the average percentage grades of nickel and copper. The mine production at Sulawesi represents the product from PTVI's screening station delivered to PTVI's processing plant and does not include nickel losses due to drying and smelting. For our Sudbury, Thompson and Voisey's Bay operations, the production and average grades represent the mine product delivered to those operations' respective processing plants and do not include adjustments due to beneficiation, smelting or refining. For our Onça Puma operation in Brazil and VNC operation in New Caledonia the production and average grade represents in-place ore production and does not include losses due to processing.

	2020(1)			2019(1)			2018(1)		
	Production	Grade		Production	Grade		Production	Grade	
		Copper	Nickel		Copper	Nickel		Copper	Nickel
<i>Ontario operating mines</i>									
Copper Cliff North .	580	1.49	1.30	644	1.72	1.38	746	1.30	1.29
Creighton	508	2.78	2.60	613	2.67	2.68	608	2.77	2.55
Stobie	—	—	—	—	—	—	—	—	—
Garson	485	1.05	1.52	641	1.32	1.77	655	1.35	2.00
Coleman	1,038	3.41	1.43	1,102	3.80	1.47	618	3.31	1.40
Ellen	—	—	—	—	—	—	—	—	—
Totten	637	1.83	1.31	669	2.08	1.33	710	2.02	1.39
Total Ontario operations ...	<u>3,248</u>	<u>2.30</u>	<u>1.58</u>	<u>3,669</u>	<u>2.50</u>	<u>1.68</u>	<u>3,337</u>	<u>2.10</u>	<u>1.70</u>
<i>Manitoba operating mines</i>									
Thompson	691	—	1.93	859	—	1.78	1,034	—	2.05
Birchtree	—	—	—	—	—	—	—	—	—
Total Manitoba operations ...	<u>691</u>	<u>—</u>	<u>1.93</u>	<u>859</u>	<u>—</u>	<u>1.78</u>	<u>1,034</u>	<u>—</u>	<u>2.05</u>
<i>Voisey's Bay operating mines</i>									
Ovoid	<u>1,588</u>	<u>1.16</u>	<u>2.19</u>	<u>2,116</u>	<u>1.19</u>	<u>2.21</u>	<u>1,895</u>	<u>1.32</u>	<u>2.37</u>
<i>Sulawesi operating mines</i>									
Sorowako(2)	<u>4,163</u>	<u>—</u>	<u>1.82</u>	<u>4,286</u>	<u>—</u>	<u>1.89</u>	<u>4,469</u>	<u>—</u>	<u>1.90</u>
<i>New Caledonia operating mines</i>									
VNC(2)	<u>1,690</u>	<u>—</u>	<u>1.50</u>	<u>2,495</u>	<u>—</u>	<u>1.54</u>	<u>2,620</u>	<u>—</u>	<u>1.46</u>
<i>Brazil operating mines</i>									
Onça Puma(3)	<u>3,429</u>	<u>—</u>	<u>1.58</u>	<u>321</u>	<u>—</u>	<u>1.40</u>	<u>—</u>	<u>—</u>	<u>—</u>

(1) Production is stated in thousands of metric tons. Grade is % of copper or nickel, respectively.

(2) These figures correspond to 100% production and are not adjusted to reflect our ownership. We are currently in the process of selling VNC. See *Overview—Business Overview—Significant Changes in Our Business—Divestments—Vale New Caledonia put option agreement*.

(3) Mining activities in Onça Puma were suspended from September 2017 through September 2019.

The following table sets forth information about our nickel production, including: nickel refined through our facilities and intermediates designated for sale. The numbers below are reported on a contained nickel ore-source basis.

Mine	Type	Finished production by ore source for the year ended December 31,		
		2020	2019	2018
		(thousand metric tons contained nickel)		
Sudbury	Underground	43.3	50.8	50.6
Thompson	Underground	10.6	11.3	14.8
Voisey's Bay(1)	Open pit	35.7	35.4	38.6
Sorowako(2)	Open cast	71.6	68.2	72.1
Onça Puma	Open pit	16.0	11.6	22.9
New Caledonia(3)	Open pit	31.0	23.4	32.5
External(4)	-	6.6	7.3	13.1
Total(5)		214.7	208.0	244.6

(1) Includes finished nickel produced at Long Harbour, Sudbury and Clydach.

(2) These figures have not been adjusted to reflect our ownership. We have a 44.34% interest in PTVI, which owns the Sorowako mines.

(3) These figures have not been adjusted to reflect our ownership. We have a 95.0% interest in VNC.

(4) Finished nickel processed at our facilities using feeds purchased from unrelated parties.

(5) These figures do not include tolling of feeds for unrelated parties.

2.1.3 Customers and sales

Our nickel customers are broadly distributed on a global basis. In 2020, 31% of our refined nickel sales were delivered to customers in Asia, 40% to Europe, 26% to North America and 3% to other markets. We have short-term fixed-volume contracts with customers for the majority of our expected annual nickel sales. These contracts generally provide stable demand for a significant portion of our annual production.

Nickel is an exchange-traded metal, currently listed on the London Metal Exchange ("LME") and Shanghai Futures Exchange ("SHFE"), and most nickel products are priced according to a discount or premium to the LME price, depending primarily on the nickel product's physical and technical characteristics. Our finished nickel products represent what is known in the industry as "primary" nickel, meaning nickel produced principally from nickel ores (as opposed to "secondary" nickel, which is recovered from recycled nickel-containing material). Finished primary nickel products are distinguishable in terms of the following characteristics, which determine the product price level and the suitability for various end-use applications:

- nickel content and purity level: (i) intermediates have various levels of nickel content, (ii) nickel pig iron has 1.5-15% nickel, (iii) ferro-nickel has 15-40% nickel, (iv) refined nickel with less than 99.8% nickel, including products such as Tonimet™ and Utility™ nickel, (v) standard LME-grade nickel has a minimum of 99.8% nickel, and (vi) high-purity nickel has a minimum of 99.9% nickel and does not contain specific elemental impurities;
- shape (such as discrete or filamentary powders, pellets, discs, squares and strips);
- size (from micron powder particles to large full-sized cathodes); and
- packaging (such as bulk, 2-ton bags, 250 kg drums, 10 kg bags)

In 2020, the principal first-use applications for primary nickel were:

- stainless steel (70% of global nickel consumption);
- non-ferrous alloys, alloy steels and foundry applications (15% of global nickel consumption);
- nickel plating (6% of global nickel consumption);
- batteries (7% of global nickel consumption); and
- others (2% of global nickel consumption).

In 2020, 78% of our refined nickel sales were made into non-stainless steel applications, compared to the industry average for primary nickel producers of 30%. This brings more diversification and sales volume stability to our nickel revenues. As a result of our focus on higher-value segments, our average realized nickel prices for refined nickel have typically exceeded LME cash nickel prices.

We offer sales and technical support to our customers on a global basis through an established marketing network headquartered at our head office in Toronto (Canada). We have a well-established global marketing network for finished nickel, based at our head office in Toronto (Canada). We also have sales and technical support distributed around the world with presence in Singapore and Toronto (Canada) and have sales managers located in St. Prex (Switzerland), Paramus, New Jersey (United States) and at several sites throughout Asia. For information about demand and prices, see *Operating and Financial Review and Prospects—Overview—Major factors affecting prices*.

2.1.4 Competition

The global nickel market is highly competitive. Our key competitive strengths include our long-life mines, our low cash costs of production relative to other nickel producers, sophisticated exploration and processing technologies, and a diversified portfolio of products. Our global marketing reach, diverse product mix, and customer technical support direct our products into applications and geographic regions that offer the highest margins for our products.

Our nickel production represented 7% of global consumption for primary nickel in 2020. In addition to us, the largest mine-to-market integrated suppliers in the nickel industry (each with its own integrated facilities, including nickel mining, processing, refining and marketing operations) are Nornickel, Glencore, Jinchuan Nonferrous Metals Corporation, Tsingshan Group and Jiangsu Delong Nickel. Together with us, these companies accounted for about 44% of global refined primary nickel production in 2020.

The quality of nickel products determines its market suitability. Upper Class I products, which have higher nickel content and lower levels of deleterious elements, are more suitable for high-end nickel applications, such as utilization in specialty industries (e.g., aircraft and spacecraft) and draw a higher premium. Lower Class I products have slightly higher levels of impurities compared to Upper Class I products and are suitable for more general nickel applications, such as foundry alloys and generally receive a lower premium compared to Upper Class I products. Class II products, which have lower nickel content and higher levels of deleterious elements, are mostly used in the making of stainless steel. Intermediate products do not represent finished nickel production and are generally sold at a discount given that they still need to be processed before being sold to end customers.

Much of the world nickel production is composed of Class II nickel products (59% of the global market in 2020), which include nickel pig iron (NPI, with nickel content under 15%). Most of our products are high quality nickel products, which makes us the supplier of choice for specialty nickel applications. In 2020, 68% of our nickel products were Class I, 24% were Class II and 8% were Intermediates.

While stainless steel production is a major driver of global nickel demand, stainless steel producers can obtain nickel with a wide range of nickel content, including secondary nickel (scrap). The choice between primary and secondary nickel is largely based on their relative prices and availability. See *Operating and Financial Review and Prospects—Overview—Major factors affecting prices—Nickel*.

Competition in the nickel market is based primarily on quality and reliability of supply and price. We believe our operations are competitive in the nickel market because of the high quality of our nickel products and our relatively low production costs.

2.2 COPPER

2.2.1 Operations

We conduct our copper operations at the parent-company level in Brazil and through our subsidiaries in Canada.

Mining complex/Location	Location	Description/History	Mineralization/Operations	Mining title	Power source	Access/Transportation
Brazil:						
Vale/Sossego	Carajás, state of Pará.	Two main copper ore bodies, Sossego and Sequeirinho, and a processing facility to concentrate the ore. Sossego was developed by Vale. Production started in 2004 and has a nominal capacity of approximately 93,000 tpy of copper in concentrates.	The copper ore is mined using the open-pit method, and the run-of-mine is processed by means of standard primary crushing and conveying, SAG milling (a semi-autogenous mill that uses a large rotating drum filled with ore, water and steel grinding balls to transform the ore into a fine slurry), ball milling, copper concentrate flotation, tailings disposal, concentrate thickening, filtration and load out.	Mining concession for an indefinite period.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	We truck the concentrate to a storage terminal in Parauapebas and then transport it via the EFC railroad to the Itaquí Port in São Luís, state of Maranhão. We constructed an 85-kilometer road to link Sossego to Parauapebas.
Vale/Salobo	Carajás, state of Pará.	Salobo I processing plant started production in 2012 and has a total capacity of 12 Mtpy of ore processed. The open pit mine and mill concluded their ramp up in the fourth quarter of 2016 and reached a capacity of 24 Mtpy of ore processed with the full implementation of Salobo II expansion. Salobo I and II have a total capacity of approximately 197,000 tpy of copper in concentrates.	Our Salobo copper mine is mined using the open-pit method, and the run-of-mine is processed by means of standard primary and secondary crushing, conveying, roller press grinding, ball milling, copper concentrate flotation, tailings disposal, concentrate thickening, filtration and load out.	Mining concession for an indefinite period.	Supplied through the national electricity grid. Acquired through power purchase agreements.	We truck the concentrate to a storage terminal in Parauapebas and then transport it via the EFC railroad to the Itaquí Port in São Luís, state of Maranhão. We constructed a 90-kilometer road to link Salobo to Parauapebas.
Canada:						
Vale Canada	Canada—Sudbury, Ontario		See—Base metals—Nickel—Operations			
Vale Canada/ Voisey's Bay	Canada—Voisey's Bay, Newfoundland and Labrador		See—Base metals—Nickel—Operations			

2.2.2 Production

The following table sets forth our annual mine production in our Salobo and Sossego mines and the average percentage grades of copper. The production and average grade represent in-place ore production and do not include losses due to processing. For the annual production of copper as a coproduct in our nickel operations, see—*Base metals—Nickel—Production*.

	2020(1)		2019(1)		2018(1)	
	Production	Grade	Production	Grade	Production	Grade
<i>Brazil</i>						
Sossego	13,145	0.85	11,735	0.79	15,664	0.72
Salobo	43,151	0.68	48,468	0.69	50,963	0.69
Total	56,296	0.72	60,202	0.71	66,627	0.70

(1) Production is stated in thousands of metric tons. Grade is % of copper.

The following table sets forth information on our copper production.

Mine	Type	Finished production by ore source for the year ended December 31,		
		2020	2019	2018
(thousand metric tons)				
<i>Brazil:</i>				
Sossego	Open pit	87.7	65.5	92.2
Salobo	Open pit	172.7	189.4	192.6
<i>Canada: (as coproduct of nickel operations)</i>				
Sudbury	Underground	76.5	92.8	72.3
Voisey's Bay	Open pit	17.8	25.0	25.7
Thompson	Underground	0.8	0.9	1.3
External(1)	—	4.5	7.5	11.3
Total		360.1	381.1	395.5

(1) We process copper at our facilities using feed purchased from unrelated parties.

2.2.3 Customers and sales

We sell copper concentrates from Sossego and Salobo under medium- and long-term contracts to copper smelters in Europe, India and Asia. We have medium-term copper supply agreements with domestic customer for part of the copper concentrates and copper matte produced in Sudbury, which are also sold under long-term contracts in Europe and Asia. We sell copper concentrates from Voisey's Bay under medium and long-term contracts to customers in Europe and electrowin copper cathodes from Sudbury and Long Harbour in North America under short-term sales agreements.

2.2.4 Competition

The global refined copper market is highly competitive. Producers are integrated mining companies and custom smelters, covering all regions of the world, while consumers are principally wire rod and copper-alloy producers. Competition occurs mainly on a regional level and is based primarily on production costs, quality, reliability of supply and logistics costs. The world's largest copper producers are Jiangxi Copper Corporation Ltd., Corporación Nacional del Cobre de Chile ("Codelco"), Tongling Non-Ferrous Metals Group Co., Freeport McMoRan Copper & Gold Inc., Aurubis AG and Glencore, each operating at

the parent-company level or through subsidiaries. Our participation in the global refined copper cathodes market is marginal as we position ourselves more competitively in the copper concentrate market.

Copper concentrate and copper matte are intermediate products in the copper production chain. Both the concentrate and matte markets are competitive, having numerous producers but fewer participants and smaller volumes than in the copper cathode market due to the high levels of integration by the major copper producers.

In the copper concentrate market, mining occurs on a global basis with a predominant share from South America, while consumers are custom smelters located mainly in Europe and Asia. Competition in the custom copper concentrate market occurs mainly on a global level and is based on production costs, quality, logistics costs and reliability of supply. The largest competitors in the copper concentrate market are Freeport McMoRan, Glencore, BHP Billiton, Codelco, Anglo American, Antofagasta plc, Rio Tinto and First Quantum; each operating at the parent-company level or through subsidiaries. Our market share in 2020 was about 2% of the total copper concentrate market.

2.3 PGMs and other precious metals

As byproducts of our Sudbury nickel operations in Canada, we recover significant quantities of PGMs, as well as small quantities of gold and silver. We operate a processing facility in Port Colborne, Ontario, which produces PGMs, gold and silver intermediate products using feed from our Sudbury operation. PGM concentrates from our Port Colborne operation are being sold to third parties. Gold and silver intermediates are also sold to third parties. Our copper concentrates from our Salobo and Sossego mines in Carajás, in the Brazilian state of Pará, also contain gold, the value of which we realize in the sale of those products.

In February 2013, we sold to Wheaton Precious Metals Corp. (formerly Silver Wheaton) (“Wheaton”) 25% of the gold produced as a byproduct at our Salobo copper mine, in Brazil, for the life of mine, and 70% of the gold produced as a byproduct at our Sudbury nickel mines, in Canada, for 20 years. In each of March 2015 and August 2016, we sold to Wheaton an additional 25% of the gold produced as a byproduct at our Salobo copper mine. In consideration for the August 2016 sale, we received an initial cash payment of US\$800 million, an option value of approximately US\$23 million from a reduction of the exercise price of the warrants of Wheaton held by Vale since 2013, and ongoing payments of the lesser of US\$400 per ounce (subject to a 1% annual inflation adjustment starting January 1, 2019) and the prevailing market price, for each ounce of gold that we deliver under the agreement. We may receive an additional cash payment if we expand our capacity to process Salobo copper ores to more than 28 Mtpy before 2036. The additional cash payment may range from US\$113 million to US\$953 million, depending on ore grade, timing and size of the expansion. Pursuant to the gold stream contract, Wheaton received 290,000 oz. of gold in 2019. In February 2020, we sold all of our warrants of Wheaton (equivalent to 10,000,000 common shares) for US\$2.5 per warrant, totaling US\$25 million.

The following table sets forth information on the contained volume of precious metals and platinum group metals (PGMs) as a byproduct of our production of nickel and copper concentrates.

Mine	Type	2020	2019	2018
		(thousand troy ounces of contained metal)		
Sudbury(1):				
Platinum.....	Underground	140	148	135
Palladium	Underground	186	182	218
Gold(2)	Underground	70	69	57
Salobo:				
Gold(2)	Open pit	331	368	361
Sossego:				
Gold	Open pit	68	43	59

- (1) Includes metal produced from unrelated parties feed purchases. Includes production out of Ontario (Canada) and Acton (England) production. Excludes tolling from unrelated parties.
- (2) Figures represent 100% of Salobo and Sudbury contained volume of gold as a byproduct of our production of nickel and copper concentrates and do not deduct the portion of the gold sold to Wheaton.

2.4 Cobalt

We recover significant quantities of cobalt as a byproduct of our nickel operations. In 2020, we produced 878 metric tons of refined cobalt metal (in the form of cobalt rounds) at our Port Colborne refinery, 1,582 metric tons of cobalt rounds at our Long Harbour refinery, and 2,197 metric tons of cobalt in a cobalt-based intermediate product in New Caledonia. We sell cobalt on a global basis. The cobalt metal and the Long-Harbour cobalt rounds are electro-refined at our Port Colborne refinery and have very high purity levels (99.8%), meeting the LME contract specification. Cobalt metal is used in the production of various alloys, particularly for aerospace applications, as well as the manufacture of cobalt-based chemicals.

In June 2018, we sold to Wheaton and Cobalt 27 Capital Corp. ("Cobalt 27") a combined 75% of the cobalt produced as a byproduct at our Voisey's Bay mine from January 1, 2021, which includes the ramp-down of production from the existing mine and the life-of-mine production from our underground mine expansion project. In consideration, we received US\$690 million in cash from Wheaton and Cobalt 27 upon closing of the transaction on June 28, 2018, and will receive additional payments of 20%, on average, of cobalt prices upon delivery. Vale remains exposed to approximately 40% of future cobalt production from Voisey's Bay, through our retained interest in 25% of cobalt production and the additional payments upon delivery. In addition, we plan to begin marketing our cobalt streams in 2021, once current offtakes are concluded. The following table sets forth information on our cobalt production.

Mine	Type	Finished production by ore source for the year ended December 31,		
		2020	2019	2018
(contained metric tons)				
Sudbury.....	Underground	453	495	520
Thompson	Underground	60	80	198
Voisey's Bay.....	Open pit	1,591	1,608	1,902
New Caledonia	Open pit	2,198	1,703	2,104
Others(1).....	—	369	490	371
Total		4,672	4,376	5,093

- (1) These figures do not include tolling of feeds for unrelated parties. Includes cobalt processed at our facilities using feeds purchased from unrelated parties and PTVI ore source 173 metric tons in 2018, 313 metric tons in 2019, and 233 metric tons in 2020.

3. COAL

3.1 Operations

We produce metallurgical and thermal coal through our subsidiary Vale Moçambique, which operates the Moatize mine.

Company/ Mining complex	Location	Description/History	Mineralization/ Operations	Mining title	Power source	Access/ Transportation
Vale Moçambique						
Moatize	Tete, Mozambique	Open-cut mine, which was developed directly by Vale. Operations started in August 2011 and are expected to reach a nominal production capacity of 22 Mtpy, considering the Moatize expansion, comprised of metallurgical and thermal coal and the Nacala Logistics Corridor ramp-up. Vale has an indirect 80.75% stake, Mitsui has an indirect 14.25% stake and the remaining is owned by Empresa Moçambicana de Exploração Mineira, S.A. In January 2021, we signed a Heads of Agreement ("HOA") with Mitsui to structure Mitsui's exit from Vale Moçambique and Nacala Logistics Corridor ("NLC"). See <i>Overview—Business Overview—Significant Changes in Our Business—Divestments—Heads of Agreement with Mitsui</i> .	Produces metallurgical and thermal coal. Moatize's main branded products are the MLV premium hard coking coal and Mabu hard coking coal, but there is operational flexibility for multiple products. The optimal product portfolio will come as a result of market trials. Coal from the mines is currently processed at a CHPP with a capacity of 4,000 metric tons per hour. An additional CHPP began production in August 2016, which increased feed capacity by additional 4,000 metric tons per hour.	Mining concession expiring in 2032, which may be extended for an additional 25-year period, subject to approval by the government of Mozambique.	Supplied by local utility company. Back up supply on site.	The coal is transported from the mine to the port at Nacala-à-Velha via the Nacala Logistics Corridor.

3.2 Production

The following table sets forth information on our marketable coal production.

Operation	Mine type	Production for the year ended December 31,		
		2020	2019	2018
(thousand metric tons)				
Metallurgical coal:				
Moatize(1)	Open-cut	3,095	4,032	6,161
Thermal coal:				
Moatize(1)	Open-cut	2,783	4,738	5,444

(1) These figures correspond to 100% production at Moatize and are not adjusted to reflect our ownership.

3.3 Customers and sales

Coal sales from our Moatize operations, in Mozambique, target global steel and energy markets, including Asia, Africa, Europe and the Americas. Our office in India supports our sales of coal to the Indian market.

3.4 Competition

The global coal industry comprises markets for metallurgical and thermal coal and is highly competitive.

The demand for steel, especially in Asia, underpins demand for metallurgical coal, while demand for electricity underpins demand for thermal coal. Competitiveness in the coal industry is primarily based on the economics of production costs, coal quality, transportation costs and proximity to the market. Our key competitive strengths are a new and competitive transportation corridor and the size and quality of our reserves. The logistics facilities in Mozambique help us ensure that our products are delivered on time and at a relatively low cost in comparison to lengthy waits at the ports in Queensland, Australia and on the east coast of the United States. The properties of our coking coal make our product highly competitive.

Our main competitors in the metallurgical coal business are located in Australia and Canada and include subsidiaries, affiliates and joint ventures of BHP Billiton, Glencore, Anglo American, Peabody, Jellinbah Resources, among others. In the thermal coal business, our main competitors are located in Indonesia, South Africa, Australia, Colombia, USA, Russia and include subsidiaries affiliates and joint ventures of Glencore, Anglo American, Drummond Co, Pt Bumi Resources and PT Adaro, among others.

4. INFRASTRUCTURE RELATED TO OUR BUSINESS

4.1 Logistics

We have developed our logistics business based on the transportation needs of our mining operations and we also provide transportation services for other customers. We conduct our logistics businesses at the parent-company level and through subsidiaries and joint ventures, as set forth in the table below.

Company	Business	Location	Our share of capital		Partners
			Voting (%)	Total	
Vale	Railroad (EFVM and EFC), port and maritime terminal operations	Brazil	—	—	—
VLI(1)	Railroad, port, inland terminal and maritime terminal operations. Holding of certain general cargo logistics assets	Brazil	29.6	29.6	FI-FGTS, Mitsui, Brookfield and BNDESPar
MRS	Railroad operations	Brazil	47.1	48.2	CSN, CSN Mineração, Usiminas Participações e Logísticas, Gerdau and public investors.
CPBS	Port and maritime terminal operations	Brazil	100	100	—
PTVI	Port and maritime terminal operations	Indonesia	44.34	44.34	Sumitomo, Inalum, public investors
Vale Logística Uruguay	Port operations	Uruguay	100	100	—
Central East African Railways ("CEAR")(2)	Railroad	Malawi	46.2	46.2	Mitsui, investors
Corredor de Desenvolvimento do Norte ("CDN")(2)	Railroad	Mozambique	46.2	46.2	Mitsui, investors
Corredor de Desenvolvimento do Norte—Porto ("CDN Porto")(2)	Port and maritime terminal operations	Mozambique	46.2	46.2	Mitsui, investors
Corredor Logístico Integrado de Nacala S.A. ("CLN")(3)	Railroad and port operations	Mozambique	50.0	50.0	Mitsui
Vale Logistics Limited ("VLL")(4)	Railroad operations	Malawi	50.0	50.0	Mitsui
Transbarga Navegación	Paraná and Paraguay Waterway System (Convoys)	Paraguay	100	100	—
VNC	Port and maritime terminal operations	New Caledonia	95.0	95.0	SPMSC
VMM	Port and maritime terminal operations	Malaysia	100	100	—
Vale Newfoundland & Labrador Limited	Port operations	Voisey's Bay and Long Harbour, in Newfoundland and Labrador	100	100	—
Vale Oman Distribution Center LLC	Port and maritime terminal operations	Oman	100	100	—

- (1) BNDES fully exercised its option to purchase shares of VLI held by us, pursuant to the VLI Stock Purchase Option Agreement, corresponding to 8% of VLI's share capital.
- (2) Vale holds its interest in CEAR, CDN and CDN Porto through a 50.0% interest in Nacala Corridor Holding Netherlands B.V., which indirectly owns 92.4% of these operating companies that comprise the NLC.
- (3) Vale holds its interest in CLN and VLL through a 50.0% interest in Nacala Corridor Holding Netherlands B.V., which indirectly owns 100% of these operating companies that comprise the NLC.

4.1.1 Railroads

Brazil

Vitória a Minas railroad ("EFVM"). The EFVM railroad links our Southeastern System mines in the Iron Quadrangle region in the Brazilian state of Minas Gerais to the Tubarão port, in Vitória, in the Brazilian state of Espírito Santo. We operate this 888-kilometer railroad under a concession agreement, which was recently renewed and will expire in 2057. The EFVM railroad consists of two lines of track extending for a distance of 584 kilometers to permit continuous railroad travel in opposite directions, and single-track branches of 304 kilometers. Industrial manufacturers are located in this area and major agricultural regions are also accessible to it. VLI has rights to purchase railroad transportation capacity on our EFVM railroad. In 2020, the EFVM railroad transported 62,385 thousand metric tons of iron ore and 20,929 thousand metric tons of other cargo. The EFVM railroad also carried 0.3 million passengers in 2020. In 2020, we had a fleet of 328 locomotives and 19,145 wagons at EFVM, which were operated by Vale and third parties.

Carajás railroad ("EFC"). The EFC railroad links our Northern System mines in the Carajás region in the Brazilian state of Pará to the Ponta da Madeira maritime terminal, in São Luis, in the Brazilian state of Maranhão. We operate the EFC railroad under a concession agreement, which was recently renewed and will expire in 2057. EFC extends for 997 kilometers from our Carajás mines to our Ponta da Madeira maritime terminal complex facilities. Its main cargo is iron ore, principally carried for us. VLI has rights to purchase railroad transportation capacity on our EFC railroad. In 2020, the EFC railroad transported 192,381 thousand metric tons of iron ore and 13,887 thousand metric tons of other cargo. EFC also carried 145 thousand passengers in 2020. EFC supports the largest train, in terms of capacity, in Latin America, which measures 3.5 kilometers, weighs 41.67 thousand gross metric tons when loaded and has 330 cars. In 2020, EFC had a fleet of 229 locomotives and 22,185 wagons, which were operated by Vale and third parties.

We have entered into amendments to the EFVM and the EFC concession agreements in order to formalize the renewals of the concessions that would expire in 2027 for an additional period of 30 years. We will undertake total commitments estimated at present value of 12.016 billion (US\$2.312 billion) to be performed by 2057, of which (i) R\$ 2.818 billion (US\$0.5 billion) are related to the payment of the grants (*outorgas*); (ii) R\$ 7.826 billion (US\$1.506 billion) are related to infrastructure work to be performed by us in the Ferrovia de Integração do Centro-Oeste (FICO) and the Ferrovia de Integração Oeste-Leste (FIOL) railways; and (iii) R\$ 1.372 billion (US\$0.3 billion) are related to other commitments, including the expansion of passenger train services and works to reduce urban conflicts.

The principal items of cargo of the EFVM and EFC railroads are:

- iron ore and iron ore pellets and manganese ore, carried for us and customers;
- steel, coal, pig iron, limestone and other raw materials carried for customers with steel mills located along the railroad;
- agricultural products, such as soybeans, soybean meal and fertilizers; and
- other general cargo, such as pulp, fuel and chemical products.

We charge market prices for customer freight, including iron ore pellets originating from joint ventures and other enterprises in which we do not have a 100% equity interest. Market prices vary based on the

distance traveled, the type of product transported and other criteria, subject to price caps set forth in the relevant concession agreements, and are regulated by the Brazilian transportation regulatory agency, ANTT (*Agência Nacional de Transportes Terrestres*).

VLI. VLI provides integrated logistics solutions through 7,940 kilometers of railroads in Brazil (FCA and FNS), eight inland terminals with a total storage capacity of 795,000 metric tons and three maritime terminals and ports operations. We hold a 29.6% stake in VLI, and are party to a shareholders' agreement with FI-FGTS, Mitsui, BNDESPar, and Brookfield, which hold the remaining equity interests in VLI. VLI's main assets are:

- *Ferrovias Centro-Atlântica S.A. ("FCA")*. Central-east regional railway network of the Brazilian national railway system, held under a 30-year renewable concession, which expires in 2026. The central east network has 7,220 kilometers of track, extending into the states of Sergipe, Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, Goiás and the Federal District of Brazil;
- *Ferrovias Norte-Sul S.A. ("FNS")*. A 30-year renewable subconcession for the commercial operation of a 720-kilometer stretch of the North-South railroad in Brazil, between the cities Açailândia, in the Brazilian state of Maranhão, and Porto Nacional, in the Brazilian state of Tocantins. This railway is connected to EFC railroad, and creates a new corridor for the transportation of general cargo, mainly for the export of soybeans, rice and corn produced in the center-northern region of Brazil;
- Right to purchase capacity of our EFVM and EFC railroads for general cargo; and
- Right to purchase capacity of our Tubarão and Praia Mole terminals for general cargo.

In 2020, VLI transported a total of 40.8 billion ntk of general cargo, including 22.5 billion ntk from FCA and FNS and 18.3 billion ntk through operational agreements with Vale.

MRS Logística S.A. ("MRS"). The MRS railroad, in which we hold a 48.16% equity interest, is 1,643 kilometers long and links the Brazilian states of Rio de Janeiro, São Paulo and Minas Gerais. The MRS railroad transports our iron ore products from the Southern System mines to our maritime terminals. In 2020, it transported a daily average of 261.4 thousand metric tons of iron ore and 175.3 thousand metric tons of other cargo.

Africa

Nacala Logistics Corridor ("NLC"). The NLC connects the Moatize mine to the Nacala-à-Velha maritime terminal, located in Nacala, Mozambique, and crosses into the Republic of Malawi. The NLC consists of railway and port infrastructure, including greenfield and rehabilitation of existing railways in Mozambique and Malawi and a new coal port terminal in Mozambique. The NLC transports our coal products from the Moatize mine to our maritime terminal and supports our operations in Southeastern Africa. Nacala Corridor Holding Netherlands B.V., a joint venture in which we hold a 50% equity interest, operates the NLC through certain operating companies, as described below:

- In Mozambique, Corredor Logístico Integrado de Nacala S.A. ("CLN") operates under two concession agreements, one related to the Mozambican greenfield railway and another related to the newly constructed coal port, which will expire in 2043, subject to renewal. Corredor de Desenvolvimento do Norte ("CDN") operated under a concession which will expire in 2035.

- In Malawi, Vale Logistics Limited (“VLL”) operates under a concession which will expire in 2046, subject to renewal, and Central East African Railways (“CEAR”) operates under a concession which will expire in 2046.

In 2020, the NLC transported a daily average of 16.07 thousand metric tons of coal and 1.15 thousand metric tons of other cargo. The NLC also carried 383.5 thousand passengers in 2020. In 2020, CLN operated a fleet of 101 locomotives and 2,677 wagons at the NLC.

4.1.2 Ports and maritime terminals

Brazil

We operate ports and maritime terminals principally as a means to complete the delivery of our iron ore and iron ore pellets to bulk carrier vessels serving the seaborne market. See—*Ferrous minerals—Iron ore and iron ore pellets—Iron ore operations*. We also use our ports and terminals to handle customers’ cargo.

Tubarão and Praia Mole Ports. The Tubarão port, which covers an area of 18 square kilometers, is located in the Brazilian state of Espírito Santo and contains the iron ore maritime terminal and the general cargo terminals (*Terminal de Granéis Líquidos* and the *Terminal de Produtos Diversos*). The Praia Mole port is also located in the Brazilian state of Espírito Santo.

- The iron ore maritime terminal has two piers. From this terminal in the Tubarão port, we export mostly iron ore produced from our Southeastern system. Pier I can accommodate two vessels at a time, one of up to 170,000 DWT on the southern side and one of up to 210,000 DWT on the northern side. Pier II can accommodate one vessel of up to 405,000 DWT at a time, limited at 23 meters draft. In Pier I there are two ship loaders, which can load up to 13,500 metric tons per hour each. In Pier II there are two ship loaders that work alternately and can each load up to 16,000 metric tons per hour continuously. The iron ore maritime terminal has a storage yard with a capacity of 2.9 million metric tons. In 2020, 48.8 million metric tons of iron ore and iron ore pellets were shipped through the terminal for us.
- The *Terminal de Produtos Diversos* handled 6,643 million metric tons of grains and fertilizers in 2020. VLI has the right to purchase the capacity of the *Terminal de Produtos Diversos*.
- The *Terminal de Granéis Líquidos* handled 736 million metric tons of fuel in 2020. VLI has the right to purchase the capacity of the *Terminal de Granéis Líquidos*.
- The Praia Mole terminal is principally a coal terminal and handled 9,969 million metric tons of coal and other related cargo in 2020. VLI has the right to purchase the capacity of the Praia Mole terminal.

Ponta da Madeira maritime terminal. Our Ponta da Madeira maritime terminal is located in the Brazilian state of Maranhão. Pier I can accommodate vessels of up to 420,000 DWT and has a maximum loading rate of 16,000 metric tons per hour. Pier III, which has two berths and three shiploaders, can accommodate vessels of up to 210,000 DWT at the south berth and 180,000 DWT at the north berth (or two vessels of 180,000 DWT simultaneously), subject to tide conditions, and has a maximum loading rate of 8,000 metric tons per hour in each shiploader. Pier IV (south berth) is able to accommodate vessels of up to 420,000 DWT and have two ship loaders that work alternately with a maximum loading rate of 16,000 metric tons per hour. Pier IV (north berth) is able to accommodate vessels of up to 420,000 DWT and have two ship loaders that work alternately with a maximum loading rate of 16,000 metric tons per hour. In 2018, Vale

received from the Brazilian tax authorities, the customs authorization for the operations of Pier IV (north berth). Cargo shipped through our Ponta da Madeira maritime terminal consists of the Northern system production of iron ore, pellets and manganese. In 2020, 191.2 million metric tons of iron ore, pellets and manganese were shipped through the terminal. The Ponta da Madeira maritime terminal has a storage yard with a static capacity of 7.2 million metric tons.

Itaguaí maritime terminal—Cia. Portuária Baía de Sepetiba (“CPBS”). From this terminal we mostly export iron ore from our Southern system. CPBS is a wholly owned subsidiary that operates the Itaguaí terminal, at the Itaguaí Port, in Sepetiba in the Brazilian state of Rio de Janeiro, which is leased from Companhia Docas do Rio de Janeiro (CDRJ). The Itaguaí port terminal has a pier with one berth that allows the loading of ships up to 17.8 meters of draft and approximately 200,000 DWT of capacity. In 2020, the terminal loaded 15.1 million metric tons of iron ore.

Guaíba Island maritime terminal. From this terminal we export mostly iron ore from our Southern system. We operate a maritime terminal on Guaíba Island in the Sepetiba Bay, in the Brazilian state of Rio de Janeiro. The iron ore terminal has a pier with two berths that allows the loading of ships of up to 350,000 DWT. In 2020, the terminal loaded 23.7 million metric tons of iron ore.

VLI also operates the Inácio Barbosa maritime terminal (TMIB), owned by Petrobras, in the Brazilian state of Sergipe; the Santos maritime terminal (TIPLAM), in the Brazilian state of São Paulo, which is jointly owned by VLI, Vale and Mosaic; and Berth 105 in the Itaquí Port.

Uruguay

Since October 2017, our subsidiary Vale Logística Uruguay S.A. (“VLU”) contracts third-party services to operate the Corporación Navios port terminal in the Nueva Palmira Free Zone in Uruguay. The port terminal provides facilities for the unloading, storing, weighing and loading of bulk materials from Corumbá, Brazil, by river barge for transshipment to ocean-going vessels destined for Brazilian, Asian and European markets. In 2020, we handled 1.2 million metric tons of iron and manganese ore through the Corporación Navios port.

Canada

Vale Newfoundland & Labrador Limited operates a port as part of our mining operation at Voisey’s Bay, Labrador and a port as part of our processing operation at Long Harbour, Newfoundland. The port at Voisey’s Bay is used for shipping nickel, and copper concentrates and re-supply. The port at Long Harbour is used to receive nickel concentrate from Voisey’s Bay along with goods and materials required for the Long Harbour operation.

Oman

Vale Oman Distribution Center LLC is part of the Oman Industrial Complex and operates a blending and distribution center in Liwa, Sultanate of Oman. The maritime terminal has a large deep-water jetty, a 600-meter long platform connected to the shore by means of a 700-meter long trestle, and is integrated with a storage yard that has throughput capacity to handle 40 Mtpy of iron ore and iron ore pellets per year. The loading nominal capacity is 10,000 metric tons per hour and the nominal unloading capacity is 9,000 metric tons per hour.

Indonesia

PTVI owns and operates two ports in Indonesia to support its nickel mining activities.

- The Balantang Special Port is located in Balantang Village, South Sulawesi, and has two types of piers, with total capacity of 12,000 DWT, two barge slips for barges with capacity of up to 5,000 DWT each for dry bulk cargo, and a general cargo wharf for vessels of up to 2,000 DWT.
- The Tanjung Mangkasa Special Port is located in Lampia Village, South Sulawesi, with mooring buoys that can accommodate vessels with capacity of up to 20,000 DWT, and a terminal that can accommodate fuel tanker vessels with capacity of up to 5,000 DWT, totaling capacity of 25,000 DWT.

New Caledonia

We own and operate a port in Prony Bay, Province Sud, New Caledonia. This port has three terminals, including a passenger ferry terminal able to berth two ships up to 50m long, a dry bulk wharf where vessels of up to 58,000 DWT can unload at a rate of 8,000 metric tons per day and a general cargo wharf where vessels up to 200m long can berth. The general cargo wharf can move containers at a rate of seven per hour and liquid fuels (liquefied petroleum gas, heavy fuel oil and diesel) at a rate of 350 cubic meters per hour, and break-bulk. The port's container yard, covering an area of approximately 13,000 square meters, can receive up to 1,300 units. A bulk storage yard is linked to the port by a conveyor and has a storage capacity of 94,000 metric tons of limestone, 95,000 metric tons of sulfur, and 60,000 metric tons of coal. We are currently in the process of selling VNC. See *Overview—Business Overview—Significant Changes in Our Business—Divestments—Vale New Caledonia put option agreement*.

Malaysia

Teluk Rubiah Maritime Terminal ("TRMT"). TRMT is located in the Malaysian state of Perak and has a pier with two berths that allows the unloading of vessels of approximately 400,000 DWT of capacity and the loading of vessels up to 220,000 DWT of capacity. In 2020, the terminal unloaded 17.1 million metric tons of iron ore and loaded 17.1 million metric tons of iron ore.

4.1.3 Shipping

Maritime shipping of iron ore and pellets

In 2020, we shipped approximately 262 million metric tons of iron ore and pellets in transactions in which we were responsible for transportation. We ship a large amount of our iron ore products from Brazil to Asia through long-term contracts of affreightment with owners of very large ore carriers (VLOCs). These vessels reduce energy consumption and greenhouse emissions by carrying an increased amount of cargo in a single trip, offering lower shipping costs. In 2020, approximately 106 million metric tons of iron ore products were transported under long term contracts of affreightment on VLOCs of 400,000 DWT and 325,000 DWT.

In light of the IMO regulation that limits global sulphur emissions to 0.5%, which became effective on January 2020, we negotiated the fitting of scrubbers on most of our dedicated fleet. These scrubbers will allow us to continue bunkering high-sulphur fuel oil, while complying with the new regulation. We expect 97% of our dedicated fleet to be scrubber-fitted by the end of 2022.

In January 2020, following our new risk management approach, we have decided to phase out or replace all converted vessels engaged in our cargo transportation, either through the early termination or the amendment of contracts. Our freight competitiveness is preserved through long-term contracts with shipowners for the use of more efficient and modern vessels as Valemax and Guaibamax.

Paraná—Paraguay waterway system

Through our subsidiary, Transbarga Navegação, and other chartered convoys, we transport iron ore and manganese ores through the Paraná and Paraguay waterway system. The barges are unloaded in our local customers' terminals in Argentina or in a contracted terminal in the Nueva Palmira Free Zone in Uruguay, where we load the ore into ocean going vessels. We transported 1.34 million metric tons through the waterway system in 2020, including 0.45 million metric tons of ore through our local customers' terminals and 0.89 million metric tons of ore through a port in Uruguay.

Tugboats

We manage a fleet of 14 owned tugboats. We directly operate five tugboats in the ports of Itaguaí and Mangaratiba, in the Brazilian state of Rio de Janeiro. We also own two tugboats in New Caledonia.

4.2 Energy

We have developed our energy assets based on the current and projected energy needs of our operations, with the goal of reducing our energy costs, minimizing the risk of energy shortages, while also meeting our consumption needs through renewable sources.

Brazil

Energy management and efficient supply in Brazil are priorities for us, given the uncertainties associated with changes in the regulatory environment and the risk of rising electricity prices. In 2020, our installed capacity in Brazil was 1.8 GW, sourced from both directly and indirectly owned power plants. We use the electricity produced by these plants for our internal consumption needs. We currently own direct stakes in three hydroelectric power plants and three small hydroelectric power plants in operation. The hydroelectric power plant of Candonga, the operations of which remain suspended since November 2015 as a result of the rupture of Samarco's tailings dam, is located in the Southeastern region, Machadinho is located in the Southern region, and Estreito is located in the Northern region. The small hydroelectric power plants of Mello, Glória and Nova Maurício are located in the Southeastern region. Through our 55% participation in Aliança Geração de Energia S.A. ("Aliança Geração"), we also have indirect stakes in the hydroelectric power plants of Igarapava, Porto Estrela, Funil, Candonga, Aimorés, Capim Branco I, Capim Branco II, located in the Southeastern Region and, additionally, we have indirect stake in Santo Inácio, a Wind Complex located in the Brazilian state of Ceará, which started operations in December 2017. Part of the electricity generated by these assets is supplied to our operations through power purchase agreements with Aliança Geração.

We also have a 4.59% indirect stake in Norte Energia S.A. ("Norte Energia"), the company established to develop and operate the Belo Monte hydroelectric plant in the Brazilian state of Pará, which started operations in April 2016 and accomplished the startup of the last of its 24 turbines in 2019. Our participation in the Belo Monte project gives us the right to purchase 9% of the electricity generated by the plant, which has already been contracted through a long-term power purchase agreement entered into with Norte Energia.

In order to achieve electricity self-sufficiency in Brazil by 2025 and increase renewable energy sources, besides Sol do Cerrado project which we have announced in December 2020, we signed a long-term energy supply contract for 20 years. The energy will be supplied by the Folha Larga Sul wind farm, a 151.2 MW project in Campo Formoso, Bahia, Brazil. This project started commercial operation in the second half of 2020. The agreement also includes a future asset call option held by Vale. In 2019, we also approved the construction of two wind farms (Gravier and Acauã) in the Brazilian states of Ceará and Rio Grande do Norte, respectively, through Aliança Geração. Projects have together 180.6 MW of installed capacity and will begin commercial operations by 2022.

Canada

In 2020, our wholly owned and operated hydroelectric power plants in Sudbury generated 20% of the electricity requirements of our Sudbury operations. The power plants consist of five separate generation stations with an installed generator nameplate capacity of 55 MW. The output of the plants is limited by water availability, as well as by constraints imposed by a water management plan regulated by the provincial government of Ontario. Over the course of 2020, average demand for electrical energy was 159 MW to all surface plants and mines in the Sudbury area.

In 2020, diesel generation provided 100% of the electric requirements of our Voisey's Bay operations. We have six diesel generators on-site, with output ranging from 12 to 14 MW, in order to meet seasonal demands.

Indonesia

Energy costs are a significant component of our nickel production costs for the processing of lateritic ore at our PTVI operations in Indonesia. A major portion of PTVI's electric furnace power requirements is supplied at a low cost by its three hydroelectric power plants on the Larona River: (i) the Larona plant, which has an average generating capacity of 165 MW, (ii) the Balambano plant, which has an average capacity of 110 MW and (iii) the Karebbe plant, with 90 MW of average generating capacity. These plants help reduce production costs by substituting oil used for power generation with hydroelectric power, reduce CO₂ emissions by replacing non-renewable power generation, and enable us to increase our current nickel production capacity in Indonesia.

5. Other investments

Below is a list of our main other investments:

- *Nickel refinery.* We have a 25% indirect stake in Korea Nickel Corporation, which operates a nickel refinery in South Korea. The remaining stake is held by Korea Zinc Co., Ltd, Postel Co., Ltd., Young Poong Co., Ltd., and others. Korea Nickel Corporation produces finished nickel for the stainless steel industry using intermediate products from our Matsusaka and New Caledonia operations.
- *Steel producers.* We own a 50% stake in California Steel Industries, Inc. ("CSI"), a producer of flat-rolled steel and pipe products located in California, United States. The remainder is owned by JFE Steel. CSI's annual production capacity is approximately 2.8 million metric tons of flat and pipe products. We also own a 50% stake in Companhia Siderúrgica do Pecém ("CSP"), an integrated steel slab plant in the Brazilian state of Ceará in partnership with Dongkuk Steel Mill Co. and Posco, two major steel producers in South Korea. CSP's annual production capacity is 3.0 million metric tons.

- *Bauxite.* We own a 40% stake in Mineração Rio do Norte S.A. (“MRN”), a bauxite mining business located in Brazil.
- *Samarco.* We own a 50% stake in Samarco, an integrated system comprised of two mines, three beneficiation plants, three pipelines, four pellet plants and a port. The mines and the beneficiation plants are located in the state of Minas Gerais and the pellet plants and port are located in the state of Espírito Santo. From Minas Gerais to Espírito Santo state production flows through the three pipelines which extend for approximately 400 Km. Samarco’s mining and pelletizing operations have been gradually resuming since December 2020 (see *Overview—Business overview—Significant changes in our business—Resumption of Samarco’s operations*).
- *Mosaic.* We own 9.2% of Mosaic’s outstanding common shares, a producer and marketer of concentrated phosphate and potash crop nutrients.

RESERVES

PRESENTATION OF INFORMATION CONCERNING RESERVES

The estimates of proven and probable ore reserves at our mines and projects and the estimates of mine life included in this annual report have been prepared by our staff of experienced geologists and engineers (unless otherwise stated), and in accordance with the technical definitions established by the SEC. Under the SEC's Industry Guide 7:

- Reserves are the part of a mineral deposit that could be economically and legally extracted or produced at the time of the reserve determination.
- Proven (measured) reserves are reserves for which (i) quantity is computed from dimensions revealed in outcrops, trenches, workings or drill holes; grade and/or quality are computed from the results of detailed sampling; and (ii) the sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth and mineral content of reserves are well-established.
- Probable (indicated) reserves are reserves for which quantity and grade and/or quality are computed from information similar to that used for proven (measured) reserves, but the sites for inspection, sampling and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for proven (measured) reserves, is high enough to assume continuity between points of observation.

We periodically revise our reserve estimates when we have new geological data, economic assumptions or mining plans. During 2020, we performed an analysis of our reserve estimates for certain projects and operations, which is presented in this report. Reserve estimates for each operation assume that we either have or expect to obtain all the necessary rights and permits to mine, extract and process mineral reserves at each mine. For some of our operations, the projected exhaustion date includes stockpile reclamation. Where we own less than 100% of the operation, reserve estimates have not been adjusted to reflect our proportional ownership interest. Certain numbers in the tables, discussions and notes have been rounded. For a description of risks relating to reserves and reserve estimates, see *Overview—Risk factors*.

As a part of our internal governance process, we have a Mineral Resources and Mineral Reserves Global Committee coordinated by our Exploration and Mineral Projects department and composed of representatives of all business units (Ferrous, Coal and Base Metals) and the Sustainability, Investor Relations and Capital Projects departments. The purpose of this committee is to ensure the transparency, consistency, professional competence and reliability of all information prepared for internal purposes and public reporting. It is also responsible for overseeing the governance of our estimation and reporting of mineral reserves, which include external audits when applicable.

We continue to report our reserves in accordance with the SEC's Industry Guide 7, and we expect to start complying with the new SEC rules governing disclosures on mining properties (Regulation S-K, Subpart 1300), including reporting of reserves and resources in our annual report on Form 20-F for the fiscal year ending December 31, 2021. The new SEC rules align SEC disclosure requirements more closely with global regulatory practices and standards, as embodied in standards developed by CRIRSCO (Committee for Mineral Reserves International Reporting Standards). We already estimate our reserves under CRIRSCO standards. However, our reserves estimates may require revisions when reported pursuant to the new SEC standards, which is similar but more prescriptive in some points in comparison with CRIRSCO.

The projected exhaustion date of our mines or complexes are continuously reviewed based on several factors and studies, including geological exploration, socio-environmental factors, mineral processing, economic assumptions, market demand, mining constraints, tailings or waste disposal constraints and production capacity, in each case supported by proven and probable mineral reserves. Investments in mineral exploration and the review of technical studies are part of our long-term strategy and continuous pursuit to add value to the company, by bringing operational reliability and expanding mineral reserves portfolio.

Our reserve estimates are based on certain assumptions about prices. We have determined that our reported reserves could be economically produced if prices for the products identified in the following table were equal to the three-year average historical prices through December 31, 2020, as indicated in the following table.

Commodity	Three-year average historical price	Pricing source
<i>Iron ore:</i>		
Vale(1)	90.6 per dry metric ton	Average Platts IODEX (62% Fe CFR China)
<i>Coal:(2)</i>		
Metallurgical – Moatize	169.2 per metric ton	Platts PHCC (PLV)
Thermal – Moatize	78.0 per metric ton	Richards Bay FOB
<i>Base metals:</i>		
Nickel(3)	13,596 per metric ton	LME Ni
Copper	6,233 per metric ton	LME Cu
<i>Nickel and copper byproducts:</i>		
Platinum	875 per oz	Average realized price
Palladium	1,588 per oz	Average realized price
Gold	1,477 per oz	Average realized price
Cobalt(3)	50,178 per metric ton	99.3% low cobalt metal (source: Metal Bulletin)
<i>Manganese ore(4):</i>		
Manganese	5.81 per dry metric ton unit	Average CRU (44% Mn CFR China)

- (1) The economic assessment of our iron ore reserves is based on the average of 62% Fe iron ore prices, as adjusted to reflect the effects of freight, moisture and the quality premium for our iron ore.
- (2) As received basis (8% moisture).
- (3) Premiums (or discounts) are applied to the nickel and cobalt spot prices at certain operations to derive realized prices. These premiums (or discounts) are based on product form, long-term contracts, packaging and market conditions.
- (4) The economic assessment of our manganese ore reserves is based on the average CRU prices, adjusted to reflect the effects of freight, moisture and the quality premium for our manganese ore prices on a CFR China basis.

IRON ORE RESERVES

The tables below set forth our iron ore reserves and other information about our iron ore mines. Our reserve table reflects our production and operational plans, which are based on the facilities (consisting of both mines and processing plants) within each system, rather than the individual mines.

We classify our iron ore reserves as proven reserves to the extent that they satisfy the requirements of the definition of proven (measured) reserves, as described above, and that we have obtained the environmental licenses for the corresponding pit operation and have at least a reasonable expectation of obtaining on a timely basis any additional licenses necessary to conduct the operations.

We periodically review the economic viability of our iron ore reserves in light of changes in the iron ore industry. We have determined that the Urucum and Corumbá mines are not economically viable based on three-year average historical prices. Accordingly, we are not reporting reserves at those facilities since 2015. In addition, we are not in a position to disclose the reserves of the properties of Ferrous Resources

do Brasil S/A, which was merged into Vale in 2020. We may report reserves for properties of Ferrous Resources do Brasil S/A (merged into Vale) after completing implementation of our determination and governance procedures, including external audit. Although Samarco resumed production in December 2020, we are not in position to disclose the mineral reserve, which is under final review.

	Iron ore reserves(1) (As of December 31, 2020)							
	Proven – 2020		Probable – 2020		Total – 2020		Total – 2019	
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Southeastern System(2)								
Itabira(3)	572.0	46.2	430.3	45.3	1,002.3	45.8	796.2	45.8
Minas Centrais(4)	547.3	42.3	1,006.3	49.9	1,553.6	47.2	769.0	54.7
Mariana(5)	726.7	45.0	1,083.4	47.9	1,810.1	46.7	3,096.3	45.7
Total Southeastern System	1,846.1	44.5	2,519.9	48.3	4,366.0	46.7	4,661.6	47.2
Southern System(6)								
Vargem Grande(7)	734.7	47.4	2,600.5	45.9	3,335.2	46.2	3,488.8	46.8
Paraopeba(8)	105.5	56.8	230.4	57.8	335.9	57.5	621.5	54.2
Total Southern System	840.2	48.5	2,830.8	46.8	3,671.0	47.2	4,110.2	47.9
Northern System(9)								
Serra Norte(10)	554.0	66.1	1,163.2	65.6	1,717.2	65.8	2,823.7	65.5
Serra Sul(11)	1,888.4	65.9	2,541.8	65.6	4,430.1	65.7	4,198.1	66.3
Serra Leste	0.0	0.0	259.8	64.8	259.8	64.8	324.5	65.1
Total Northern System	2,442.4	65.9	3,964.8	65.6	6,407.2	65.7	7,346.3	65.9
Total Vale Systems	5,128.6	55.4	9,315.6	55.2	14,444.2	55.3	16,118.2	55.9

- (1) Iron Ore Reserve estimates stated as metric million tonnes inclusive moisture and dry %Fe grade; following moisture contents: 1.09% Itabira; 5.5% Minas Centrais; 5.5% Mariana; 6.3% Vargem Grande; 7.3% Paraopeba; 6.6% Serra Norte; 7.2% Serra Sul; 2.2% Serra Leste.
- (2) Approximate drill hole spacing used to classify the Reserves were: 100m × 100m to Proven Reserves and 200m × 200m to Probable Reserves. Average product recovery (tonnage basis) of the iron ore reserves are: 50% for Itabira, 67% for Minas Centrais and 74% for Mariana.
- (3) Itabira complex includes Conceição and Minas do Meio mines.
- (4) Minas Centrais complex comprises the reserves for Brucutu, Apolo project and Morro Agudo mine.
- (5) Mariana complex includes Alegria, Fábrica Nova and Fazendão mines and Capanema project.
- (6) Approximate drill hole spacing used to classify the Reserves were: 100m × 100m to Proven Reserves and 200m × 200m to Probable Reserves. Average product recovery (tonnage basis) of the iron ore reserves are: 68% for Vargem Grande and 74% for Paraopeba.
- (7) Vargem Grande complex includes Sapicado, Galinheiro, Tamanduá, Capitão do Mato and Abóboras mines.
- (8) Paraopeba complex includes João Pereira and Segredo, Mar Azul and Capão Xavier mines.
- (9) Approximate drill hole spacing used to classify the reserves were: 150m × 100m to proven reserves and 300m × 200m to probable reserves, except Serra Leste which is 100m × 100m to proven reserves and 200m × 200m to probable reserves. Average product recovery (tonnage basis) of the iron ore reserves are: 100% for Serra Norte, 100% for Serra Leste and 100% for Serra Sul.
- (10) Serra Norte complex includes N3, N4W, N4E and N5 mines and N1 and N2 projects.
- (11) Serra Sul complex includes S11 C and S11 D deposits.

We periodically revise our mineral reserve estimates based on new geological data, study developments, economic assumptions, mining plans, new technology developments and regulatory updates, among other factors. Future changes in these aspects may positively or negatively impact our future mineral reserves. Variations in iron ore reserves from 2019 to 2020 reflect depletion resulting from mine production for operating mines (corresponding to approximately 490Mt), and downgrades resulting from pit reviews reflecting more detailed analysis of the impact of environmental regulations of caves, strategic review of long-term projects and others modified factors assumptions (geotechnical, market and

processing). This was partially compensated by new geological information and pit reviews that positively affected our models. The main changes are summarized below:

- Consistently with the current environmental regulation for caves and advances of the characterization studies, we are reducing our iron ore mineral reserves by approximately 2,200 Mt, of which approximately 939 Mt were in the Northern System and the remainder in the Southern and Southeastern Systems. Such downward adjustments may be reversed in the future, depending on changes in legislation and on the deepening of our own knowledge about the properties of these caves, which may have its relevance level reclassified to types that can be removed or compensated elsewhere. For additional information on regulations of caves, see *Information on the Company—Regulatory matters—Environmental regulations*.
- In the Southeastern System, the mineral reserves of Minas Centrais complex increased by 785Mt supported by the incorporation of new geological information and pit optimization reviews. The mineral reserves of Mariana complex decreased by approximately 1,286Mt, mainly due to the withdraw of the low-grade phase of Capanema project, constraints relating to caves, and other modifying factors assumptions impacts. The change in the projected exhaustion date for the Minas Centrais complex reflects the earlier start-up of the Apolo project, and the change of the projected exhaustion date of the Mariana complex reflects the decrease in mineral reserves.
- Our mineral reserves for the Southern System decreased by 439Mt in total, mainly due to constraints relating to caves, in-pit tailing disposal and processing factors. We are conducting additional studies to address the tailing in-pit disposal solution for the Segredo and João Pereira integrated operations, which currently impact the reserve in 227Mt and the projected the exhaustion date for the Paraopeba Complex, aiming to recover a portion of the downgraded reserve. The projected exhaustion date was anticipated for the Vargem Grande Complex to 2093 from 2119 due to the increase in our production guidance.
- Our mineral reserves for the Northern System were mainly impacted by constraints related to caves, partially offset by an increase due to the incorporation of new geological information for the S11D (Serra Sul complex). The projected exhaustion date for the Serra Sul complex was extended, and reduced for the Serra Norte and Serra Leste operations, as a consequence of the previously discussed changes in mineral reserve. Despite reducing the reserves associated with caves, we have in Serra Norte complex enough reserves for at least 17 years of production at the same pace and quality.

The mine exhaustion schedule has been adjusted due to our new production plan and our revision of project capacity.

	Type	Iron ore integrated operations			Vale interest (%)
		Operating since	Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	
Southeastern System					
Itabira	Open pit	1957	2031	2029	100.0
Minas Centrais	Open pit	1994	2058	2065	98
Mariana	Open pit	1976	2054	2091	100.0
Southern System					
Vargem Grande	Open pit	1942	2093	2119	100.0
Paraopeba	Open pit	2003	2043	2073	100.0
Northern System					
Serra Norte	Open pit	1984	2037	2047	100.0
Serra Sul	Open pit	2016	2058	2056	100.0
Serra Leste	Open pit	2014	2048	2054	100.0

(1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.

(2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date—2020."

MANGANESE ORE RESERVES

The following tables set forth manganese ore reserves and other information about our mines. The variation in the mine's ore reserves from 2019 to 2020 predominantly reflects depletion through mine production. Although in production stage, we are not in a position to report mineral reserves for our Manganese operations in Urucum. As a result of strategic adjustments in the context of COVID-19 pandemic, our operations at Azul mine have been suspended since the first quarter of 2020.

	Manganese ore reserves(1)(2) (As of December 31, 2020)							
	Proven – 2020		Probable – 2020		Total – 2020		Total – 2019	
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Azul	9.0	26.5	4.1	27.5	13.0	26.8	13.1	26.8
Morro da Mina	4.6	29.0	3.6	25.2	8.2	27.4	8.3	26.8
Total	13.6	27.4	7.7	26.4	21.3	27.0	21.4	26.8

(1) Manganese Ore Reserve estimates stated as metric million tons inclusive moisture and dry %Mn grade; following moisture contents: Morro da Mina (3.4%) and Mina do Azul (17.2%).

(2) Approximate drill hole spacing used to classify the reserves was: 100m × 100m for Proven Reserves and 200m × 200m for Probable Reserves. Average product recovery (tonnage basis) of the manganese ore reserves are: Azul (40%) and Morro da Mina (70%).

The mine exhaustion schedule has been adjusted to reflect our new production plan.

	Type	Manganese ore mines			Vale interest (%)
		Operating since	Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	
Azul	Open pit	1985	2027	2025	100.0
Morro da Mina	Open pit	1902	2056	2055	100.0

(1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.

(2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date—2020."

COAL RESERVES

In 2020, we updated our Moatize coal reserves estimates, following significant mineral exploration investments made since 2018. These investments include approximately 230,000 meters of infill and extension drilling as well as brownfields exploratory drilling in areas underexplored in the past. Additionally, more than 170-line kilometers bi-dimensional seismic surveys were conducted, contributing to the reduction of geological uncertainties in the existing mining sections and in the optimization of the exploration programs in the brownfields areas. Some newly developed brownfield reserves benefited from being geographically and geologically continuous to existing mining operations.

Our coal reserves have been estimated by McElroy Bryan Geological Services Pty Ltd, an external and independent consultant that conducted the comprehensive review of our coal reserves aiming to reduce geological uncertainties and improve the confidence of our mining plans.

The 197.3 million metric ton reduction in coal reserves from 2019 to 2020 and the change in projected exhaustion date to 2035 from 2039 reflect, in addition to 23.1 million metric tons depletion, mainly the effect of incorporation of new geological information, as described above, infrastructure constraints, marketing assumptions, and the introduction of stricter safety geotechnical parameters.

Our coal reserve estimates are provided on an in-place material basis after adjustments for depletion through mine production, anticipated mining losses and dilution. Marketable reserves include adjustments for losses associated with beneficiation of raw coal mined to meet saleable product requirements.

		Coal ore reserves(1) (As of December 31, 2020)						Marketable reserves(3)	
		ROM(2)						2020	2019
		Proven – 2020	Probable – 2020	Total – 2020	Total – 2019			2020	2019
Coal type		Tonnage	Tonnage	Tonnage CV	Tonnage CV			Tonnage	Tonnage
Moatize	Metallurgical & thermal	125.5	591.0	716.5 26	913.8 26			273.9(4)	364.9

- (1) The reserve stated above is on a 100% shareholding basis. Vale has a 80.75% ownership interest in the Moatize mine.
- (2) Tonnage is stated in millions of metric tons and is reported on an in situ 4.0% moisture basis. Calorific Value (CV) for thermal coal is stated as the Gross Calorific Value (Mj/Kg) on air-dried basis.
- (3) Tonnage is stated in millions of metric tons.
- (4) Approximately 60% of the estimated marketable reserves correspond to metallurgical coal and 40% to thermal coal.

		Coal mines				
		Type	Operating since	Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	Vale interest (%)
Moatize		Open pit	2011	2035	2039	80.75

- (1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.
- (2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date – 2020."

NICKEL ORE RESERVES

Our nickel mineral reserve estimates are of in-place material after adjustments for depletion and mining losses (or screening and drying in the case of PTVI) and recoveries, with no adjustments made for metal losses due to processing.

Nickel ore reserves(1) (As of December 31, 2020)									
	Proven – 2020		Probable – 2020		Total – 2020		Total – 2019		Recovery range (%)
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	
<i>Canada</i>									
Sudbury	15.8	1.58	35.2	1.30	51.1	1.39	58.1	1.38	75 - 85
Thompson ...	–	–	–	–	–	–	–	–	–
Voisey's Bay ..	13.4	2.01	15.2	1.91	28.6	1.96	28.9	2.11	75 - 85
<i>Indonesia</i>									
PTVI(3)	61.9	1.73	42.1	1.75	104.0	1.74	107.6	1.73	85 - 90
<i>New Caledonia</i>									
VNC	–	–	–	–	–	–	–	–	–
<i>Brazil</i>									
Onça									
Puma(2).....	57.2	1.64	47.5	1.36	104.7	1.51	113.3	1.53	85 - 90
Total	148.2	1.70	140.1	1.52	288.3	1.61	307.9	1.63	

(1) Tonnage is stated in millions of dry metric tons. Grade is % of nickel. Recovery range is overall metal recovered to point of first material sale.

(2) Estimated consolidated nickel ore reserves include 3.1 million dry metric tons of stockpile.

(3) The reported mineral reserves may differ in quantity or quality from those reported in other jurisdictions, under different standards.

In Canada, our Sudbury and Voisey's Bay operation's mineral reserves decreased in 2020 due to depletion and the downgrade of mineral reserves due to uncertainties in engineering modifying factors (geotechnical, metallurgical) at the Coleman and Copper Cliff mines. In Indonesia, the mineral reserves at the PTVI operations decreased due to depletion and pit optimization studies. The mineral reserves at Onça Puma, in Brazil, decreased due to mining depletion, reclaiming stockpiles and downgrade of Puma West portion due to land ownership and environmental uncertainties.

We are not reporting the mineral reserves of Thompson, Canada, as of December 31, 2020, because the mineral reserves for this operation would not be economically viable at the three-year historical average price. Thompson continues to operate and is currently conducting studies to identify measures to reduce its production costs and improve efficiency.

Since 2014, we have not been reporting the mineral reserves of VNC, because the mineral reserves for our New Caledonia operations would not be economically viable at the three-year historical average prices. We expect to enter into an agreement to sell the VNC operations or to place these operations into care and maintenance in 2021.

Nickel ore mines					
	Type	Operating since	Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	Vale interest (%)
<i>Canada</i>					
Sudbury	Underground	1885	2043	2043	100.0
Thompson	Underground	1961	–	–	100.0
Voisey's Bay(3)	Open pit/ Underground	2005	2034	2034	100.0
<i>Indonesia</i>					
PTVI	Open pit	1977	2045(4)	2044	44.3
<i>New Caledonia</i>					
VNC	Open pit	2011	–	–	95.0
<i>Brazil</i>					
Onça Puma	Open pit	2011	2067	2072	100.0

(1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.

(2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date – 2020."

(3) Voisey's Bay will transition from an open pit mine to an underground mine.

(4) Extension of one year because of a re-evaluation due to a pit design update related to pit optimization results.

COPPER ORE RESERVES

Our copper mineral reserve estimates are of in-place material after adjustments for depletion and mining losses and recoveries, with no adjustments made for metal losses due to processing.

Copper ore reserves(1) (As of December 31, 2020)									
	Proven – 2020		Probable – 2020		Total – 2020		Total – 2019		Recovery range %
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	
<i>Canada</i>									
Sudbury	15.8	2.11	35.2	1.41	51.1	1.63	58.1	1.75	85 - 95
Voisey's Bay ..	13.4	0.89	15.2	0.84	28.6	0.86	28.9	0.92	85 - 95
<i>Brazil</i>									
Sossego(2)	59.2	0.89	39.1	0.40	98.3	0.69	109.3	0.67	90 - 95
Salobo(3)	142.2	0.67	1,014.9	0.58	1,157.1	0.59	1,148.4	0.60	80 - 90
Total	230.5	0.84	1,104.5	0.60	1,335.0	0.64	1,344.7	0.67	

(1) Tonnage is stated in millions of dry metric tons. Grade is % of copper. Recovery range is overall metal recovered to point of first material sale.

(2) Estimated consolidated copper ore reserves include 32.6 million dry metric tons of stockpile.

(3) Estimated consolidated copper ore reserves include 193.3 million dry metric tons of stockpile.

In Canada, the mineral reserves for our Sudbury and Voisey's Bay operations decreased in 2020 for the same reasons discussed above in connection with the nickel reserves. In Brazil, the mineral reserves for our Sossego and Salobo operations decreased due to depletion, partially offset by Salobo design evaluations. In addition, the Salobo and Sossego stockpile mineral reserves were re-categorized from proven to probable due to uncertainties in grade variability and degree of oxidation.

	Type	Copper ore mines			Vale interest (%)
		Operating since	Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	
<i>Canada</i>					
Sudbury.....	Underground	1885	2043	2043	100.0
	Open pit/				
Voisey's Bay.....	Underground	2005	2034	2034	100.0
<i>Brazil</i>					
Sossego.....	Open pit	2004	2028	2028	100.0
Salobo.....	Open pit	2012	2053	2052	100.0

- (1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.
(2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date – 2020."

PGMS AND OTHER PRECIOUS METALS RESERVES

We expect to recover significant quantities of precious metals as byproducts of our Sudbury, Sossego and Salobo operations. Our mineral reserve estimates are of in-place material after adjustments for depletion and mining losses and recoveries, with no adjustments made for metal losses due to processing.

	Precious metals reserves(1) (As of December 31, 2020)								
	Proven – 2020		Probable – 2020		Total – 2020		Total – 2019		Recovery range (%)
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	
<i>Canada</i>									
<i>Sudbury</i>									
Platinum ...	15.8	1.31	35.2	1.14	51.1	1.19	58.1	1.26	70 – 75
Palladium ..	15.8	1.29	35.2	1.44	51.1	1.39	58.1	1.52	70 – 80
Gold.....	15.8	0.49	35.2	0.41	51.1	0.43	58.1	0.47	60 – 75
<i>Brazil</i>									
<i>Sossego</i>									
Gold(2)	59.2	0.24	39.1	0.10	98.3	0.19	109.3	0.18	75 – 80
<i>Salobo</i>									
Gold(3)	142.2	0.37	1,014.9	0.30	1,157.1	0.31	1,148.4	0.32	60 – 70
Total Pt + Pd(4).	15.8	2.60	35.2	2.58	51.1	2.59	58.1	2.77	
Total Gold	217.2	0.34	1,089.3	0.30	1,306.4	0.30	1,315.8	0.31	

- (1) Tonnage is stated in millions of dry metric tons. Grade is grams per dry metric ton. Recovery range is overall metal recovered to point of first material sale.
(2) Estimated consolidated copper ore reserves include 32.6 million dry metric tons of stockpile.
(3) Estimated consolidated copper ore reserves include 193.3 million dry metric tons of stockpile.
(4) Pt+Pd is the sum of Platinum and Palladium grades.

In Sudbury, our reserve estimates for platinum, palladium and gold decreased for the same reasons discussed above in connection with the nickel reserves. In Brazil, reserve estimates for gold changed for the same reasons discussed above in connection with the copper reserves.

	Type	Operating since	Precious metals mines		Vale interest (%)
			Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	
<i>Canada</i>					
Sudbury	Underground	1885	2043	2043	100.0
<i>Brazil</i>					
Sossego	Open pit	2004	2028	2028	100.0
Salobo	Open pit	2012	2053	2052	100.0

- (1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.
(2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date – 2020."

COBALT ORE RESERVES

We expect to recover significant quantities of cobalt as a byproduct of our Sudbury and Voisey's Bay operations. Our cobalt reserve estimates are of in-place material after adjustments for depletion and mining losses, with no adjustments for metal losses due to processing.

	Cobalt ore reserves(1) (As of December 31, 2020)								
	Proven – 2020		Probable – 2020		Total – 2020		Total – 2019		Recovery range %
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	
<i>Canada</i>									
Sudbury	15.8	0.04	35.2	0.04	51.1	0.04	58.1	0.04	20 - 30
Voisey's Bay ..	13.4	0.12	15.2	0.12	28.6	0.12	28.9	0.13	70 - 80
<i>New Caledonia</i>									
VNC	–	–	–	–	–	–	–	–	–
Total	29.2	0.08	50.5	0.06	79.6	0.07	87.0	0.07	

- (1) Tonnage is stated in millions of metric tons. Grade is % of cobalt. Recovery range is overall metal recovered to point of first material sale.

Our cobalt reserve estimates decreased in 2020 for the same reasons discussed above in connection with the nickel mineral reserves.

	Type	Operating since	Cobalt ore mines		Vale interest (%)
			Projected exhaustion date – 2020(1)	Projected exhaustion date – 2019(2)	
<i>Canada</i>					
Sudbury	Underground Open pit/	1885	2043	2043	100.0
Voisey's Bay	Underground	2005	2034	2034	100.0
<i>New Caledonia</i>					
VNC	Open pit	2011	–	–	95.0

- (1) Indicates the life-of-mine for the operating mine with the longest projected exhaustion date in the complex, as of December 31, 2020.
(2) Projected exhaustion dates estimated as of December 31, 2019. Projected exhaustion dates in this column are superseded by the estimates indicated under "Projected exhaustion date – 2020."

CAPITAL EXPENDITURES

Our investment budget for capital expenditures in 2021 is approximately US\$5.8 billion, including approximately US\$4.8 billion to sustaining our existing operations and replacement projects and approximately US\$1.0 billion for project execution, reflecting a 31% increase compared to 2020. Most of the capital expenditures budget for project execution will be invested in Brazil (88%).

	2021 budget		2020 expenditures(1)		2019 expenditures(1)	
	(US\$ million)	(% of total)	(US\$ million)		(US\$ million)	
Project execution (construction in progress)	1,000	17	522		544	
Investments to sustain existing operations and replacement projects (property, plant and equipment)	4,800	83	3,908		3,160	
Total	US\$ 5,800	100%	US\$ 4,430	US\$ 3,704		

(1) Executed capital expenditures comprise the sum of cash outflows.

Our project portfolio is comprised of projects focused on organic growth and with expectations of high rates of return. Our four main initiatives, the Salobo III project, the Northern System 240Mt Program, the Serra Sul 120, and the Capanema project, account for 70% of the US\$1.0 billion budget for project execution in 2021. With respect to replacement projects, the VBME and the Gelado projects account for 11% of the US\$4.8 billion budget for sustaining existing operations and replacement projects.

The following table sets forth total expenditures in 2020 for our main investment projects and expenditures budgeted for those projects in 2021, together with estimated total expenditures for each project and the actual or estimated start-up date of each project as of December 31, 2020.

Business area	Main projects(1)	Actual or Estimated start-up	Executed CAPEX		Expected CAPEX	
			2020(2)	Total executed(3)	2021(4)	Total expected(5)
				(US\$ million)		
Iron ore	CLN S11D	2H19(6)	102	7,434	98	7,283
Base Metals—North Atlantic	VBME	1H21	437	909	449	1,694
Iron ore	Gelado	1H22	100	175	100	428
Base Metals—South Atlantic	Salobo III	1H22	210	346	262	816
Iron ore	Northern System 240 Mt Program	2H22	111	181	229	772
Iron ore	Serra Sul 120	1H24	—	—	168	1,502
Iron ore	Capanema	2H23	—	—	47	495
Iron ore	NS-04	2H22	—	—	55	125

(1) Projects approved by our Board of Directors.

(2) Executed capital expenditures comprise the sum of cash outflows.

(3) Total executed CAPEX through December 31, 2020, including capital expenditures in prior periods.

(4) Figure presented corresponds to the investment budget for capital expenditures in 2021 of approximately US\$5.8 billion.

(5) Estimated total capital expenditure cost for each project, including capital expenditures in prior periods. Total expected CAPEX includes expenses, in line with the budget approved by our Board of Directors, while these expenses are not included in the expected CAPEX for the year or in the total executed CAPEX figures.

(6) The CLN S11D project had physical completion in December 2019. Until 2022, the project will be in a monitored ramp-up phase with additional works expected on adjustments.

Our key investment projects are described in more detail below:

- The Serra Sul 120 project was approved by our Board of Directors in August 2020. This project consists of increasing the S11D mine-plant capacity by 20 Mtpy, to a total of 120 Mtpy at site. This project is expected to result in an increase of the Northern System's mine-plant capacity to 260 Mtpy. The project has total multiyear investments of US\$1.5 billion and its start-up is

expected for the first half of 2024. The project includes: (i) the opening of new mining areas; (ii) the duplication of the existing long-distance belt conveyor; (iii) the implementation of new processing lines at the plant; and (iv) the expansion of storage areas, among other measures. Serra Sul 120 will create an important buffer of productive capacity, ensuring greater operational flexibility to face eventual production or licensing restrictions in the Northern System.

- The CLN S11D project was launched in 2014 to increase the logistics capacity of the Northern System to support the S11D mine, including the expansion of approximately 570 km of railway, construction of a railway spur of 101 km, acquisition of wagons and locomotives and port expansion (onshore and offshore expansions at Ponta da Madeira maritime terminal). The project had a start-up in December 2016, with capacity at the railway being continuously added until December 2019, and with executed capital expenditures (total cash outflows) of US\$7.434 billion. Until 2022, the project will be in a monitored ramp-up phase with additional works expected on adjustments, especially at the Ponta da Madeira port terminal.
- The Voisey's Bay underground mine extension project ("VBME") project is expected to extend the mine life of Voisey's Bay and to increase Voisey's Bay production to an estimated annual production of around 45 kt of nickel, on average, about 20 kt of copper and about 2.6 kt of cobalt, in total. VBME will replace existing Voisey's Bay mine production, thus being recorded as a sustaining investment for the purpose of the dividend policy. The project is 60% complete, with executed capital expenditures (total cash outflows) of US\$909 million. The start-up of one of the mines (Reid Brook) is expected in the first half of 2021. In June 2018, we entered into a cobalt streaming transaction that enabled the development of VBME.
- The Gelado project, approved in September 2018 by our Board of Directors, is expected to recover approximately 10 Mtpy of pellet feed with high iron content in the Carajás Complex, in order to feed the São Luís pellet plant. The project reached a physical progress of 73%, with executed capital expenditures (total cash outflows) of US\$175 million.
- The Salobo III copper project, approved in October 2018 by our Board of Directors, is a brownfield expansion of our Salobo operations, increasing processing throughput capacity. The project encompasses a third concentrator line and will use Salobo's existing infrastructure. Salobo III is expected to produce an average copper volume of approximately 50 ktpy in the first 5 years, 42 ktpy in the first 10 years and 36 ktpy throughout the life of mine. Start-up is scheduled for the first half of 2022 with a ramp up of 15 months. In 2020, 68% of the project's physical progress was completed, with the partial conclusion of earthworks and ground preparation, and conclusion of construction of gearless engines and part of the heavy structures by international providers.
- The Northern System 240 Mt Program, approved in December 2018 by our Board of Directors, will expand the iron ore fines production and logistics capacity at our Northern System with the start-up expected until the end of 2022, when the total annual capacity is expected to reach 240 million tons. In 2020, the project's mine-plant physical progress reached 59%, with the partial completion of earthworks, the replacement of crushers, advances in the assembling of the Line 3 of the railway's reverse loop and the issuance of the installation permit for both mine and plant, among other measures.
- The Capanema project, approved in December 2020 by our Board of Directors, includes investments in the Capanema mine to resume facilities and acquire new equipment, and to

implement a long-distance belt conveyor, as well as adjustments in the Timbopeba stockyards, totaling expected multiyear investments of US\$ 495 million. The start-up is expected for the second half of 2023, with a production capacity by natural moisture (without tailings generation) of 18 Mtpy and in the first years will bring us a net addition of 14 Mtpy of capacity with the expedition through the Timbopeba site.

- **New Steel Project (NS04)**—In December 2020, our Board of Directors approved the implementation of the NS-04 Project, located in the municipality of Nova Lima, in the state of Minas Gerais, Brazil. The project, located in Vargem Grande complex, is expected to be the world's first industrial-scale dry magnetic fines concentration, with total expected multi-year investments of US\$125 million, capacity of 1.5Mtpy and start-up expected for the second half of 2022.

REGULATORY MATTERS

We are subject to a wide range of governmental regulation in all the jurisdictions in which we operate worldwide. The following discussion summarizes the kinds of regulation that have the most significant impact on our operations.

MINING RIGHTS AND REGULATION OF MINING ACTIVITIES

Mining and mineral processing are subject to extensive regulation. In order to conduct these activities, we are required to obtain and maintain some form of governmental or private permits, which may include concessions, licenses, claims, tenements, leases or permits (all of which we refer to below as "concessions"). The legal and regulatory regime applicable to the mining industry and governing concessions differs among jurisdictions, often in important ways. In most jurisdictions, including Brazil, mineral resources belong to the government and may only be exploited pursuant to a governmental concession. In other jurisdictions, such as Ontario in Canada, a substantial part of our mining operations is conducted pursuant to mining rights we own (private permits). Government agencies are typically in charge of granting mining concessions and monitoring compliance with mining law and regulations.

The table below summarizes our principal concessions and other similar rights for our operations.

Location	Mining title	Approximate area covered (in hectares)	Expiration date
Brazil(1)	Mining concessions (including under applications)	601,868	Indefinite
Canada(2)	Mining concessions (terminology varies among provinces)	218,761	2021 – 2041
–Ontario	Patented mineral rights, mineral leases and mining licenses of occupation.	105,469	2021 – 2041
–Manitoba	Order in Council leases, mineral leases.	111,693	2021 – 2034
–Newfoundland and Labrador	Mining Lease	1,599	2027
Indonesia(3)	Contract of work	118,017	2025
New Caledonia(4)	Mining concessions	20,697	2022 – 2051
Mozambique(5)	Mining concessions	23,780	2032

- (1) Change reflects the inclusion of the mining concessions held by Ferrous Resources do Brasil S/A, a company merged into Vale in 2020.
- (2) The approval process for applications submitted in 2020 is in progress. All conditions required for the renewal were fulfilled. This process usually takes a number of years and we can continue to operate while the approval process is ongoing.
- (3) The contract of work entered into by PTVI and the Indonesian government will expire in 2025. PTVI is entitled to two 10-year extensions in the form of a business license, subject to government approval.
- (4) VNC has requested renewal of some concessions that were scheduled to expire before 2020. We may continue to operate while the approval process is ongoing. Area covered was reduced as the swap negotiation of mining titles with the "Soci t  Le Nickel" was officially validated in 2020.
- (5) Entitled to 25-year extensions, subject to approval by the Mozambique government.

In addition to the concessions listed above, we have exploration licenses and exploration applications covering 2.88 million hectares in Brazil and 1.6 million hectares in other countries.

In 2020, there were several developments to the Brazilian legislative and regulatory framework concerning the operation of dams, including but not limited to the prohibition of the construction of mining dams in areas where studies of rupture scenarios identify the existence of a community in the Self-Rescue Zone, with the exclusion of exceptional cases such as dams that are already under installation or operation and which comply with the applicable laws, observing the specific requirements established by law.

There were also changes and new provisions related to mandatory financial guarantees, guidelines for the preparation of Emergency Action Plans, deadlines for the de-characterization of upstream dams and the establishment of new sanctions, including fines of up to R\$ 1 billion. New amendments and regulations to the existing laws are expected in 2021. As a result of new regulations, the licensing process

for our operations may become longer and more uncertain, and we expect our monitoring and compliance costs to increase. These additional laws and regulations may impose restrictions on our operations, require additional investments or modifications to our operations to comply with specific requirements established by law.

We are implementing tailings filtration and storage methods that do not rely on dams to continue operating some of our mines and plants. We have approved projects and further studies are in progress, to apply a residue disposal technology that consists of filtering and stocking of partially or totally dewatered tailings, which will reduce our reliance on tailing dams in the medium and long term. These technologies will cause an increase in our production costs and require additional investments in our mines and plants.

ROYALTIES AND OTHER TAXES ON MINING ACTIVITIES

We are required in many jurisdictions to pay royalties or taxes on our revenues or profits from mineral extractions and sales. These payments are an important element of the economic performance of a mining operation. The following royalties and taxes apply in some of the jurisdictions in which we have our largest operations:

- *Brazil.* We are required to pay a royalty known as CFEM (*Compensação Financeira pela Exploração de Recursos Minerais*) on the revenues from the sale of minerals we extract. The calculation of the CFEM is done as follows: (i) for domestic sales, the basis for calculation of CFEM is the revenue from sales, net of sales taxes levied; (ii) for exports, the basis for calculation of CFEM is the highest amount between the revenue from the exports and the amount equivalent to the transfer pricing in federal income tax legislation; and (iii) for a company's internal mineral consumption, the basis for calculation of CFEM is the value equivalent to the current price of the ore in the domestic market, the international markets or a reference value, as to be determined by the Brazilian National mining agency (*Agência Nacional de Mineração—“ANM”*). The current CFEM rates are: 3.5% for iron ore; 2% for copper, nickel and other materials; 3% for bauxite and manganese ore.
- *Brazilian states.* Several Brazilian states, including Minas Gerais, Pará and Mato Grosso do Sul, impose a tax on mineral production (*Taxa de Fiscalização de Recursos Minerais—“TFRM”*), which is currently assessed at rates ranging from R\$0.50 to R\$3.575 per metric ton of minerals produced in or transferred from the state. In March 2021, a state decree increased the TFRM rate in the state of Pará to R\$11.188 per metric ton, with effectiveness as of April 2021. We are in the process of evaluating the legal aspects and economic effects of this increase. Other companies and an industry association currently dispute the legality of the TFRM in a number of legal proceedings, including before the Federal Supreme Court (*Supremo Tribunal Federal—“STF”*)
- *Canada.* The Canadian provinces in which we operate charge us a tax on profits from mining operations. Profit from mining operations is generally determined by reference to gross revenue from the sale of mine output and deducting certain costs, such as mining and processing costs and investment in processing assets. The statutory mining tax rates are 10% in Ontario; with graduated rates up to 17% in Manitoba; and a combined mining and royalty tax rate of 16% in Newfoundland and Labrador. The mining tax paid is deductible for corporate income tax purposes.
- *Mozambique.* The mining agreement signed in June 2007 with the Mozambican government requires that we pay a royalty known as IPM (*Imposto sobre a Produção*)

Mineira) on revenues from sales of extracted coal, net of insurance and transportation costs incurred before sales. The royalty rate on coal mining activity in Mozambique is currently 3%.

- *Indonesia*. Our subsidiary PTVI pays mining royalties of 2% on its nickel matte revenues when LME nickel prices are below US\$21,000 per metric ton and 3% of its nickel matte revenues when LME nickel prices are above or equal to US\$21,000 per metric ton.

ENVIRONMENTAL REGULATIONS

We are also subject to environmental regulations that apply to the specific types of mining and processing activities we conduct. We are required to obtain approvals, licenses, permits or authorizations from governmental authorities to construct and operate. In most jurisdictions, the development of new facilities requires us to submit environmental and social impacts assessments for approval and often to make investments to mitigate environmental and social impacts, and we must operate our facilities in compliance with the terms of the approvals, licenses, permits or authorizations.

Environmental legislation is becoming stricter worldwide, which could lead to greater costs for environmental compliance. Environmental regulations affecting our operations relate, among other matters:

- Emissions of pollutants into the air, soil and water, including greenhouse gas and climate change regulations.
- Recycling and waste management
- Protection and preservation of forests, coastlines, caves, cultural heritage sites, watersheds and other features of the ecosystem.
- Water use
- Financial provisions and closure plans required for mining licenses, including decharacterization, decommissioning, environmental liabilities and reclamation and remediation costs.

Below is a discussion of some key regulatory matters:

- *Protection of caves*. In Brazil, we are subject to extensive environmental regulation for protection of caves. In 2008, a federal decree established a criteria for classification of caves based on their degree of relevance (maximum, high, medium or low), prohibiting interventions in areas of maximum relevance and allowing impact on areas of other degrees of relevance with proper environmental license. We are required to conduct extensive technical studies to identify the existence of caves and to determine degree of relevance of each identified cave. We are also required to negotiate compensatory measures with Brazilian environmental regulators in order to continue to operate in certain sites. In certain of our iron ore mining operations or projects, we may be required to limit or modify our mining plans or to incur additional costs to preserve maximum relevance caves or to compensate for the impact on non-maximum relevance caves, with potential consequences for production volumes, costs or reserves in our iron ore business. For additional information

regarding the impact of cave protection regulations in our reported reserves, see *Information on the company—Reserves*.

- *Protection of indigenous people.* A Brazilian regulation for the protection of indigenous people, enacted in 2011 and revised in 2015, requires us to conduct specific studies of impact and sponsor mitigation programs in connection with operations and projects close to indigenous people's lands.
- *Other environmental regulation in Brazil.* There are also environmental regulatory obligations that could affect our operations or lead to compensatory measures related to native vegetation suppression in the state of Minas Gerais, the Atlantic Forest biome, flora species protected by law, permanent preservation areas and archaeological and cultural heritage. In addition, all new projects that include activities with a significant environmental impact must collect financial resources to support the implementation and maintenance of conservation areas, in order to comply with the environmental compensation obligation.
- *Climate change.* We expect heightened attention from various governments to reducing greenhouse gas emissions as a result of concern over climate change, especially following the entry into force of the Paris Agreement in late 2016. The ratification of the Paris Agreement increased international pressure for the establishment of carbon pricing, on single-jurisdiction, multi-jurisdiction, and global scales. This regulatory evolution, in conjunction with civil society and investor-driven concern, has added pressure on companies to adopt carbon pricing strategies. The pricing of greenhouse gas emissions may impact our operational costs, mainly through higher price for fossil fuels as mining is an energy intensive industry, and our cost of international freight. In particular, consumption of thermal coal, one of the products we sell, is facing pressure from international institutions due to its carbon intensity.
- *Regulation of chemicals.* Some of our products are subject to regulations applicable to the marketing, distribution and use of chemical substances present in their composition. For example, the European Commission has adopted a European Chemicals Policy, known as REACH ("Registration, Evaluation and Authorization of Chemicals"). Under REACH, European manufacturers and importers are required to register substances prior to their entry into the European market and in some cases may be subject to an authorization process. A company that fails to comply with the REACH regulations could face fines and penalties. We are compliant with the requirements of the REACH regulations. In addition, South Korea is currently implementing a regulation similar to REACH, and we anticipate further expansion of REACH-like regulations in other Asian countries.
- *Regulation of international maritime transportation.* We are subject to health, safety and environmental regulation by the International Maritime Organization (IMO). IMO rules apply not only to the international shipping categories, but also to the types of cargoes transported, including special rules for iron ore, coal, nickel and copper. The IMO is currently discussing further measures for enhancing the energy efficiency of international shipping and reducing its overall greenhouse gas emissions. In April 2018, reduction targets were defined as part of the IMO's initial strategy for curbing the sector's emissions. These targets include a 50% reduction in greenhouse gas emissions by 2050, based on 2008 levels. The organization will reach a final strategy, including the measures to be adopted, by 2023. These measures may increase our freight cost in the future. In 2016, the IMO also approved regulation establishing limits for sulfur oxides emission limits, which became effective in 2020. This regulation may increase freight cost due to the need to use bunker with low sulfur

content or to install additional pollutant control equipment (i.e. scrubbers) to limit air emissions. Also, the International Convention for the Control and Management of Ships' Ballast Water and Sediments became effective in September 2017 for new ships (those with keels laid after that date). For existing ships, the convention became effective in stages beginning in September 2019, following which date each vessel will have a specific deadline for compliance, with the global fleet required to be fully compliant by September 2024. Under this convention, all compliant ships during their international voyages are required to manage their ballast water and sediments in accordance with the defined requirements, which may also result in increases in freight and port operation costs. In 2020, the European Parliament adopted a proposal to revise the EU system for monitoring, reporting and verifying CO₂ emissions from maritime transport (the "EU MRV Regulation"), with the inclusion of shipping in the EU Emissions Trading System (ETS), which may also result in increases in our freight costs.

BRAZILIAN REGULATION OF MINING DAMS

Under a 2017 regulation of ANM, companies operating mining dams in Brazil are required to comply with specific rules, including:

- *Audit*: Companies operating mining dams must conduct two annual stability audits for each dam and prepare a stability condition report and the corresponding Stability Condition Statement (DCE). At least one of these audits must be conducted by external auditors.
- *Dam Periodic Safety Reviews (RPSB—Revisão Periódica de Segurança de Barragem)*: The report must include detailed analysis of all dam's documentation, including projects and procedures, stability analysis of the structures and the impacts on surrounding communities, including hazards and rupture impact studies. The RPSB reports must be renewed each 3, 5 and 7 years for high, medium and low associated potential damage (DPA) respectively, and whenever any structural modifications are made.
- *Emergency Action Plan of Mining Dams Training*: Companies operating high-DPA mining dams must conduct two annual emergency action plan training sessions for their employees.

In February 2019, the ANM issued a resolution on dam safety requiring companies that own upstream dams to submit a technical decharacterization project and to fully decharacterize such structures within the upcoming years. Also, a wide range of measures were imposed to ensure the stability and safety of mining dams and their monitoring and warning systems. In addition, the resolution sets forth a minimum safety factor and the obligation for a DCE to be signed by an individual at a higher level in the hierarchy of the company jointly with the technical individual responsible for its preparation.

In February 2019, the state of Minas Gerais enacted a statute prohibiting the increase, modification or construction of any upstream dam. The statute also prohibits the increase, modification or construction of any dam if communities are established within its Self-Rescue Zone, an area which encompasses the portion of the valley downstream of the dam where timely evacuation and intervention by the competent authorities in emergency situations is not possible. In general, it imposes certain restrictions on the use of any other type of tailings dams and significant restrictions on our ability to increase any existing dam.

In September 2020, the federal government enacted Law no. 14,066, which modified the National Dam Safety Policy (Law no. 12.334/2020), reinforcing the prohibition of constructing and raising upstream dams in Brazil. The statute also requires companies to decharacterize the structures built using the upstream method by 2022, or by a later date if it is proven that the decharacterization is not technically

feasible by 2022. In this regard, public authorities in charge of overseeing dam management have already adopted longer timelines for dams with higher volumes, for instance, and may also agree to the extension of those timelines to ensure adequate safety conditions to the decharacterization projects. In the case of dams already installed or in operation in Self-Rescue Zones, governmental authorities may require (a) the decharacterization of the structure, (b) the resettlement the population and recovery of the cultural heritage, or (c) carry out reinforcement works to guarantee the stability of the structure. The new legislation has introduced other important rules, which are still subject to regulation of the ANM.

REGULATION OF OTHER ACTIVITIES

We are subject to comprehensive regulatory regimes for some of our other activities, including rail transport, port operations and electricity generation. We are also subject to more general legislation on workers' health and safety, safety and support of communities near mines, and other matters. The following descriptions relate to some of the other regulatory regimes applicable to our operations:

- *Brazilian railway regulation.* Our Brazilian railroad business operates pursuant to concession agreements granted by the federal government, and our railroad concessions are subject to regulation and supervision by the Brazilian Ministry of Infrastructure and the regulatory agency for ground transportation (ANTT). The concessions for EFC and EFVM was recently renewed for 30 years, and will expire in 2057. VLI has also been awarded a subconcession contract for commercial operation of a 720-kilometer segment of the FNS railroad in Brazil, which expires in 2037. FCA and MRS concessions expire in 2026 and they may be renewed for 30 years at the federal government's discretion. Rail transportation prices can be negotiated directly with the users of such services, subject to a price cap set forth in the concession agreements and annually approved by ANTT for each of the concessionaires and for the different products transported. ANTT regulations also require concessionaires to give trackage rights to other railway operators, to make investments in the railway network, and to meet certain productivity and safety requirements, among other obligations.
- *Brazilian port regulation.* Port operations in Brazil are subject to regulation and supervision by ANTAQ, the federal agency in charge of maritime transportation services, and by the Ministry of Infrastructure through the National Secretariat of Ports and Aquatic Transport (SNP), whose purpose is to formulate policies and guidelines. The agreements to operate our private terminals are valid until 2039 and may be renewed for equal periods, with the exception of the agreement with CPBS, which will expire in 2026 and may be renewed for one more period of 25 years at the discretion of the Ministry of Infrastructure and the federal regulatory agency.

III. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

OVERVIEW

In 2020, we recorded a net income attributable to our stockholders of US\$4.881 billion, compared a loss of US\$1.683 billion in 2019. Our Adjusted EBITDA increased to US\$16.588 billion in 2020 from US\$10.585 billion in 2019. The most significant factors impacting our results in 2020 were: (i) higher iron ore sales prices (with an impact of US\$4.989 billion in our Adjusted EBITDA), mainly due to the increase in the average realized price for iron ore in 2020 (a 23.3% increase compared to the average realized price in 2019); and (ii) lower impairment and disposals of non-current assets, which decreased to US\$2.243 billion in 2020 from US\$5.074 billion in 2019. These factors were partially offset by (i) a US\$1.189 billion increase in fair value losses on our currency derivatives in 2020, compared to 2019; and (ii) the impact of the Global Settlement for reparation of Brumadinho of US\$3.872 billion and additional provisions for dam de-characterization of US\$ 617 million. For a discussion of the impact of the dam rupture on our results, see *Overview—Business overview—Rupture of tailings dam in Brumadinho*.

Adjusted EBITDA is a non-GAAP measure, which is calculated using net income or loss and adding (i) depreciation, depletion and amortization, (ii) income taxes, (iii) financial results, net, (iv) equity results and other results in associates and joint ventures, (v) impairment and disposal of non-current assets, and (vi) dividends received and interest from associates and joint ventures. For more information and the reconciliation of our Adjusted EBITDA to our net income (loss), see *Operating and Financial Review and Prospects—Results of operations—Results of operations by segment—Adjusted EBITDA*.

COVID-19

The COVID-19 pandemic is having a significant impact on the global economy and financial markets.

At this time, the outbreak has not caused a significant impact to our operations, logistics or sales, but if it continues for an extended period of time or increases in intensity in the regions where we operate, our financial conditions or results of operations in 2021 may be adversely impacted. Below is a summary of the key impacts on our business in 2020 and the risks we are facing in 2021:

- We placed the Voisey's Bay Mine in care and maintenance for 3 months, which has caused impact in the copper production. The impact in our nickel production was mitigated by Long Harbour refinery, which has sustained its operations using nickel concentrate stockpiles. Additionally, social distancing measures required more shaft trips, increasing time to change shifts and impacting productivity in North Atlantic, while meaningful absenteeism and postponed maintenance works impacted productivity in Brazil.
- If we are required to suspend operations, or if we suffer restrictions on our ability to transport our products to customers generally, our results for 2021 may be impacted by reduced revenues and increased logistics costs and stoppage expenses. This may also adversely affect our cash generation and liquidity in 2021.
- We have suspended all non-essential construction works at our sites, which may increase our expenses and delay the achievement of the benefits of our expansion plans, revision of operations or resumption of production capacity, among other difficulties.

For more information on the risks related to the COVID-19 pandemic and our response see *Overview—Business overview—Significant changes in our business—Developments related to the pandemic of the*

coronavirus and Overview—Risk factors—Developments relating to the pandemic of the coronavirus may have a material adverse impact on our financial conditions or results of operations.

MAJOR FACTORS AFFECTING PRICES

Iron ore and iron ore pellets

Iron ore and iron ore pellets are priced based on a wide array of quality levels and physical characteristics. Price differences derive from various factors, such as the iron content of specific ore deposits, the beneficiation processes required to produce the desired final product, particle size, moisture content and the type and concentration of contaminants (such as phosphorus, alumina, silica and manganese ore) in the ore. Also, fines, lump ore and pellets typically command different prices.

Demand for our iron ore and iron ore pellets is a function of global demand for carbon steel. Demand for carbon steel, in turn, is strongly influenced by real estate and infrastructure construction and global industrial production. Demand from China has been the principal driver of world demand and prices.

2020 iron ore average price closed at US\$ 108.9/dmt, 14% higher than 2019. In the second half of 2020, prices strongly increased following global economy recoveries from the COVID-19 pandemic. The combination of a tighter seaborne market together with a significant upward adjustment to hot metal production in China, at a time when the country's domestic iron ore production was running close to capacity, feeds through to stronger demand for seaborne iron ore and higher prices. The high coal prices in China, following the country's import restriction over Australia coal together with high levels of steel margins and the decrease of pellets and concentrate inventories at Chinese ports supported the level for high grade premiums.

China's crude steel production in 2020 was 1,053Mt, an increase of 5.2% year-on-year, closing the year at a very strong pace, producing 91.25Mt in December, an increase of 7.7% year-on-year. The economy recovery in the country over the second half of the year, boosted by economic stimulus lead China's GDP to exceed 100 trillion yuan by the end of 2020, with 2020 annual GDP growth reaching 2.3% year-on-year. Industrial production and exports continued outperforming in the last quarter. GDP growth in the last quarter of 2020 recovered further to 6.5% year-on-year from 4.9% year-on-year in the third quarter of 2020, while Fixed Asset Investment (FAI) continued growing smoothly. Property sales remained high, which strongly supported construction demand for steel.

Excluding China, lockdown measures took a toll on steel demand leading to a total steel production of 776Mt in 2020, a decrease of 8.2% year-on-year, as demand slumped and the entire manufacturing supply chain got interrupted. Advanced economies were the hardest hit with crude steel production having contracted 11% in 2020 compared to a 4% contraction observed in developing countries, excluding China. Steel production in 2020 declined 17% in the U.S., Japan, 16% in Japan and 12% in the European Union compared to 2019, as per the World Steel Association. Nonetheless, in the last quarter of 2020 we have seen steel mills resuming idled capacity in response to recovering demand, inventories replenishment throughout the manufacturing chain and record high steel prices, leading to a steel production, excluding China, of 208Mt in the last quarter of 2020, 2% higher than the same quarter of 2019.

The price differentials between high- and low-grade iron ores are a structural change that should continue to impact the market in the coming years. The move towards a more efficient steel industry, with the enforcement of stricter environmental policies in China, should support the demand for high-quality ores that enable productivity and lower emission levels like pellets and Carajás fines (IOCJ).

We believe that iron ore prices may be subject to additional volatility in 2021 due to the impact of the COVID-19 pandemic.

Nickel

Nickel is an exchange-traded metal, listed on the LME and, starting in 2015, on the SHFE. Most nickel products are priced based on a discount or premium to the LME price, depending on the nickel product's physical and technical characteristics. Demand for nickel is strongly affected by stainless steel production, which represents 70% of global primary nickel consumption in 2020.

We have short-term fixed-volume contracts with customers for the majority of our expected annual nickel sales. These contracts, together with our sales for non-stainless steel applications (alloy steels, high nickel alloys, plating and batteries), provide stable demand for a significant portion of our annual production. In 2020, 78% of our refined nickel sales were made for non-stainless steel applications, compared to the industry average for primary nickel producers of 38%, bringing more stability to our sales volumes. As a result of our focus on such higher-value segments, our average realized nickel prices for refined nickel have typically exceeded LME cash nickel prices.

Stainless steel is a significant driver of demand for nickel, particularly in China. In 2020, stainless steel production in China represented 48% of total nickel demand. As a consequence, changes in Chinese stainless steel production have a large impact on global nickel demand. In 2020, Chinese stainless steel production grew 5% compared to 11% in 2019. Also, the growth in stainless steel focused on 300-series grade steels, which contains relatively high amounts of nickel, due to superior physical characteristics compared to other austenitic stainless steel series.

While stainless steel production is a major driver of global nickel demand, stainless steel producers can obtain nickel with a wide range of nickel content, including secondary nickel (scrap). The choice between primary and secondary nickel is largely based on their relative prices and availability. On average between 2016 and 2020, secondary nickel accounted for approximately 39% of total nickel used for stainless steel. Regional availability and consumption of secondary nickel varies. In China, due to low availability of scrap, the use of secondary nickel represents 21.5% of the total nickel used for stainless steel.

In recent years, Chinese domestic production of nickel pig iron accounted for the majority of world nickel supply growth. In 2020, approximately 501kt, representing 20% of world primary nickel supply was produced as nickel pig iron in China using nickel ore from the Philippines and Indonesia. Chinese nickel pig iron production was adversely affected by export restriction of unprocessed ores from Indonesia, beginning in 2014. In January 2017, the Indonesian government issued a ministerial decree changing the 2009 mining law that banned the export of unprocessed and semi-processed ores from the country. The ministerial decree allows for the controlled recommencement of limited nickel ore exports from Indonesia allowing availability of ores for the production of nickel pig iron in China, with the expectation of re-enforcing the export ban in 2022. As a result, the bottleneck for production has shifted away from ore availability to nickel pig iron capacity. In 2019, the Indonesian government advanced the export ore ban from the beginning of 2022 to the beginning of 2020. These dynamics have allowed Indonesia to emerge as a large producer of nickel pig iron. In 2020, 604kt of nickel as nickel pig iron was produced in Indonesia much of it integrated directly to produce stainless steel. We expect nickel pig iron production in Indonesia to continue to grow, while China's nickel pig iron production to be impacted by the Indonesian ore export ban advancement.

In addition, the high-value segment, which consists of both Upper Class and Lower Class I products, is the second largest market, making up 41% of nickel demand in 2020. Global high-value demand declined by 16% compared to a slight decline of 2% in 2019.

The nickel market was in surplus in 2020 by approximately 135kt. Global exchange inventories (London Metals Exchange and Shanghai Future Exchange) increased 76.7 metric tons from January 1, 2020 to December 31, 2020, implying some off-exchange inventory holding. For 2021, due to recent events, mostly related to the COVID-19, we expect the market to remain in surplus.

In the long term, the battery segment shows important upside potential as electric vehicle production continues to attract significant investments, which could positively affect nickel price and our nickel premiums. As currently foreseeable, commercially viable electric vehicle battery technologies utilize nickel; increasing nickel content in such batteries results in improved energy storage and lower cost. As a result, nickel demand is expected to surge, particularly given the expected increase in production of electric vehicles and the trends towards increased battery size and increased nickel content in batteries to improve performance and lower cost.

Copper

Copper demand in recent years has been driven primarily by China, given the important role copper plays in construction in addition to electrical and consumer applications. Copper prices are determined on the basis of (i) prices of copper metal on terminal markets, such as the LME, SHFE and the Commodities Exchange ("COMEX"), and (ii) in the case of intermediate products, such as copper concentrate (which comprise most of our sales) and copper anode, treatment and refining charges negotiated with each customer.

Demand for refined copper was relatively flat in 2020, with China responsible for approximately 54% of worldwide consumption. For 2021, we anticipate that the market will be in deficit.

Coal

Demand for metallurgical coal is fundamentally driven by steel demand, and future growth continues to be expected in Asia. Asia, including India, accounts for more than 70% of the steel market and consumes approximately 75% of seaborne metallurgical coal. Chinese total coking coal imports decreased by 6% to almost 75.2 million metric tons in 2020 compared to approximately 80.0 million metric tons imported in 2019, mainly due to ban on Australia coking coal and decreased supply from Mongolia. Global demand, excluding China, has reduced by approximately 13% in 2020, compared to 2019, mainly driven by BF production cuts in Europe, Japan, Korea and Taiwan.

In the international market, price volatility continued in 2020. Premium coking coal average price reduced by 30.1% year-on-year from US\$177.40 per metric ton in 2019 to US\$123.95 per metric ton in 2020. Seaborne coking coal prices were strong at an average of US\$155 per metric ton in the first quarter of 2020 amid strong demand from China. Prices started falling from the second quarter of 2020 due to persistent lower crude steel production across ex-China markets. This was followed by an unofficial ban on Australia coal by China in the third quarter of 2020, which drove the fourth quarter of 2020 average price lower to US\$ 108.11 per metric ton. The ban led to a shortage of coking coal in the China market and prompted Chinese buyers to look for non-Australia coking coal from Canada, United States and Mozambique. This pushed the Platts Premium Low Vol CFR China Index to a high average of US\$ 161.21 per metric ton in the fourth quarter of 2020.

Demand for thermal coal is closely related to electricity consumption, which continues to be driven by global economic growth and urbanization, with the highest levels of growth found in Asia and emerging markets. The Chinese seaborne thermal coal import ended lower in 2020, down by approximately 7.0 million metric tons, down 4% year on year, due to import quotas set by the government to limit imports to 2018 levels. Demand in Asian countries (excluding China) has been on the rise, mainly driven by

Vietnam, which jumped from 39.0 million metric tons in 2019 to 49.0 million metric tons in 2020. Coal consumption for power generation has fallen for the sixth consecutive year in Europe, and demand is estimated to drop by more than 30% year-on-year. The European seaborne import decrease was largely impacted by the decline in coal consumption in the UK and Germany, and continued competition against gas and renewables. In India, thermal coal demand ebbed with seaborne imports decreasing by approximately 27 million metric tons in 2020 compared to 2019, due to decreased power generation during India's COVID-19 lockdown period.

The Newcastle Index average in 2020 reached US\$59.48 per metric ton, a decrease of 23.3% year on year, while the Richards Bay Coal Index decreased by 8.9% to US\$65.2 per metric ton. Thermal coal prices started the year strong, supported by healthy demand in India, but gradually declined throughout the year due to reduced coal demand for power as global economies went into COVID-19 lockdown. Coal demand for power lifted in the fourth quarter of 2020 driven by economic upturn after first COVID-19 lockdown and colder winter in Northeast Asia. The drop in benchmark prices saw discounts of off-specification 5500 coal return to historical average levels of US\$50 per metric ton in Richards Bay.

Climate change policies may continue to adversely impact coal, especially of thermal coal, demand in Europe, North America and China. However, consumption in other developing Asian economies such as Southeast Asia and South Asia is expected to expand. On the supply side, some temporary production cuts due to low coal prices is expected to return, but with current coal-based investments being low and the lack of new projects under development, supply is not expected to exceed 2019 levels. Weather (cold winters, rains, summer temperatures) and alternative energy (natural gas and renewables) should play a prominent role on coal demand and prices during 2021.

TAILINGS DAM RUPTURE IN BRUMADINHO

The Brumadinho dam rupture had a significant impact on our financial performance and results of operations as of and for the year ended December 31, 2020. The key impacts are summarized below:

- *Impact on our statement of income.* The impact of the dam rupture in our income statement for the year ended December 31, 2020 was US\$5.257 billion, including (i) US\$3.872 billion in provisions to meet our obligations under the Global Settlement, (ii) US\$617 million in provisions to meet our obligations in connection with the de-characterization of our upstream dams, (iii) US\$258 million in provisions to ensure geotechnical safety of the remaining structures at the Córrego do Feijão mine and the removal and proper disposal of the tailings of the dam rupture, and (iv) US\$510 million in expenses with items such as communication services, accommodation and humanitarian assistance, equipment for rescue and remediation efforts, legal services, water, food aid, and taxes, among other items. Additional provisions related to the dam rupture in Brumadinho may be recognized in the future.
- *Impact on balance sheet.* The total amount of provisions recognized in our balance sheet as of December 31, 2020 in connection with Brumadinho dam failure, including provisions for remediation and reparation obligations under the Global Settlement, individual indemnification and other commitments and decharacterization of dams is US\$6.864 billion.
- *Operational stoppages.* We have suspended some operations due to judicial decisions or technical analysis performed by us on our upstream dam structures. We recorded losses in relation to the operational stoppage and idle capacity of the ferrous mineral segment in the amounts of US\$634 million for the year ended December 31, 2020. We are working on legal and technical measures to resume all operations at full capacity.

- *Freeze orders.* Following the Brumadinho dam rupture, various Brazilian courts have ordered freezes, attachments, judicial deposits and similar measures affecting our financial assets, including balances in our bank accounts and pre-existing judicial deposits to secure the payment of damages resulting from the dam rupture. We have obtained bank guarantees and surety bonds in the amount of US\$1.124 billion and have applied to the relevant courts to have part of our judicial deposits replaced with these guarantees. With the Global Settlement, our restricted assets and guarantees will be released to the authorities for the implementation of projects under the Global Settlement.

FUNDAÇÃO RENOVA AND SAMARCO FUNDING

We own a 50% interest in Samarco and account for it under the equity method. Under the Framework Agreement, the June 2018 Agreement and Renova's bylaws, Fundação Renova must be funded by Samarco, but to the extent that Samarco is unable to fund, Vale and BHPB must ratably bear the funding requirements under the Framework Agreement. As Samarco is gradually resuming its activities, we and BHPB have been funding Fundação Renova and also providing funds directly to Samarco, to preserve its operations and to support Samarco's funding obligations.

- For 2021, Samarco, or Vale and BHPB, will provide to Fundação Renova funding based on the amounts needed to implement the projects approved for each year, subject to an annual minimum of R\$800 million.
- Additionally, Fundação Renova must allocate a minimum annual amount of R\$240 million over 15 years (from 2016) to the implementation of compensation programs. Under the terms of the Framework Agreement, Fundação Renova must spend an additional amount of at least R\$500 million on sewage collection and treatment and solid waste disposal.

Below is a summary of the impact of the rupture of Samarco's dam, which occurred in November 2015, in our financial statements:

- The carrying value for our investment in Samarco was reduced to zero in 2015.
- The amount of provisions related to Samarco as of December 31, 2020 is US\$2.074 billion, 22.0% higher than in 2019, mainly due to the increase of the estimated costs driven by (i) delays and overruns in the construction works for the Novo Bento resettlement of 257 families, (ii) reassessment of the indemnification expenditures following the parameters established by the court rulings during 2020 (see *Additional Information—Legal proceedings—Legal proceedings related to the rupture of Samarco's tailings dam*) and (iii) the revision of the plan to mitigate and compensate for the impacts of the disruption from Samarco's tailing dam, net of the contributions made to Fundação Renova. This provision represents the present value of our best estimate of the amounts we may incur to comply with our obligations under the Framework Agreement, considering our 50% stake in Samarco. At each reporting period, we reassess the key assumptions used by Samarco in the preparation of its projected future cash flows and adjust the provision, if required.
- In 2020, we contributed R\$2.904 billion (US\$560 million), which was allocated as follows: (i) R\$2.059 billion (US\$394 million) contributed to Fundação Renova and Samarco to be used in the reparation programs in accordance with the Framework Agreement, and deducted from the provision, and (ii) R\$845 million (US\$166 million) was used by Samarco to fund its working capital. These contributions were made through the issuance by Samarco of non-convertible private debentures, which were equally subscribed by Vale and BHPB. We

recognized an impairment in our statement of income for the year ended December 31, 2020 for the amount of these non-convertible private debentures.

- We intend to make available short-term facilities up to US\$85 million to support Samarco's operations during 2021, and for expenses related to the experts named pursuant to the preliminary agreements with the MPF, signed in January 2017. These funds will be released as needed, but we have not undertaken an obligation to Samarco. BHPB has stated that it will make available to Samarco short-term facilities with similar terms and conditions.
- Since the creation of Fundação Renova in 2016, we and BHPB made contributions directly to Fundação Renova in the total aggregate amount of R\$11.330 billion (US\$2.587 billion). We and BHPB expect to contribute R\$5.860 billion (US\$1.127 billion) in 2021, to be used in the programs in accordance with the Framework Agreement.

EFFECT OF CURRENCY EXCHANGE VARIATION

Our results are affected in several ways by changes in the value of the Brazilian *real*. Year-end exchange rate variations impact our financial results, while the average exchange rate impacts our operational performance.

In 2020, the Brazilian *real* depreciated 29.0% against the U.S. dollar, from an exchange rate of R\$4.03 to US\$1.00 on December 31, 2019 to R\$5.20 to US\$1.00 on December 31, 2020. The most important effects were non-cash losses, as described below.

- We had *real*-denominated debt of US\$1.390 billion as of December 31, 2020, excluding accrued charges. Since most of our revenues are in U.S. dollars, we used swaps to convert part of our debt service from Brazilian *reais* to U.S. dollars. Changes in the value of the U.S. dollar against the Brazilian *real* result in fair value variation on these derivatives, affecting our financial results. As a result of the depreciation of the Brazilian *real* against the U.S. dollar in 2020, we had fair value loss on our currency derivatives of US\$1.147 billion. For more information on our use of derivatives, see *Operating and Financial Review and Prospects—Risk management*.

In 2020, the annual average exchange rate for Brazilian *reais* against the U.S. dollar depreciated by 30.6%, from an average exchange rate of R\$3.95 to US\$1.00 in 2019 to R\$5.16 to US\$1.00 in 2020. This had a positive impact on our operational result and cash flows. The most important effect is described below:

- Most of our revenues are denominated in U.S. dollars, while our cost of goods sold are denominated in various currencies, including the U.S. dollar (53.0% in 2020), the Brazilian *real* (39.5% in 2020), the Canadian dollar (6.3% in 2020) and the Euro (1.2% in 2020). As a result, the depreciation of the Brazilian *real* and other currencies against the U.S. dollar decreased our costs and expenses by US\$2.564 billion.

Under our hedge accounting program, our debt denominated in U.S. dollars and Euros serves as a hedge instrument for our investments in Vale International. With the program, the impact of exchange rate variations on debt denominated in U.S. dollars and Euros has been partially recorded under other comprehensive income, reducing the volatility of our financial performance. In 2020, we recognized a loss of US\$578 million in the "Cumulative translation adjustments" in stockholders' equity.

Additionally, we have considered certain long-term intercompany loans payable by Vale S.A. to Vale International, for which settlement is neither planned nor likely to occur in the foreseeable future, as part of Vale S.A.'s net investment in foreign operation. The foreign exchange differences associated with our net investment in Vale International are recognized in other comprehensive income in our stockholders' equity. This amount would be reclassified from stockholders' equity to income statement in case of disposal or partial disposal of the net investment in Vale International. In 2020, we recognized a loss of US\$2.208 billion in the "Cumulative translation adjustments" in stockholders' equity.

RESULTS OF OPERATIONS

For commentary on our results of operations for the year 2019 compared with 2018, please see pages 102-111 of our Form 20-F for the year ended December 31, 2019.

Consolidated statement of income data

	For the year ended December 31,	
	2020	2019
	(US\$ million)	
Net operating revenue	40,018	37,570
Cost of goods sold and services rendered	(19,039)	(21,187)
Selling, general, administrative and other operating expenses, net	(1,306)	(992)
Research and evaluation expenses	(443)	(443)
Pre-operating and operational stoppage	(887)	(1,153)
Brumadinho event	(5,257)	(7,402)
Impairment and disposals of non-current assets	(2,243)	(5,074)
Operating income (loss)	10,843	1,319
Non-operating income (expenses):		
Financial income (expenses), net	(4,811)	(3,413)
Equity results and other results in associates and joint ventures	(1,063)	(681)
Income (loss) before income taxes	4,969	(2,775)
Income taxes	(438)	595
Net income (loss) from continuing operations	4,531	(2,180)
Net income (loss) attributable to non-controlling interests	(350)	(497)
Net income (loss) from continuing operations attributable to Vale's stockholders	4,881	(1,683)
Net income (loss) from discontinued operations attributable to Vale's stockholders	—	—
Net income (loss) attributable to Vale's stockholders	4,881	(1,683)
Net income (loss) attributable to non-controlling interests	(350)	(497)
Net income (loss)	4,531	(2,180)

CONSOLIDATED REVENUES

In 2020, our net operating revenues were US\$40.018 billion, 6.5% higher than the net operating revenues for the same period in 2019, which were US\$37.570 billion. The increase was mainly due to higher iron ore sales prices (impact of US\$4.989 billion), reflecting the increase in the market reference price, partially offset by lower iron ore fines and iron ore pellets sales volumes (impact of US\$2.660 billion).

Our revenue depends, among other factors, on the volume of production at our facilities and the prices for our products. For more information on our production, see *Information on the Company—Lines of business*. Increases in the capacity of our facilities resulting from our capital expenditure program have an important effect on our performance. Our production is also affected by acquisitions and dispositions.

The following table summarizes, for each of the years indicated, the distribution of our net operating revenues based on the geographical location of our customers.

	Net operating revenues by destination			
	2020		2019	
	(US\$ million)	(% of total)	(US\$ million)	(% of total)
North America				
Canada	258	0.6%	717	1.9%
United States	1,041	2.6	1,335	3.6
	1,299	3.2	2,052	5.5
South and Central America				
Brazil	2,908	7.3	3,348	8.9
Other	362	0.9	641	1.7
	3,270	8.2	3,989	10.6
Asia				
China	23,140	57.8	18,242	48.6
Japan	2,213	5.5	2,603	6.9
South Korea	1,278	3.2	1,278	3.4
Taiwan	587	1.5	943	2.5
Other	1,391	3.5	1,091	2.9
	28,609	71.5	24,157	64.3
Europe				
Germany	1,666	4.2	1,683	4.5
England	637	1.6	168	0.4
Italy	270	0.7	356	0.9
France	269	0.7	517	1.4
Other	2,495	6.2	2,470	6.6
	5,337	13.3	5,194	13.8
Rest of the world	1,503	3.8	2,178	5.8
Total	40,018	100%	37,570	100%

CONSOLIDATED OPERATING COSTS AND EXPENSES

Our cost of goods sold and services rendered decreased by US\$2.148 billion, or 10.1%, to US\$19.039 billion in 2020 from US\$21.187 billion in 2019. Excluding depreciation, depletion and amortization, our cost of goods sold and services rendered decreased by US\$1.729 billion reflecting lower sales volumes (US\$754 million impact) and the positive effect of foreign exchange rates (US\$1.487 billion impact), which were partially offset by higher costs (US\$513 million impact), mainly ferrous minerals costs (US\$413 million impact), due to increased volumes and prices of third-party iron ore fines acquisition, maintenance and royalties.

Our selling and administrative expenses were US\$554 million in 2020, a 13.8% increase from US\$487 million recorded in 2019, mainly due to higher expenses with consulting and legal services.

Our research and evaluation expenses totaled US\$443 million in 2020, in line with US\$443 million recorded in 2019.

Our pre-operating and operational stoppage expenses totaled US\$887 million in 2020, a decrease of US\$266 million from the US\$1.153 billion recorded in 2019, mainly due to the to the positive effect of exchange rate variation (US\$345 million impact).

Our other operating expenses, net, were US\$752 million in 2020, a 48.9% increase from US\$505 million recorded in 2019, mostly due to higher provisions for asset retirement obligations.

Expenses associated with the rupture of the Brumadinho dam were US\$5.257 billion in 2020. These expenses consisted of obligations assumed, including decharacterization of the dams, indemnification and donations to those affected by the event, remediation of the affected areas and compensation to affected communities.

RESULTS OF OPERATIONS BY SEGMENT

Net operating revenue by segment

The following table summarizes our net operating revenues by product for the years indicated.

	Year ended December 31,		
	2020	2019	% change
	(US\$ million, except for %)		
Ferrous minerals:			
Iron ore	27,285	23,343	16.9%
Iron ore pellets	4,242	5,948	(28.7)
Ferroalloys and manganese	225	282	(20.2)
Other ferrous products and services	326	432	(24.5)
Subtotal	32,078	30,005	6.9
Base metals:			
Nickel and other products(1)	4,995	4,257	17.3
Copper concentrate(2)	2,175	1,904	14.2
Subtotal	7,170	6,161	16.4
Coal	473	1,021	(53.7)
Other products and services	297	383	(22.5)
Net operating revenues	40,018	37,570	6.5

(1) Includes nickel coproducts (copper) and byproducts (precious metals, cobalt and others).

(2) Does not include copper produced in our nickel operations.

Sales volumes

Production and sales of iron ore fines and iron ore pellets decreased mainly as a result of the suspension of operations following the Brumadinho dam rupture and the stronger than usual weather-related

seasonality. The following table sets forth our principal products and the total volumes sold of each product in each of the years indicated:

	Year ended December 31,	
	2020	2019
	(thousand metric tons, except where indicated)	
Ferrous minerals:		
Iron ore fines	254,012	267,992
Iron ore pellets	31,211	43,199
Manganese	1,378	1,063
Ferroalloys	67	127
ROM (run of mine)	853	1,314
Coal:		
Thermal coal	2,953	4,356
Metallurgical coal	2,914	4,427
Base metals:		
Nickel	211	206
Copper	247	244
Copper as nickel byproduct	99	122
PGMs (000' oz.)	325	319
Gold (000' oz.)	441	459
Silver (000' oz.)	2,231	1,830
Cobalt (metric tons)	4,089	4,273

Average realized prices

The following table sets forth our average realized prices for our principal products for each of the years indicated. We determine average realized prices based on our net operating revenues, which consist of the price charged to customers, excluding certain items that we deduct in arriving at net operating revenues, mainly value-added tax.

	Year ended December 31,	
	2020	2019
	(US\$ per metric ton, except where indicated)	
Ferrous minerals:		
Iron ore	107.42	87.10
Iron ore pellets	135.90	137.69
Manganese	114.85	139.05
Ferroalloys	947.97	1,057.23
Coal:		
Thermal coal	54.28	59.15
Metallurgical coal	107.42	172.53
Base metals:		
Nickel	15,291.26	14,064.04
Copper	5,864.18	5,445.05
Copper as nickel byproduct	5,864.83	5,414.50
Gold (US\$/oz)	1,857.35	1,418.52
Silver (US\$/oz)	21.06	15.44
Cobalt	28,784.67	26,093.40

Cost of goods sold by segment (excluding depreciation, depletion and amortization)

The following table presents, for each year indicated, our cost of goods sold and services rendered (excluding depreciation, depletion and amortization) by segment and the percentage change from year to year.

	Year ended December 31,		
	2020	2019	% change
	(US\$ million, except for %)		
Ferrous minerals:			
Iron ore.....	8,171	8,778	-6.9%
Iron ore pellets.....	1,661	2,666	-37.7%
Ferroalloys and manganese	179	220	-18.6%
Other ferrous products and services.....	254	324	-21.6%
Subtotal	10,265	11,988	-14.4%
Base metals:			
Nickel and other products(1).....	3,216	2,867	12.2%
Copper(2).....	794	905	-12.3%
Subtotal	4,010	3,772	6.3%
Coal	1,456	1,638	-11.1%
Others.....	328	390	-15.9%
Total (excluding depreciation, depletion and amortization)	16,059	17,788	-9.7%
Depreciation, depletion and amortization	2,980	3,399	-12.3%
Total (including depreciation, depletion and amortization).....	19,039	21,187	-10.1%

(1) Includes nickel coproducts (copper) and byproducts (precious metals, cobalt and others).

(2) Does not include copper produced in our nickel operations.

Expenses by segment (excluding depreciation, depletion and amortization)

The following table summarizes, for each year indicated, our expenses (consisting of selling, general and administrative, research and evaluation, pre-operating, stoppage and other expenses, net of other

revenues) by operating segment (excluding depreciation, depletion and amortization) and the percentage change from year to year.

	Year ended December 31,		
	2020	2019	% change
	(US\$ million, except for %)		
Ferrous minerals:			
Iron ore	848	1,196	-29.1%
Iron ore pellets	71	108	-34.3%
Ferroalloys and manganese	31	11	181.8%
Other ferrous products and services	(1)	1	-200.0%
Subtotal	949	1,316	-27.9%
Base metals:			
Nickel and other products(1)	103	147	-29.9%
Copper(2)	76	68	11.8%
Subtotal	179	215	-16.7%
Coal	43	29	48.3%
Brumadinho event(3)	5,257	7,402	-29.0%
COVID-19	109	—	n/a
Others	1,102	701	57.2%
Total (excluding depreciation, depletion and amortization)	7,639	9,663	-20.9%
Depreciation, depletion and amortization	254	327	-22.3%
Total (including depreciation, depletion and amortization)	7,893	9,990	-21.0%

(1) Includes nickel coproducts (copper) and byproducts (precious metals, cobalt and others).

(2) Does not include copper produced in our nickel operations.

(3) In 2019, following the rupture of the Brumadinho dam, we created a special department in charge of reparation and development (*Diretoria Especial de Reparação e Desenvolvimento*), which is in charge of social, humanitarian, environmental and structural recovery measures in Brumadinho and other affected areas. This special department, which reports to our CEO, assesses the costs related to the Brumadinho event. These costs are not allocated to any operating segment because they are not directly related to any of our operating activities.

Adjusted EBITDA

The table below shows a reconciliation of our Adjusted EBITDA with our net income (loss) for the years indicated.

	Year ended December 31,	
	2020	2019
	(US\$ million)	
Income (loss) attributable to Vale's stockholders	4,881	(1,683)
Income (loss) attributable to non-controlling interests	(350)	(497)
Income (loss)	4,531	(2,180)
Depreciation, depletion and amortization	3,234	3,726
Income taxes	438	(595)
Financial results, net	4,811	3,413
Equity results and other results in associates and joint ventures	1,063	681
Dividends received and interest from associates and joint ventures(1)	268	466
Impairment and disposal of non-current assets	2,243	5,074
Adjusted EBITDA	16,588	10,585

(1) Includes remuneration of the financial instrument in the coal segment.

Our management uses Adjusted EBITDA as the measure to assess the contribution of each segment to our performance and to support decision-making in allocating resources. Adjusted EBITDA is a non-GAAP measure, which is calculated for each segment using operating income or loss from continuing operations

plus dividends received and interest from associates and joint ventures, and adding back the amounts charged as (i) depreciation, depletion and amortization and (ii) impairment and disposal of non-current assets. For more information, see note 4 to our consolidated financial statements.

The following table summarizes our Adjusted EBITDA for each of our segments.

	Year ended December 31,	
	2020	2019
	Adjusted EBITDA	Adjusted EBITDA
	(US\$ million)	
Ferrous minerals:		
Iron ore.....	18,289	13,398
Iron ore pellets.....	2,626	3,432
Ferroalloys and manganese	15	51
Other ferrous products and services.....	75	116
Subtotal	21,005	16,997
Base metals:		
Nickel and other products (1).....	1,676	1,243
Copper (2).....	1,305	931
Subtotal.....	2,981	2,174
Coal	(931)	(533)
Brumadinho Event (3).....	(5,257)	(7,402)
COVID-19	(109)	
Other (4).....	(1,101)	(651)
Adjusted EBITDA	16,588	10,585

(1) Includes nickel coproducts (copper) and byproducts (precious metals, cobalt and others).

(2) Does not include copper produced in our nickel operations.

(3) In 2019, following the rupture of the Brumadinho dam, we created the Special Recovery and Development Board, which is in charge of social, humanitarian, environmental and structural recovery measures in Brumadinho and other affected areas. This board, which reports to the CEO, assesses the costs related to the Brumadinho event. These costs are not allocated to any operating segment because they are not directly related to any of our operating activities.

(4) The line "Others" includes sales and expenses of other products, services, research and development, investments in joint ventures and associates of other business and unallocated corporate expenses.

We discuss below, for each segment, the changes in our net operating revenues, cost of goods sold and services rendered (excluding depreciation, depletion and amortization), expenses (excluding depreciation, depletion and amortization and excluding impairment charges) and Adjusted EBITDA. The expenses incurred in connection with remediation, indemnification and donations in respect of the rupture of the Brumadinho dam are not directly related to our operating activities and are therefore not allocated to any operating segment.

Ferrous minerals

- *Our net operating revenues from sales of ferrous minerals* totaled US\$32.078 billion in 2020, a 6.9% increase from US\$30.005 billion in 2019, mainly reflecting higher average realized sales prices of iron ore fines, partially offset by lower sales volumes of iron fines and iron ore pellets. Our average realized prices for iron ore fines in 2020 were 23.3% higher than our average realized prices in 2019. Our sales volume of iron ore fines decreased by 5.2% in 2020, compared to 2019, due to lower production and following our strategy to rebuild operational inventories. Our sales volume of iron ore pellets decreased by 27.8%, compared to 2019, due to lower pellet feed availability mainly from the Itabira complex because of the

suspension of tailings disposal at the Itabiruçu dam since October 2019 and lower market demand.

- *Our cost of goods sold and services rendered from ferrous minerals*, excluding depreciation, depletion and amortization, decreased by 14.4% in 2020, to US\$10.265 billion in 2020 from US\$11.988 billion in 2019. This decrease primarily reflects lower sales volumes (impact of US\$868 million) and lower freight costs (impact of US\$551 million), partially offset by higher iron ore costs due to increased volumes and prices of third-party acquisition, maintenance and royalties (impact of US\$816 million). Our cost of goods sold and services rendered from ferrous minerals in 2020 was positively affected by exchange rate variation (impact of US\$1.268 billion).
- *Our net expenses from ferrous minerals*, excluding depreciation, depletion and amortization, decreased by 27.9%, to US\$949 million in 2020, compared to US\$1.316 billion in 2019, mainly due to the positive effect of exchange rate variation (US\$345 million impact).
- *Our Adjusted EBITDA from ferrous minerals* was US\$21.005 billion in 2020, an increase of US\$4.008 billion, or 23.6%, compared to our Adjusted EBITDA in 2019. This increase primarily reflects the US\$1.613 billion positive impact of foreign exchange rate variations in our costs and expenses, in addition to the increase in revenues and reduction in costs discussed above.

Base metals

- *Our net operating revenues from sales of base metals* totaled US\$7.170 billion in 2020, a 16.4% increase from US\$6.161 billion in 2019. The increase was mainly driven by higher sales prices for nickel (impact of US\$259 million) and due to the positive effect of our nickel revenue hedging program, copper as a nickel by-product (impact of US\$243 million) and PGMs (impact of US\$310 million)]. Our sales volume of nickel increased by 5 million metric tons, compared to 2019, with an impact of US\$75 million.
- *Our cost of goods sold from base metals*, excluding depreciation, amortization and depletion, increased by 6.3% in 2020, to US\$4.010 billion in 2020 from US\$3.772 billion in 2019, mainly due to higher sales volume of nickel (impact of US\$122 million), higher costs due to increased volumes and prices of third-party acquisition of copper (impact of US\$241 million) and higher costs related to the scheduled maintenance activities at the Copper Cliff Nickel Refinery, in Sudbury (impact of US\$39 million). Our cost of goods sold and services rendered from base metals in 2020 was positively affected by exchange variation (impact of US\$203 million).
- *Our net expenses from base metals*, excluding depreciation, amortization and depletion, decreased 16.7% in 2020, to US\$179 million in 2020 from US\$215 million in 2019, mainly due to tax credits of US\$50 million.
- *Our Adjusted EBITDA from base metals* was US\$2.981 billion in 2020, 37.1% higher than US\$2.174 billion in 2019, mainly due to higher prices discussed above.

Coal

- *Our net operating revenues from sales of coal* decreased by 53.7% to US\$473 million in 2020, from US\$1.021 billion in 2019. The decrease is mainly attributable to lower sales volumes (impact of US\$344 million) and lower realized sales prices, in each case for both thermal and metallurgical coal (impact of US\$204 million), as a result of deteriorated market conditions. Sales volumes of thermal coal totaled 2.953 Mt in 2020, decreasing 1.403 Mt when compared to the same period in 2019, while sales volumes of metallurgical coal totaled 2.914 Mt in 2020, decreasing 1.513 Mt in relation to 2019.
- *Our cost of goods sold and services rendered from coal*, excluding depreciation, amortization and depletion, decreased by 11.1% to US\$1.456 billion in 2020 from US\$1.638 billion in 2019, mainly due to lower sales volumes partially compensated by impact of fixed cost dilution on lower sales volumes, higher logistics costs, and higher maintenance at processing plants.
- *Our net expenses from coal*, excluding depreciation, amortization and depletion, totaled US\$43 million in 2020, in line with US\$29 million recorded in 2019.
- *Our Adjusted EBITDA from coal* was a loss of US\$931 million in 2020, compared to a loss of US\$533 million in 2019, for the reasons described above.

IMPAIRMENT AND DISPOSAL OF NON-CURRENT ASSETS

In 2020, we recorded impairment and disposal of non-current assets of US\$2.243 billion. We recorded impairment of: (i) US\$882 million in connection with the potential sale of our investment held in Vale Nouvelle-Calédonie S.A.S. ("VNC"), including the provisions for the commitment to fund the continuity of VNC operations, (ii) US\$798 million on the outstanding intercompany loan receivable from Nacala B.V. due to the review of the expected volume of coal to be transported by the Nacala Logistic Corridor, and (iii) US\$137 million on assets acquired during the year related to our coal operation, (iv) US\$125 million related to our forestry assets due to the conclusion of the sale of this investment to a third party, and (v) US\$76 million following the decision to shut down our manganese plant at Simões Filho.

We also recorded a loss on disposal of non-current assets of US\$225 million related to non-viable projects and operating assets written off through sale or obsolescence.

FINANCIAL RESULTS, NET

The following table details our financial results, net, for the years indicated.

	Year ended December 31,	
	2020	2019
	(US\$ million)	
Financial income(1)	375	527
Financial expenses(2)	(3,283)	(3,746)
Gains (losses) on derivatives, net	(1,210)	244
Net foreign exchange losses	(523)	39
Indexation losses, net	(170)	(477)
Financial results, net	<u>(4,811)</u>	<u>(3,413)</u>

(1) Includes short-term investments and other financial income (see note 6 to our consolidated financial statements)

(2) Includes loans and borrowings gross interest, capitalized loans and borrowing costs, participating debentures, expenses of REFIS, interest on lease liabilities, financial guarantees, expenses with cash tender offer repurchased and others financial expenses (see note 6 to our consolidated financial statements).

In 2020, our financial results, net, was an expense of US\$4.811 billion compared to an expense of US\$3.413 billion in 2019. This mainly resulted from:

- Net foreign exchange loss of US\$523 million in 2020 compared to net foreign exchange gain of US\$39 million in 2019, mainly due to the following:
 - The Brazilian *real* depreciated by 30.6% against the U.S. dollar in 2020, compared to a 4.0% depreciation of the Brazilian *real* in 2019.
 - We considered certain long-term loans payable to Vale International SA, for which settlement is neither planned nor likely to occur in the foreseeable future, as part of our net investment in that foreign operation. As of December 31, 2020, we recognized a loss of US\$2.208 billion, compared to US\$319 million, as of December 31, 2019 as “cumulative translation adjustments” in our stockholders’ equity.
- The net effect of fair value changes in derivatives represented a loss of US\$1.210 billion in 2020, compared to a gain of US\$244 million in 2019. This variation was derived from the following main categories of derivatives transactions:
 - *Currency and interest rate swaps.* We recognized a net loss of US\$1.147 billion in 2020 from currency and interest rate swaps, compared to a net gain of US\$42 million in 2019. These swaps are primarily used to convert debt denominated in Brazilian reais into U.S. dollars in order to protect our cash flow from exchange rate volatility. Despite those losses, we recorded an offsetting reduction in the dollar value of its Brazilian Real-denominated debt, which is not recognized in the income statement.
 - *Gasoil, Brent and Freight derivatives.* We recognized a net loss of US\$134 million in 2020 compared to a net gain of US\$42 million in 2019. These gains resulted from the fair value of the hedge contracts and the variation is due to volatility in the spot price of bunker oil, brent crude oil and gasoil.

- *Others.* We recognized a gain of US\$61 million in the fair value of other derivatives instruments (including lenders' conversion options into our shares of Valor da Logística Integrada S.A. (VLI)), in 2020, compared to a gain of US\$102 million in 2019.
- The non-cash effect of the fair value changes in participating debentures represented a loss of US\$1.565 billion in 2020, compared to a loss of US\$1.475 billion in 2019. This variation was derived from the increase on the weighted average trading price of the secondary market in 2020 compared to 2019.
- A decrease in financial expense of US\$463 million, to US\$3.283 billion in 2020 from US\$3.746 billion in 2019, attributable primarily to: (i) US\$265 million of expenses with cash tender offer repurchased in 2019 (ii) lower loans and borrowings gross interest due to reduction in our debt, with an impact of US\$170 million.

EQUITY RESULTS AND OTHER RESULTS IN ASSOCIATES AND JOINT VENTURES

In 2020, the equity results and other results in associates and joint ventures accounted for a loss of US\$1.063 billion compared to a loss of US\$681 million in the same period in 2019, mostly due to (i) the recognition of a provision of US\$1.095 billion to mitigate and compensate the impacts from the rupture of Samarco's Fundão dam, which is the present value of the revised estimate in relation to Vale's responsibility to support Fundação Renova and is equivalent to 50% of Samarco's additional obligations, (ii) contributions of US\$166 million to fund Samarco's working capital needs, and (iii) a gain of US\$172 million following the full exercise of the option held by BNDESPar to purchase 8% of our VLI shares.

INCOME TAXES

In 2020, we recorded a net income tax expense of US\$438 million, compared to a net income tax benefit of US\$595 million in 2019. Our effective tax rate differed from our statutory tax rate of 34%, principally because of a benefit related to the exchange variation on the tax loss carryforward from foreign subsidiaries (impact of US\$845 million), resulting in an effective tax rate of 25.8%. Our effective tax rate also differed from our statutory tax due to: (i) the tax benefit from the payment of interest on stockholders' equity (impact of US\$316 million), (ii) savings derived from tax incentives from our copper operations in the North region of Brazil (impact of US\$211 million) compared to the same period in 2019, and (iii) unrecognized tax losses in the year (impact of US\$217 million). The reconciliation from statutory tax rate to our effective tax rate is presented in note 8 to our consolidated financial statements.

LIQUIDITY AND CAPITAL RESOURCES

In the ordinary course of business, our principal funding requirements are for capital expenditures, dividend payments and debt service. We expect to meet these requirements, in line with our historical practice, by using cash generated from operating activities and borrowings.

Our investment budget for capital expenditures in 2021 is approximately US\$5.8 billion, including approximately US\$4.8 billion dedicated to sustaining our existing operations and replacement projects and approximately US\$1.0 billion for project execution. A principal amount of US\$685 million of our debt matures in 2021. We are constantly evaluating opportunities for additional cash generation. Finally, we are committed to continue the reduction in our costs and expenses, maintain our debt leverage and discipline in capital allocation.

SOURCES OF FUNDS

Our principal sources of funds are our operating cash flow and borrowings. The amount of operating cash flow is strongly affected by global prices for our products. In 2020, our operating activities provided by cash flows from of US\$14.322 billion, in line with the US\$12.110 billion provided in 2019. In 2020, our cash and cash equivalents were US\$13.487 billion compared to US\$7.350 billion in 2019.

In 2020, we borrowed US\$6.800 billion, compared to US\$3.142 billion in 2019. Our major transactions in 2020 are summarized below:

- As a precautionary measure to increase our cash position due to the uncertainties resulting from the COVID-19 pandemic, we drew down our US\$5.000 billion revolving credit lines in March 2020. These loans were fully paid in September 2020.
- In July 2020, our wholly owned subsidiary Vale Overseas Ltd. issued US\$1.500 billion 3.750% notes due 2030, guaranteed by Vale S.A.
- In 2020, we borrowed US\$300 million in pre-export financing agreements with commercial banks.

USES OF FUNDS

In the ordinary course of business, our principal funding requirements are for capital expenditures, dividend payments and debt service. In addition, in 2020, we used a total amount of cash of US\$1.319 billion in matters related to the rupture of our dam in Brumadinho, of which US\$293 million was in connection with decharacterization of dams, US\$516 million was in connection with obligations assumed under settlement agreements, and US\$510 million was in connection with communication services, accommodation and humanitarian assistance, equipment, legal services, water, food aid, taxes, among others. In 2020, we also used a total amount of cash of US\$560 million, in matters related to the rupture of Samarco's dam, of which US\$394 million was contributed to Fundação Renova and Samarco to be used in the reparation programs in accordance with the Framework Agreement, and US\$166 million was used by Samarco to fund its working capital.

Capital expenditures

Our capital expenditures in 2020 amounted to US\$4.430 billion, including US\$3.908 billion dedicated to sustaining our existing operations and US\$522 million for project execution (construction in progress). For more information about the specific projects for which we have budgeted funds, see *Information on the Company—Capital expenditures*.

Distributions and repurchases

In July 2020, we paid dividends declared in December 2019 based on profit reserves of US\$1.159 billion (R\$6.287 billion), equivalent to R\$1.414364369 per share, classified as interest on stockholders' equity.

In September 2020, we paid dividends on profit reserves of US\$3.350 billion (R\$18.637 billion), equivalent to R\$2.407510720 per share.

On February 25, 2021, our Board of Directors approved the stockholder's remuneration on the results of 2020 of US\$3.972 billion (R\$21.866 billion), equivalent to R\$4.262386983 per share, to be paid on March 15, 2021.

We did not repurchase any of our shares in 2020.

Tax payments

We paid US\$1.397 billion in income tax in 2020, excluding the payments in connection with REFIS tax settlement, compared to US\$1.376 billion in 2019. In 2020, we paid a total of US\$339 million in connection with the REFIS, compared to US\$434 million in the same period in 2019.

Liability Management

In 2020, we repaid US\$6.064 billion under our financing agreements, including the repayment of US\$5.000 billion of credit lines drawn in the first quarter of 2020 and the repayment of US\$ 1.064 billion in loans with development banks and other institutions.

DEBT

As of December 31, 2020, our total outstanding debt was US\$13.360 billion (including US\$13.159 billion of principal and US\$201 million of accrued interest) compared with US\$13.056 billion as of December 31, 2019. As of December 31, 2020, US\$176 million of our debt was secured by our property, plant and equipment. As of December 31, 2020, the weighted average of the remaining term of our debt was 8.4 years, compared to 8.5 years in 2019.

As of December 31, 2020, the short-term debt and the current portion of long-term debt was US\$887 billion, including accrued interest.

Our major categories of long-term indebtedness are described below. The principal amounts shown below, excluding accrued interest.

- *U.S. dollar-denominated loans and financing (US\$3.225 billion as of December 31, 2020).* This category includes export financing lines, loans from export credit agencies, and loans from commercial banks and multilateral organizations.
- *U.S. dollar-denominated fixed rate notes (US\$7.448 billion as of December 31, 2020).* We have issued in public offerings several series of fixed-rate debt securities, directly by Vale and through our wholly-owned finance subsidiary Vale Overseas Limited (debt securities guaranteed by Vale) totaling US\$6.631 billion. Our subsidiary Vale Canada Limited has outstanding fixed-rate note in the amount of US\$297 million.

- *Euro-denominated fixed rate notes (US\$920 million as of December 31, 2020).* We have issued in public offering a series of fixed rate debt securities denominated in Euro an amount of €750 million. We will redeem all of the outstanding notes under this series on March 29, 2021, pursuant to notice given to holders of the notes.
- *Other debt (US\$1.566 billion as of December 31, 2020).* We have outstanding debt, principally owed to BNDES, Brazilian commercial banks and holders of infrastructure debentures, denominated in Brazilian *reais* and other currencies.

As of December 31, 2020, we have two revolving credit facilities with syndicates of international banks, which will mature in 2022 and 2024. The revolving credit lines allow more efficient cash management, consistent with our strategic focus on reducing cost of capital. We currently have US\$5.000 billion available under these two revolving credit lines which can be drawn by Vale, Vale Canada and Vale International.

Some of our long-term debt instruments contain financial covenants. In particular, instruments representing 16.3% of the aggregate principal amount of our total debt require that we maintain, as of the end of each quarter, (i) a consolidated ratio of total debt to adjusted EBITDA for the past 12 months not exceeding 4.5 to one and (ii) a consolidated interest coverage ratio of at least 2.0 to one. These covenants appear in our financing agreements with BNDES, with other export and development agencies, and with some other lenders. As of December 31, 2020, we were in compliance with our financial covenants.

As of December 31, 2020, the corporate financial guarantees we provided (within the limit of its direct or indirect interest) for certain associates and joint ventures totaled US\$1.557 billion.

In a broader view and considering other relevant commitments, such as leases, the REFIS tax settlement, and the Brumadinho and Samarco commitments, our expanded net debt decreased from US\$17.766 billion as of December 31, 2019 to US\$ 13.334 billion as of December 31, 2020. The decrease of US\$4.432 billion is mainly due to higher cash generation, which were offset by Brumadinho commitments.

CONTRACTUAL OBLIGATIONS

The following table summarizes our contractual obligations as of December 31, 2020. This table excludes other common non contractual obligations that we may have, including pension obligations, deferred tax liabilities and contingent obligations arising from uncertain tax positions, all of which are discussed in the notes to our consolidated financial statements.

	Payments due by period					Thereafter
	Total	Less than 1 year	2022	2023	2024	
			(US\$ million)			
Debt less accrued interest	13,159	685	1,230	1,229	2,024	7,991
Interest payments(1)	6,913	637	610	581	527	4,558
Purchase obligations(2)	9,936	4,730	1,315	918	711	2,262
Total	30,008	6,052	3,155	2,728	3,262	14,811

- (1) Consists of estimated future payments of interest on our loans, financings and debentures, calculated based on interest rates and foreign exchange rates applicable as of December 31, 2020 and assuming that (i) all amortization payments and payments at maturity on our loans, financings and debentures will be made on their scheduled payments dates, and (ii) our perpetual bonds are redeemed on the first permitted redemption date. Amounts do not include derivatives transactions.
- (2) The purchase obligations derive mainly from take-or-pay contracts, contracts for the acquisition of fuel and energy and the acquisition of raw materials and services. For more information, see note 30 to our consolidated financial statements.

OFF-BALANCE SHEET ARRANGEMENTS

As of December 31, 2020, we did not have any off-balance sheet arrangements as defined in the Form 20-F.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

We believe that the following are our critical accounting policies. We consider an accounting policy to be critical if it is important to our financial condition and results of operations and if it requires significant judgments and estimates on the part of our management.

DEFERRED REVENUE

Defining the gain on sale of mineral interest and the contract liabilities portion of the gold transaction requires the use of critical accounting estimates including, but not limited to: (i) allocation of costs between nickel or copper and gold based on relative prices; (ii) expected margin for the independent elements (sale of mineral rights and service for gold extraction); and (iii) discount rates used to measure the present value of future inflows and outflows.

DEFERRED INCOME TAXES

Determining our provision for income taxes and our deferred tax assets and liabilities requires significant management judgment, estimates and assumptions about matters that are highly uncertain. For each income tax asset, we evaluate the likelihood of whether some portion or the entire asset will not be realized. Deferred tax assets recognized in relation to accumulated tax loss carryforwards depends on our assessment of the probability of generation of future taxable profits within the legal entity in which the related deferred tax asset is recorded, based on our production and sales plans, commodity prices, operating costs, environmental costs, group restructuring plans for subsidiaries and site reclamation costs and planned capital costs.

CONSOLIDATION

In some circumstances, our judgment is required to determine whether, after considering all relevant factors, we have either control, joint control or significant influence over an entity. Significant influence includes situations of collective control. We hold the majority of the voting capital in five joint arrangements (Aliança Geração de Energia S.A., Aliança Norte Energia Participações S.A., Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização and Companhia Nipo-Brasileira de Pelotização), but our management has concluded that we do not have a sufficiently dominant voting interest to have the power to direct the activities of these entities. As a result, these entities are accounted under equity method due to shareholder's agreements where relevant decisions are shared with other parties.

MINERAL RESERVES AND MINE USEFUL LIFE

We regularly evaluate and update our estimates of proven and probable mineral reserves. These reserves are determined using generally accepted geological estimates and international best practices. The calculation of reserves requires us to make assumptions about expected future conditions that are uncertain, including future ore prices, exchange rates, inflation rates, mining technology, availability of permits and production costs. Changes in assumptions could have a significant impact on our proven and probable reserves.

The estimated volume of mineral reserves is used as basis for the calculation of depletion of the mineral properties and also for the estimated useful life, which is a major factor to quantify the provision for asset retirement obligation, environmental recovery of mines and impairment of long-lived assets. Any changes to the estimates of the volume of mine reserves and the useful lives of assets may have a significant impact on the depreciation, depletion and amortization charges and assessments of impairment.

IMPAIRMENT OF NON-CURRENT ASSETS

Non-financial assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount might not be recoverable. An impairment loss is recognized for the amount by which the asset's carrying value exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal ("FVLCD") and value in use ("VIU").

FVLCD is generally determined as the present value of the estimated future cash flows expected to arise from the continued use of the asset from a market participant's perspective, including any expansion prospects. VIU model is determined as the present value of the estimated future cash flows expected to arise from the continued use of the asset in its present form. Value in use is determined by applying assumptions specific to our continued use and cannot take into account future development. These assumptions are different to those used in calculating fair value and consequently the VIU calculation is likely to give a different result to a FVLCD calculation.

Assets that have an indefinite useful life and are not subject to amortization, such as goodwill, are tested annually for impairment.

For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (CGU). Goodwill is allocated to Cash Generating Units or Cash Generating Units groups that are expected to benefit from the business combinations in which the goodwill arose and are identified in accordance with the operating segment.

Non-current assets (excluding goodwill) in which we recognized impairment in the past are reviewed whenever events or changes in circumstances indicate that the impairment may no longer be applicable. In such cases, an impairment reversal will be recognized.

For certain long-term contracts, a provision is recognized when the present value of the unavoidable cost to meet our obligation exceeds the economic benefits that could be received from those contracts.

Significant judgments, estimates and assumptions are required to determine whether an impairment trigger has occurred and to prepare our cash flows. Management uses the budgets approved as a starting point and key assumptions are, but not limited to: (i) mineral reserves and mineral resources measured by internal experts; (ii) costs and investments based on the best estimate of projects as supported by past performance; (iii) sale prices consistent with projections available in reports published by industry, considering the market price when appropriate; (iv) the useful life of each cash-generating unit (ratio between production and mineral reserves); and (v) discount rates that reflect specific risks relating to the relevant assets in each cash-generating unit.

These assumptions are susceptible to risks and uncertainties and may change our projections and, therefore, may affect the recoverable value of assets.

FAIR VALUE ESTIMATE

Derivatives transactions that are not qualified for hedge accounting are classified and presented as an economic hedge, as we use derivative instruments to manage our financial risks as a way of hedging against these risks. Derivative financial instruments are recognized as assets or liabilities in the balance sheet and are measured at their fair values. Changes in the fair values of derivatives are recorded in the statement of comprehensive income or in stockholders' equity when the transaction is eligible for effective hedge accounting.

We use well-known market participants' valuation methodologies to compute the fair value of instruments. To evaluate the financial instruments, we use estimates and judgments related to present values, taking into account market curves, interest rates, exchange rates, counterparty (credit) risk adjustments, forward market prices and their respective volatilities, when applicable. We evaluate the impact of credit risk on financial instruments and derivative transactions, and we enter into transactions with financial institutions that we consider having a high credit quality. The financial institution's credit risk tracking is performed making use of a credit risk valuation methodology that considers, among other information, published ratings provided by international rating agencies and other management judgments.

BRUMADINHO DAM FAILURE

The provision for social, economic and environmental reparation may be affected by factors including, but not limited to: (i) changes in the current estimated market price of the direct and indirect cost related to products and services, (ii) changes in timing for cash outflows, (iii) changes in the technology considered in measuring the provision, (iv) number of individuals entitled to the indemnification payments, (v) resolution of existing and potential legal claims, (vi) demographic assumptions, (vii) actuarial assumptions, and (viii) updates in the discount rate.

The main critical assumptions and estimates applied in the de-characterization provision considers, among others: (i) volume of the waste to be removed based on historical data available and interpretation of the enacted laws and regulations; (ii) location availability for the tailings disposal; (iii) engineering methods and solution; and (iv) updates in the discount rate.

Therefore, future expenditures may differ from the amounts currently provided because the realized assumptions and various other factors are not always under our control. These changes to key assumptions could result in a material impact to the amount of the provision in future reporting periods. At each reporting period, we reassess the key assumptions used in the preparation of the projected cash flows and will adjust the provision, if required.

LIABILITIES RELATED TO ASSOCIATES AND JOINT VENTURES

The provision related to Renova Foundation requires the use of assumptions that may be mainly affected by: (i) changes in scope of work required under the Framework Agreement as a result of further technical analysis and the ongoing negotiations with the Federal Prosecution Office, (ii) resolution of uncertainty in respect of the resumption of Samarco's operations; (iii) updates of the discount rate; and (iv) resolution of existing and potential legal claims.

Moreover, the main critical assumptions and estimates applied in the Germano dam provision considers, among others: (i) volume of the waste to be removed based on historical data available and interpretation of the enacted laws and regulations; (ii) location availability for the tailings disposal; and (iii) acceptance by the authorities of the proposed engineering methods and solution. As a result, future expenditures may differ from the amounts currently provided and changes to key assumptions could result in a material impact to the amount of the provision in future reporting periods. At each reporting period, we reassess the key assumptions used by Samarco in the preparation of the projected cash flows and adjust the provision, if required.

ASSET RETIREMENT OBLIGATION

Expenditures relating to ongoing compliance with environmental regulations are charged against earnings or capitalized as appropriate. These ongoing programs are designed to minimize the environmental impact of our activities.

We recognize a liability for the fair value of our estimated asset retirement obligations in the period in which they are incurred, if a reasonable estimate can be made. We consider the accounting estimates related to reclamation and closure costs to be critical accounting estimates because:

- we will not incur most of these costs for a number of years, requiring us to make estimates over a long period;
- reclamation and closure laws and regulations could change in the future or circumstances affecting our operations could change, either of which could result in significant changes to our current plans;
- calculating the fair value of our asset retirement obligations requires us to assign probabilities to projected cash flows, to make long-term assumptions about inflation rates, to determine the applicable discount rates that reflect the current market assessments of the time value of the money and the risks specific to the liability; and
- given the significance of these factors in the determination of our estimated environmental and site reclamation costs, changes in any or all of these estimates could have a material impact on net income. In particular, given the long periods over which many of these charges are discounted to present value, changes in our assumptions about credit-adjusted risk-free interest rates could have a significant impact on the size of our provision.

The future costs of retirement of our mines and processing assets at all our sites are reviewed annually, in each case considering the actual stage of exhaustion and the projected exhaustion date of each mine and site. The future estimated retirement costs are discounted using applicable discount rates that reflect current market assessments of the time value of money and of the risks specific to the liability.

As of December 31, 2020, we estimated the fair value of our total asset retirement obligations to be US\$4.220 billion.

LITIGATION

We disclose material contingent liabilities unless the possibility of any loss arising is considered remote, and we disclose material contingent assets where the inflow of economic benefits is probable. We discuss our material contingencies in note 26 to our consolidated financial statements.

We record an estimated loss from a loss contingency when information available prior to the issuance of our financial statements indicates that it is probable that an outflow of resources will be required to settle an obligation, and the amount of the loss can be reasonably estimated. In particular, given the nature of Brazilian tax legislation, the assessment of potential tax liabilities requires significant management judgment. By their nature, contingencies will only be resolved when one or more future events occurs or fails to occur, and typically those events will occur a number of years in the future. Assessing such liabilities, particularly in the Brazilian legal environment, inherently involves the exercise of significant management judgment and estimates of the outcome of future events.

The provision for litigation as of December 31, 2020, totaling US\$1.091 billion, consists of provisions of US\$335 million for labor, US\$260 million for civil, US\$485 million for tax and US\$11 million for environmental claims. These provisions do not include provisions related to the rupture of the Brumadinho dam, which are reflected in the line Brumadinho event in our statement of income. Claims for which the likelihood of loss, in our opinion and based on the advice of our legal counsel, is reasonably possible but not probable, and for which we have not made provisions, amounted to a total of US\$9.729 billion as of December 31, 2020, including claims of US\$563 million for labor claims, US\$1.348 billion for civil claims, US\$6.911 billion for tax claims and US\$907 billion for environmental claims.

EMPLOYEE POST-RETIREMENT OBLIGATIONS

We sponsor defined benefit pension and other post-retirement benefit plans covering some of our employees. The determination of the amount of our obligations for these benefits depends on certain actuarial assumptions. These assumptions are described in note 27 to our consolidated financial statements and include, among others, the discount rate, the expected long-term rate of return on plan assets and increases in salaries.

RISK MANAGEMENT

We have developed an integrated framework for managing the risks to which we are exposed, in order to support the achievement of our objectives, financial strength and flexibility and business continuity. In 2020, we launched a new global risk platform to promote synergies among our lines of defense, ensuring greater sharing of knowledge and process simplification. Our risk management strategy considers the impact on our business of market risk factors (market risk), risks associated with inadequate or failed internal processes, people, systems or external events (operational risk), risks arising from third-party obligations (credit risk), risks from exposure to legal penalties, fines or reputational losses associated with failure to act in accordance with applicable laws and regulations, internal policies or best practices (compliance risk), and risks associated with our business model, governance and political and regulatory conditions in countries in which we operate (strategic risk), among others.

RISK GOVERNANCE STRUCTURE

Our Operational Excellence and Risk Committee advises our Board of Directors with respect to the risks we are exposed. See *Management and Employees—Management—Advisory Committees to the Board of Directors*.

Our Board of Executive Officers has established five advisory committees (the Business Risk Executive Committees) to advise our management with respect to each of these risks: (i) operational risks, (ii) geotechnical risks, (iii) strategy, finance and cyber risks, (iv) compliance risks and (v) sustainability, institutional relations and reputational risks. The main responsibilities of these committees are, among others: promoting and spreading the culture of risk management throughout the company; supporting the first line of defense, described below; supporting our management on preventive monitoring of potential operational, geotechnical, strategy, finance and cyber risks; making preventive recommendations about potential risks; and recommending revisions about management instruments and risk prevention principles, in accordance with the Risk Management Policy.

Our Board of Directors has established a Compliance Office headed by our Chief Compliance Officer (“CCO”), who reports directly to the Board of Directors and is supervised by the Audit Committee, ensuring autonomy and independence from others executive structures of the company.

The creation of the Compliance Office and appointment of our CCO is another step towards addressing the recommendations made by the Ad Hoc Consulting Committee for Investigation (CIAEA) in the report released in February 2020, and adds to other measures to strengthen our risk governance and safety, such as the establishment of the Audit Committee and the adoption of the Engineer of Record.

The CCO is responsible for supervising the Corporate Integrity, the Internal Audit and also the Whistleblower Channel. The Internal Audit and the Whistleblower Channel are responsible for the third line of defense. In 2020, the Compliance Office reinforced the internal audit activities with the creation of a team focused on technical and operational safety matters and restructured the functional activities of the Corporate Integrity and the Whistleblower Channel areas, implementing new methodologies and protocols. Furthermore, the Compliance Office revised two important documents in 2020—our Global Anti-Corruption Policy and our Code of Conduct. Our Code of Conduct is now principle-based document, which connects directly with our purpose and values. Our Code of Conduct applies to us and our subsidiaries in Brazil or in other countries, our employees, management, interns, suppliers and any person acting on our behalf. Our Global Anti-Corruption Policy and our Code of Conduct were approved by the Board of Directors and are part of our Ethics & Compliance Program launched in March 2021, marking a new format in the management and training of topics related to ethics, conduct and the Whistleblower Channel.

The Whistleblower Channel is operated by an independent company and is structured to guarantee confidentiality, protect whistleblower anonymity and protect the information for a fair investigation. The Whistleblower Channel offers all conditions for a report to be independently verified, and prohibits breaches of confidentiality, intimidation or retaliation against whistleblowers.

Any breaches of our Code of Conduct, policies and standards can be reported by anyone, including employees, contractors, suppliers, members of affected communities and other stakeholders, via our Whistleblower Channel.

Our risk governance structure is based on the Risk Management Policy, which has the main purpose of: (i) supporting the strategic planning, budget and sustainability of our business; (ii) strengthening the capital structure and asset management of our business, by including concepts and assumptions of management based on potential risk in operations, maintenance of assets and logistics modes; (iii) strengthening our governance practices, based on lines of defense model; (iv) using ISO 31000, ISO 55000 and COSO-ERM standards as references for risk management; (v) adopting the RBPS (Risk Based Process Safety) as the operational safety management system; (vi) measuring and monitoring our potential risks, on a consolidated basis, considering the effect of diversification, when applicable, of our entire business; (vii) establishing a specialized structure for specific and independent performance, as Second Line of Defense Specialist, in the assessment of potential operational risks, including geotechnical risks; and (viii) assessing the impact of new investments, acquisitions and divestitures on our risk map and risk tolerance.

In August 2020, we revised our Risk Management Policy to establish the Sustainability, Institutional Relations and Reputational Risk Executive Committee, and in March 2021 we revised the policy to include concepts of business risks, corporate and operational processes risks and to reinforce the roles and responsibilities of the three lines of defense. Our Risk Management Policy may be accessed at our website.

Our integrated risk governance practice is based on a three lines of defense model. We reevaluate our risk practices from time to time to ensure the alignment between strategic decisions, performance and the risk approach determined by our Board of Directors.

MANAGEMENT OF SPECIFIC RISKS

Market Risk

We are exposed to various market risk factors that can impact our cash flow. An assessment of the potential impact of the consolidated market risk exposure is performed periodically to support the decision making process regarding the risk management strategy, which may incorporate financial instruments, including derivatives. The financial instrument portfolio is monitored on a monthly basis, enabling us to properly evaluate financial results and their impact on cash flow, and ensure correlation between the strategies implemented and the proposed objectives.

Considering the nature of our business and operations, the main market risk factors that we are exposed to are:

- *Foreign exchange rates.* Our cash flows are exposed to the volatility of several currencies against the U.S. dollar and of interest rate on loans and financings. While most of our product prices are indexed to U.S. dollars, most of our costs, disbursements and investments are indexed to currencies other than the U.S. dollar, principally the Brazilian *real* and the Canadian dollar. We also have debt instruments denominated in currencies other than U.S.

dollars, mainly in Brazilian *reais* and euros. We may use swaps and forward transactions to convert into U.S. dollars a portion of the cash outflows of these debt instruments, and of some other assets or liabilities denominated in currencies other than U.S. dollars.

- *Interest rates* Our floating rate debt consists mainly of loans including export pre-payments, commercial bank loans and multilateral organization loans. In general, the U.S. dollar floating rate debt is subject to changes to LIBOR (London Interbank Offer Rate) in U.S. dollars.
- *Product prices and input costs.* We are also exposed to market risks associated with commodities price volatilities. We may enact risk mitigation programs in situations such as the following: (i) where there is a risk of financial distress; (ii) to support commercial activities and specific needs of our business segments; (iii) to ensure a minimum cash and/or value generation for certain businesses; and (iv) to protect from the increase of certain cost items, such as fuel oil used on ships and freight chartering. These programs include predominantly forward transactions, futures contracts and options.

See note 19 to our consolidated financial statements for quantitative information about risks relating to financial instruments, including financial instruments entered into pursuant to our risk management policies.

Operational Risk

Operational risk management is the structured approach we take to manage uncertainty related to internal and external events. Internal events consist of inadequate or failed internal processes, people and systems, while external events include natural and operational catastrophes caused by third parties.

We are conducting Hazard Identification and Risk Assessment (HIRA), a process that identifies and analyzes operational risks and defines performance criteria and establishes assurance to the associated critical controls. By the end of 2020, 95% of our operational sites (75 out of 79 sites) implemented HIRA as part of the strategy to improve operational risk management. Our target is to assess 100% of the sites in the first half of 2021, and to assess all geotechnical structures by the end of 2022. As of March 22, 2021, we have mapped 790 materials undesired events and identified 8,574 critical controls, and as a result completed 2,169 immediate actions.

We reduce operational risk by implementing new controls, improving existing ones, and monitoring their effectiveness. Our response plans include the high risks scenarios and identify the necessary resources to mitigate the impacts. We seek a clear view of the major risks we are exposed to, the cost-benefit on mitigation plans and the controls in place to closely monitor the impact of operational risks and to efficiently allocate capital to reduce it.

Geotechnical Risk

Geotechnical risk management is the structured approach we take to manage the risks of dams, slopes and ore piles ruptures, with the potential to cause fatalities, impacts on the community, the environment and/or interrupt the our activities.

It is the structured approach we take to manage, in particular, the risks of dams, slopes and ore piles ruptures with the potential to cause fatalities, impacts on the community, the environment and/or interrupt our activities, which are very significant to our business. Geotechnical risks are continuously

monitored and are duly integrated to our enterprise risk management. We have been working on the improvement of our tailings management practices by implementing our Tailings and Dam Management System (TDMS). This system is based on the adoption of multiple layers of protection, including our three internal lines of defense and external lines of defense, such as the Engineer of Record (EoR).

Operational, Planning and Continuity Risk

Planning and operational continuity risks include risks that may paralyze operations such as the unavailability of critical resources and of place for disposal of tailings, risks of not obtaining or not renewing licenses, concessions and mining rights, logistics risks and risks of availability and quality of reserves.

Cyber Risk

Cyber risk management is the approach taken to manage information security risks, such as theft and leakage of information, technology assets unavailability and compromising data integrity. The increase on the threat landscape is a natural trend in our industry and the evolving risks in this space come from a variety of cyber threat actors like nation states, cyber criminals, hacktivists and insiders. We have experienced threats to the security of our information, but none of these had an impact on our business in 2020.

We employ several measures to manage this risk in order to protect, detect and respond to cyber events including information security policies and standards, security protection technologies, detection and monitoring of threats, as well as testing of response and recovery procedures. To encourage vigilance among our employees we create a culture of cybersecurity awareness in the organization through a training program covering topics such as email phishing, information classification and other information security best practices.

Credit Risk

We are exposed to credit risk arising from trade receivables, derivative transactions, guarantees, down payment for suppliers and cash investments. Our credit risk management process provides a framework for assessing and managing counterparties' credit risk and for maintaining our risk at an acceptable level.

We assign an internal credit rating and a credit limit to each counterparty using our own quantitative methodology for credit risk analysis, which is based on market prices, external credit ratings and financial information of the counterparty, as well as qualitative information regarding the counterparty's strategic position and history of commercial relations.

Based on the counterparty's credit risk, risk mitigation strategies may be used to manage our credit risk. The main credit risk mitigation strategies include non-recourse discount of receivables, insurance instruments, letters of credit, corporate and bank guarantees, mortgages, among others.

From a geographic standpoint, we have a diversified accounts receivable portfolio, with Asia, Europe and Brazil, the regions with the most significant exposure. According to each region, different guarantees can be used to enhance the credit quality of the receivables. We monitor the counterparty exposure in the portfolio periodically and we block additional commercial credit to customers in delinquency.

To manage the credit exposure arising from cash investments and derivative instruments, credit limits are approved to each counterparty to which we have credit exposure. We control the portfolio diversification

and monitor different indicators of solvency and liquidity of our different counterparties that were approved for trading.

Compliance Risk

Anti-Corruption Risk

Our Ethics & Compliance Program have specific anti-corruption rules, which are stated in the Code of Conduct, the Global Anti-Corruption Policy, and the Global Anti-Corruption Manual. The program, which is under the responsibility of the Compliance Office, states that we have zero tolerance for corruption and prohibit bribery in all its forms (direct or indirect).

Our anti-corruption rules are related to:

- Socioenvironmental investments must be previously approved by Corporate Integrity through an internal tool and must have a contract with anti-corruption and accountability clauses.
- Gifts, meals, and entertainment involving public officials above a specific value must be previously approved by Corporate Integrity through an internal tool, regardless of the amount, and gifts in cash or equivalent are prohibited at Vale.
- All suppliers, entities, associations, or any third parties that receive funds from us, before being registered, must go through due diligence, where a background check is performed and the risk of corruption is defined. Anti-corruption clauses must be included in the contracts.
- The process of recruiting and selecting employees and leaders who are related to any public official must also be previously approved by Corporate Integrity.

Strategic Risk

Strategic risk comprises governance, business model, external environment issues, regulatory, political, economic or social actions taken by governments or other stakeholders.

IV. SHARE OWNERSHIP AND TRADING

MAJOR SHAREHOLDERS

As of February 28, 2021, our corporate capital was composed of 5,284,474,770 common shares and 12 golden shares issued to the Brazilian government. The 12 golden shares have veto powers over certain actions, such as changes to our name, the location of our headquarters and our corporate purpose as it relates to mining activities.

The following table sets forth information regarding ownership of Vale shares by the shareholders we know beneficially own more than 5% of our outstanding capital stock, and by our directors and executive officers as a group, as of February 28, 2021, unless otherwise indicated.

	Common shares owned	% of class(6)
Caixa de Previdência dos Funcionários do Banco do Brasil (PREVI)(1)	539,445,082	10.5%
Capital World Investors(2)	302,201,922	5.9%
Capital Research Global Investors(2)	294,934,543	5.7%
Bradespar S.A.(3)	293,907,266	5.7%
Mitsui & Co., Ltd.(4)	286,347,055	5.6%
BlackRock, Inc.(5)	279,562,772	5.4%
Directors and executive officers as a group	1,248,675	Less than 1%
Shares held in treasury	154,563,828	3.0%

- (1) Previ was a shareholder of Litel Participações S.A. and Litela Participações S.A., which were part of our former control group.
- (2) Capital World Investors (CWI) and Capital Research Global Investors (CRGI) are independent investment divisions of Capital Research and Management Company. Number of shares as of December 31, 2020 as reported in CWI's and CRGI's Schedule 13G, filed with the SEC on February 16, 2021.
- (3) Bradespar S.A. is controlled by a control group consisting of Cidade de Deus—Cia. Comercial Participações, Fundação Bradesco, NCF Participações S.A. and Nova Cidade de Deus Participações S.A. Bradespar was part of our former control group.
- (4) Mitsui & Co. Ltd. was part of our former control group.
- (5) Number of shares as of December 31, 2020 as reported in BlackRock, Inc.'s Schedule 13G/A, filed with the SEC on January 29, 2021.
- (6) All percentages are based on 5,129,910,942 common shares outstanding as of December 31, 2020.

We were informed of the following significant changes in the percentage ownership held by our major shareholders during the past three years:

- Between September 2018 and December 2018, BNDES Participações S.A. ("BNDESPAR") and Bradespar S.A. ("Bradespar") disposed of an aggregate of 94,461,581 common shares, representing an aggregate of 4.8% of our outstanding share capital (based on a total outstanding share capital of 5,126,258,410 common shares outstanding as of November 30, 2018).
- In December 2018 and August 2019, Litel Participações S.A. ("Litel") distributed to its shareholders as payment of interest on equity 32,709,876 and 95,167,645 common shares, respectively, representing an aggregate of 0.6% and 1.9% of our outstanding share capital, respectively (based on a total outstanding share capital of 5,129,910,942 common shares outstanding as of June 30, 2019).
- In January 2019 and August 2020, BNDESPAR disposed of an aggregate of 16,039,700 common shares and 135,000,000 common shares, respectively, representing an aggregate of 0.3% and 2.6% of our outstanding share capital, respectively (based on a total outstanding share capital of 5,129,910,942 common shares outstanding as of June 30, 2019).
- In September 2019, Litel transferred to Litela Participações S.A. ("Litela") as part of its partial spin-off of Litela 808,746,864 common shares, representing an aggregate of 15.8% of our

outstanding share capital (based on a total outstanding share capital of 5,129,910,942 common shares outstanding as of June 30, 2019).

- In January 2020, Litela transferred to its shareholders as a result of its capital reduction 386,040,325 common shares, representing an aggregate of 7.5% of our outstanding share capital (based on a total outstanding share capital of 5,129,910,942 common shares outstanding as of June 30, 2019).
- In February 2021, Litela transferred to its shareholders as a result of a distribution of assets to its shareholders, 504,801,150 common shares, representing an aggregate of 9.8% of our outstanding share capital (based on a total outstanding share capital of 5,129,910,942 common shares outstanding as of January 31, 2021). As a result, Litela reduced its shareholding in Vale to 0.29%. In this distribution, PREVI received 406,981,677 common shares, increasing its interest to 10.2%.
- Throughout 2020 and 2021, BNDESPAR reduced its stake in Vale. As of February 2021, BNDESPAR had disposed of all of our common shares.

EXPIRATION OF SHAREHOLDERS' AGREEMENT

On November 9, 2020, the Shareholders' Agreement entered in 2017 among Litel, Litela, Bradespar, Mitsui and BNDESPAR expired. Since the expiration of the Shareholders' Agreement, there are no shareholders' agreements filed at our headquarters and we believe that we no longer have a controlling shareholder.

RELATED PARTY TRANSACTIONS

In 2021, we released our revised policy on related party transactions. The policy sets forth rules and principles to ensure transparency and arm's-length terms in our transactions with related parties and other situations of potential conflicts of interest. Pursuant to our policy:

- The definition of related party is based on applicable accounting standards and on this policy, which may be more restrictive than applicable laws and regulations under certain circumstances.
- Our revised policy introduced the concept of "Reference Shareholders," which are shareholders we consider to be related parties, based on the standards set forth in the policy such as, the effective influence over Vale through a direct or known relationship, the existence of common management with such shareholder or a company that is part such shareholder's group, among others. The list of our Reference Shareholders will be annually reviewed by the Audit Committee.
- Our Audit Committee is responsible for issuing reports about potential conflicts of interest between us and our shareholders or management and for reviewing the procedure and terms of related party transactions that are submitted to our Board of Directors for approval.
- If we identify a conflict of interest with a shareholder, then that shareholder or its representative may not participate in any discussions related to the transaction at any shareholders' meeting and will only have access to publicly available information about the matter.
- Under Brazilian corporate law, if a director or an executive officer has a conflict of interest with the company in connection with any proposed transaction, such director or executive officer may not vote in any decision of the Board of Directors or of the Board of Executive Officers regarding such transaction and must disclose the nature and extent of the conflicting interest for transcription in the minutes of the meeting. Under our policy on related party transactions, any director or executive officer who has a conflict of interest cannot receive any relevant documentation or information and may not participate in any related discussions. None of our directors or executive officers can transact any business with us, except on reasonable or fair terms and conditions that are identical to the terms and conditions prevailing in the market or offered by unrelated parties.
- The policy also prohibits the extension of any loans to related parties other than our subsidiaries and affiliated companies.

We have engaged, and expect to continue to engage, in arm's-length transactions with certain entities controlled by, or affiliated with, our major shareholders.

- Bradespar is controlled by a group of entities that also control Banco Bradesco S.A. ("Bradesco"). Bradesco and its affiliates are full-service financial institutions that have performed, and may perform in the future, investment banking, advisory or general financing and banking services for us and our affiliates, from time to time, in the ordinary course of business.
- Previ, a pension fund of the employees of Banco do Brasil S.A. ("Banco do Brasil"), owns 100% of the investment fund BB Carteira Ativa, which holds 80.62% of the common equity of Litela Participações S.A. and Litel Participações S.A., which in turn hold together 1.70% of the common shares of Vale as of February 28, 2021. Banco do Brasil appoints three out of the

Related Party Transactions

six members of Previ's senior management. An affiliate of Banco do Brasil is the manager of BB Carteira Ativa. Banco do Brasil is also a full-service financial institution, and Banco do Brasil and its affiliates have performed, and may perform in the future, investment banking, advisory or general financing and banking services for us and our affiliates, from time to time, in the ordinary course of business.

- We have commercial relationships in the ordinary course of our business with Mitsui, a large Japanese conglomerate. Mitsui has direct investments in some of our subsidiaries, joint ventures and associated companies. Mitsui is also our joint venture partner at VLI. Mitsui has an indirect stake in Vale Moçambique and Nacala Corridor Holding, which controls the coal operations (mine, rail and port) in Mozambique (see *Overview—Business overview—Significant changes in our business*).

We have engaged, and expect to continue to engage, in arm's-length transactions with certain of our associates and joint ventures. For information regarding investments in associate companies and joint ventures and for information regarding transactions with major related parties, see notes 14 and 29 to our consolidated financial statements.

DISTRIBUTIONS

In July 2020, our Board of Directors reestablished our dividend policy, which had been suspended since January 2019 following the Brumadinho dam failure. Under Brazilian law and our bylaws, we are required to distribute to our shareholders an annual amount equal to not less than 25% of the distributable amount, referred to as the mandatory dividend, unless the Board of Directors advises our shareholders at our shareholders' meeting that payment of the mandatory dividend for the preceding year is inadvisable in light of our financial condition. For a discussion of dividend distribution provisions under Brazilian corporate law and our bylaws, see *Additional Information—Bylaws*.

The tax regime applicable to distributions to ADR and to non-resident shareholders will depend on whether those distributions are classified as dividends or as interest on shareholders' equity. See *Additional Information—Taxation—Brazilian tax considerations*.

By law, we are required to hold an annual shareholders' meeting by April 30 of each year at which an annual dividend may be declared. Additionally, our Board of Directors may declare interim dividends. Under Brazilian corporate law, dividends are generally required to be paid to the holder of record on a dividend declaration date within 60 days following the date the dividend was declared, unless a shareholders' resolution sets forth another date of payment, which, in either case, must occur prior to the end of the fiscal year in which the dividend was declared. A shareholder has a three-year period from the dividend payment date to claim dividends (or payments of interest on shareholders' equity) in respect of its shares, after which we will have no liability for such payments.

We make cash distributions on the common shares underlying the ADSs in *reais* to the custodian on behalf of the depositary. The custodian then converts such proceeds into U.S. dollars and transfers such U.S. dollars to be delivered to the depositary for distribution to holders of ADRs net of the depositary's fees. For information on taxation of dividend distributions, see *Additional Information—Taxation—Brazilian tax considerations*.

The following table sets forth the cash distributions we paid to holders of common shares and preferred shares for the years indicated. Amounts have been restated to give effect to stock splits that we carried out in subsequent periods. Amounts are stated before any applicable withholding tax.

Year	Payment date	Reais per share			U.S. dollars per share(1)	U.S. dollars total(1)
		Dividends	Interest on equity	Total	Total	(US\$ million)
2016	December 16, 2016	–	0.17	0.17	0.05	250
2017	April 28, 2017	–	0.91	0.91	0.28	1,459
2018	March 15, 2018	–	0.91	0.91	0.28	1,437
	September 20, 2018	0.17	1.31	1.48	0.36	1,876
2019(2)	August 7, 2020	–	1.41	1.41	0.25	1,324
2020	September 30, 2020	1.41	1.00	2.41	0.45	2,329
2021	March 15, 2021	3.42	0.83	4.26	0.77	3,972

(1) As approved by the Board of Directors.

(2) Amounts were approved by the Board of Directors on December 19, 2019, and payment of the amounts was approved on July 29, 2020.

TRADING MARKETS

Our publicly traded share capital consists of common shares, without par value. Our common shares are publicly traded in Brazil on the B3, under the ticker symbol VALE3. Our common shares also trade on the LATIBEX, under the ticker symbols XVALO. The LATIBEX is a non-regulated electronic market created in 1999 by the Madrid stock exchange in order to enable trading of Latin American equity securities.

Our common ADSs, each representing one common share, are traded on the NYSE, under the ticker symbol VALE. Citibank N.A. serves as the depositary for the common ADSs. On December 31, 2020, there were 1,288,124,823 common ADSs outstanding, representing 25% of our total share capital.

DEPOSITARY SHARES

Citibank N.A. serves as the depositary for our ADSs. ADR holders are required to pay various fees to the depositary, and the depositary may refuse to provide any service for which a fee is assessed until the applicable fee has been paid.

ADR holders are required to pay the depositary amounts in respect of expenses incurred by the depositary or its agents on behalf of ADR holders, including expenses arising from compliance with applicable law, taxes or other governmental charges, facsimile transmission or conversion of foreign currency into U.S. In this case, the depositary may decide in its sole discretion to seek payment by either billing holders or by deducting the fee from one or more cash dividends or other cash distributions. The depositary may recover any unpaid taxes or other governmental charges owed by an ADR holder by billing such holder, by deducting the fee from one or more cash dividends or other cash distributions, or by selling underlying shares after reasonable attempts to notify the holder, with the holder liable for any remaining deficiency.

ADR holders are also required to pay additional fees for certain services provided by the depositary, as set forth in the table below.

Depositary service	Fee payable by ADR holders
Issuance of ADSs upon deposit of shares, excluding issuances as a result of distributions described in the following item	Up to US\$5.00 or less per 100 ADSs (or fraction thereof) issued
Distribution of securities other than ADSs or rights to purchase additional ADSs (i.e., spin-off shares)	Up to US\$5.00 or less per 100 ADSs (or fraction thereof) held
Distribution of cash dividends or other cash distributions (i.e., sale of rights and other entitlements)	Up to US\$5.00 or less per 100 ADSs (or fraction thereof) held
Distribution of ADSs pursuant to (i) stock dividends or other free stock distributions, or (ii) exercise of rights to purchase additional ADSs	Up to US\$5.00 or less per 100 ADSs (or portion thereof) held
Delivery of deposited property against surrender of ADSs	Up to US\$5.00 or less per 100 ADSs (or portion thereof) surrendered
ADS services	Up to US\$5.00 per 100 ADSs (or fraction thereof) held on the applicable record date(s) established by the depositary

The depositary may deduct applicable depositary fees and charges from the funds being distributed in the case of cash distributions. For distributions other than cash, the depositary will invoice the amount of the applicable depositary fees to the applicable holders.

ADDITIONAL CHARGES

The holders, beneficial owners, persons depositing shares and persons surrendering ADSs for cancellation and for the purpose of withdrawing deposited securities are also subject to the following charges: (i) taxes (including applicable interest and penalties) and other governmental charges; (ii) registration fees as may be applicable from time to time; (iii) reimbursement of certain expenses as provided in the deposit agreement; (iv) the expenses and charges incurred by the depositary in the conversion of foreign currency; (v) certain fees and expenses incurred by the depositary in connection with compliance with exchange control regulations and other regulatory requirements; and (vi) certain fees and expenses incurred in connection with the delivery or servicing of deposited shares, as provided for under the deposit agreement.

Depository Shares

The depository reimburses us for certain expenses we incur in connection with the ADR program and other expenses, subject to a ceiling agreed between us and the depository from time to time. These reimbursable expenses currently include legal and accounting fees, listing fees, investor relations expenses and fees payable to service providers for the distribution of material to ADR holders. The depository also agreed to make an additional reimbursement annually based on the issuance and cancellation fees, dividend fees and depository service fees charged by the depository to our ADS holders. For the year ended December 31, 2020, Citibank N.A. reimbursed us US\$9.7 million.

PURCHASES OF EQUITY SECURITIES BY THE ISSUER AND AFFILIATED PURCHASERS

Vale did not engage in any share repurchases during 2020.

V. MANAGEMENT AND EMPLOYEES

MANAGEMENT

BOARD OF DIRECTORS

Our Board of Directors sets general guidelines and policies for our business and monitors the implementation of those guidelines and policies by our executive officers. In March 2021, our shareholders approved a number of changes to our bylaws and as a result certain rules relating to our Board of Directors have changed. For more information about the changes, see *Overview—Business Overview—Our Environmental, Social and Governance (ESG) Framework—Governance*.

- Our bylaws provide for a Board of Directors consisting of 11 to 13 members, and one alternate member. One member of the Board of Directors and his or her alternate are directly elected by our employees, in a separate election. Since March 2021, our bylaws no longer provide for the election of alternate members, with the exception of the alternate for the director elected by our employees, as required by law. In the event that a member of the Board of Directors is absent or otherwise not able to participate in a meeting, the remaining members may appoint a substitute member until the next general shareholders' meeting.
- We currently have three independent members in our Board of Directors. Since March 2021, our bylaws require that at least seven members of the Board of Directors must be independent. We expect to comply with this new requirement following our 2021 annual shareholders' meeting.
- Our bylaws provide that the chief executive officer cannot serve as chairperson of the Board of Directors. It also provides that if the chairperson of the Board of Directors is not an independent member, the independent directors will appoint a lead independent director (LID). As of the date hereof, we do not have a lead independent director.
- All members of the Board of Directors are elected for the same two-year term at the annual shareholders' meeting, can be re-elected, and are subject to removal at any time. Shareholders representing 5% of our voting capital may demand the adoption of a cumulative voting procedure. See *Additional Information—Bylaws—Common shares and golden shares—Voting rights*. The terms of all of our current directors and alternate directors will expire at the 2021 annual shareholders' meeting.
- The Board of Directors holds regularly scheduled meetings eight times per year and holds additional meetings when called by the chairperson, vice-chairperson or any four directors. Decisions of the Board of Directors require a quorum of a majority of the directors and are taken by majority vote.
- Under the rules of the Novo Mercado listing, to be considered independent, a director may not (i) be a controlling shareholder of Vale; (ii) have its vote subject to a shareholders agreement; (iii) be a relative, to the second degree, of any director or executive of Vale; or (iv) have been an employee or executive of Vale in the past three years. The Novo Mercado rules also provide for other situations that require a case-by-case analysis of the independence of a director. Since March 2021, our bylaws provide that, in addition to the Novo Mercado independence standards, to be considered independent, a director may not (i) hold more than 5% of our share capital or have any formal or declared relation with any shareholder holding more than 5% of our share capital; or (ii) have been a director of Vale for five or more consecutive or non-consecutive terms or for 10 or more consecutive or

non-consecutive years. The current composition of Vale's Board of Directors is in compliance with the rules established by the Novo Mercado special segment of B3.

The following table lists the current members of the Board of Directors and each director's alternate.

Director	Year first elected	Alternate director	Year first elected
José Maurício Pereira Coelho (chairman)	2019	Arthur Prado Silva	2015
Fernando Jorge Buso Gomes (vice-chairman)	2015	Johan Albino Ribeiro	2019
Eduardo de Oliveira Rodrigues Filho	2019	Vacant	—
Isabella Saboya de Albuquerque(1)	2017	Adriano Cives Seabra(1)	2019
José Luciano Duarte Penido	2019	Vacant	—
Lucio Azevedo(2)	2015	Iran da Cunha Santos(2)	2019
Marcel Juvinião Barros	2012	Marcia Fragoso Soares	2019
Murilo Cesar Lemos dos Santos Passos	2019	João Ernesto de Lima Mesquita	2020
Oscar Augusto de Camargo Filho	2003	Ken Yasuhara	2019
Marcelo Gasparino da Silva(1)	2020	Nuno Maria Pestana de Almeida Alves(1)	2020
Roger Allan Downey	2019	Ivan Luiz Modesto Schara	2019
Sandra Maria Guerra de Azevedo(1)	2017	Vacant	—
Toshiya Asahi	2017	Hugo Serrado Stoffel	2019

(1) Independent directors.

(2) Appointed by our employees.

Below is a summary of the business experience, activities and areas of expertise of our current directors.

JOSÉ MAURÍCIO PEREIRA COELHO	Born:	1966
Chairman of the Board, Member of the Personnel, Compensation, and Governance Committee	First elected:	2019
Other current activities and director or officer positions:		<ul style="list-style-type: none"> • CEO of the Employees' Pension Fund of Banco do Brasil—Previ • Director and Member of the Audit and Risk Committee of Ultrapar Participações S.A. • Chairman of the Deliberative Board of Associação Brasileira das Entidades Fechadas de Previdência Complementar ("Abrapp")
Business experience:		<ul style="list-style-type: none"> • CEO of Banco do Brasil ("BB") Seguridade Participações S.A. • Vice-President of Finance and Investor Relations of Banco do Brasil S.A. • Director of BB Mapfre SHI Participações S.A. • Chairperson of Mapfre BB SH2 Participações S.A. • Director of Brazilian Reinsurance Institute—IRB • Finance Director of Banco do Brasil S.A.

<p>FERNANDO JORGE BUSO GOMES Vice Chairman, Coordinator of the Finance Committee and Personnel, Compensation, and Governance Committee</p>	<p>Born: 1956 First elected: 2015</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Member of Vale's Finance Committee and coordinator of Vale's Personnel, Compensation and Governance Committee • Director, CEO, and Investor Relation Officer of Bradespar S.A. • Executive Officer of Millenium SEC. Holding Corp <p>Business experience:</p> <ul style="list-style-type: none"> • Vice Chairman of the Board of Directors of Bradespar S.A. • Director, Executive Officer, and CEO of 2B Capital S.A. • CEO and Director of Investor Relations of Bradespar S.A. • Member of Vale's Executive Development Committee • Member of Vale's Strategy Committee • Executive officer of Valepar S.A. • Director of Valepar S.A. (and Vice-Chairman of Board of Directors) • Chairman of the Board of Directors of Smartia Corretora de Seguros S.A. • Chairman of the Board of Directors of SMR Grupo de Investimentos e Participações S.A. • Director of BCPAR S.A. • Director of BR Towers S.A.
<p>EDUARDO DE OLIVEIRA RODRIGUES FILHO Director, Coordinator of the Operational Excellence and Risk Committee</p>	<p>Born: 1954 First elected: 2019</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Managing Partner of CWH Consultoria em Gestão Empresarial <p>Business experience:</p> <ul style="list-style-type: none"> • Member of Vale's Finance Committee and Sustainability Committee • Alternate Director of Valepar S.A. • Commercial Director of Rio Tinto Brasil • Commercial Manager at Minerações Brasileiras Reunidas S.A.
<p>ISABELLA SABOYA DE ALBUQUERQUE Director and Coordinator of Audit Committee</p>	<p>Born: 1970 First elected: 2017</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Coordinator of Vale's Audit Committee <p>Business experience:</p> <ul style="list-style-type: none"> • Director, Coordinator of the Related Parties Committee and Member of the Personnel Committee of Wiz Soluções e Serviços de Corretagem S.A. • Director and Coordinator of the Audit Committee at IBGC • Director and Coordinator of the Audit Committee of BR Malls S.A. • Partner at Jardim Botânico Investimentos S.A.

<p>JOSÉ LUCIANO DUARTE PENIDO Director, Coordinator of the Sustainability Committee and Member of the Operational Excellence and Risk Committee</p>	<p>Born: 1948 First elected: 2019</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Director of Copersucar S.A. • Independent Director of Algar S.A. • Independent Director of Hermes Pardini S.A. <p>Business experience:</p> <ul style="list-style-type: none"> • Director of Banco Santander Brasil • Independent Director of Química Amparo Ypê • Chairman of the Board of Directors of Fibria Celulose • CEO of VCP—Votorantim Celulose e Papel • CEO of Samarco Mineração
<p>LUCIO AZEVEDO Director</p>	<p>Born: 1958 First elected: 2015</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Employee of Vale (currently released for union activity) • President of the Employees' Union of Railway Companies of the Brazilian states of Maranhão, Pará and Tocantins
<p>MARCEL JUVINIANO BARROS Director, Member of the Sustainability Committee</p>	<p>Born: 1962 First elected: 2012</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Director of Brazilian National Counsel of Complementary Security—CNPc • Vice-President of National Association of Participants of Pension Funds <p>Business experience:</p> <ul style="list-style-type: none"> • Security Director of PREVI—Pension Fund for Banco do Brasil Employees • Executive Officer of Litel Participações S.A. • Member of Vale's Personnel, Compensation and Governance Committee • Member of Vale's Executive Development Committee • Director of UN-PRI (Principles for Responsible Investments) • Effective Director of Valepar
<p>MARCELO GASPARINO DA SILVA Director, Member of the Sustainability Committee</p>	<p>Born: 1971 First elected: 2020 (Alternate since 2019)</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Member of the Fiscal Council of Petróleo do Brasileiro S.A.—Petrobras • Director of Companhia Energética de Minas Gerais—CEMIG • Chairman of the Board of Directors of ETERNIT S.A. <p>Business experience:</p> <ul style="list-style-type: none"> • Director of Kepler Weber S.A. • Director of Companhia Catarinense de Águas e Saneamento—CASAN • Director of Centrais Elétricas Brasileiras de Santa Catarina—CELESC • Director of Battistella S.A. • Director of AES Eletropaulo • CEO of Usiminas • Director of Bradespar

<p>MURILO CÉSAR LEMOS DOS SANTOS PASSOS Director and Member of the Finance Committee</p>	<p>Born: 1947 First elected: 2019</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Director of Odontoprev S.A. • Chairman of the Board of Directors of Tegma Gestão e Logística S.A. • Director of IPLF Holding S/A • Director of Suzano Holding S.A. <p>Business experience:</p> <ul style="list-style-type: none"> • Member of the Management Committee of Suzano Holding S.A. • Chairman of the Board of Directors of CCR S.A. • Chairman of the Board of Directors of CPFL Energia • CEO of Suzano Bahia Sul Papel e Celulose S.A. • Superintendent-Officer of Celulose Nipo-Brasileira S.A.—Cenibra Florestas do Rio Doce S.A • Director of Instituto Ecofuturo-Futuro para o Desenvolvimento Sustentável and of Fundação Nacional da Qualidade • Various positions at Vale in several divisions, such as environment, metallurgy and forest products
<p>OSCAR AUGUSTO DE CAMARGO FILHO Director</p>	<p>Born: 1938 First elected: 2003</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Managing Partner of CWH Consultoria Empresarial <p>Business experience:</p> <ul style="list-style-type: none"> • Member of Vale’s Strategy Committee • Coordinator of Vale’s Executive Development • Vale’s Personnel and Governance Committee • Several positions at Grupo Caemi, including Commercial Director of MBR, President of Caemi Internacional (trading), CEO of Caemi (holding) • Director of MRS Logística • Chairman of the Board of Directors of Quebec Cartier Mining Co., Canada
<p>ROGER ALLAN DOWNEY Director and Member of the Operational Excellence and Risk Committee</p>	<p>Born: 1967 First elected: 2019</p>	<p>Other current activities and director or officer positions:</p> <ul style="list-style-type: none"> • Director of Fertimar S.A. (PrimaSea) <p>Business experience:</p> <ul style="list-style-type: none"> • CEO of Fertimar S.A. (PrimaSea) • CEO of Vale Fertilizantes S.A. • CEO of MMX Mineração e Metálicos S.A. • Director of Mining & Steel Research of Credit Suisse • Commercial manager of Rio Tinto Brasil

<p>SANDRA MARIA GUERRA DE AZEVEDO Director and Member of the Personnel, Compensation, and Governance Committee</p>	Born:	1955
	First elected:	2017
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> Independent Director of Granbio Investimentos S.A. Founding Partner of Better Governance Consulting Services Member of Vale's Personnel, Compensation and Governance Committee Accredited Mediator at CEDR—Centre for Effective Dispute Resolution, London
	Business experience:	<ul style="list-style-type: none"> Member of Vale's Governance, Compliance and Risk Committee Director of Global Reporting Initiative—GRI Director of Vix Logística S.A. Director of Companhia Paranaense de Energia—Copel S.A. Chairman of the Board of Directors of the Brazilian Institute of Corporate Governance—IBGC
<p>TOSHIYA ASAHI Director</p>	Born:	1966
	First elected:	2017
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> Vice President of Mitsui & Co. (Brasil) S.A. Director of Petrobras Gás S.A.—Gaspetro
	Business experience:	<ul style="list-style-type: none"> Deputy General Manager of New Metals and Aluminum of Mitsui & Co. Ltd. Assistant Executive, Secretariat Div., Mitsui & Co Ltd

ADVISORY COMMITTEES TO THE BOARD OF DIRECTORS

Our bylaws provide for the following advisory committees to the Board of Directors, each governed by its own internal rules.

- The *Personnel, Compensation and Governance Committee*, which is responsible for evaluating the company's human resources general policies as submitted by the Executive Board to the Board of Directors; evaluating the adequacy of the compensation model for members of the Board of Executive Officers and the proposed annual, global budget for the compensation of executives; supporting the Board of Directors in setting and monitoring of goals for performance evaluation of members of the Executive Board and other officers who report directly to the CEO; supporting the Board of Directors in the process of selecting, evaluating, setting the compensation of, and removing the Corporate Governance Secretary and the Chief Compliance Officer, the latter jointly with the Audit Committee; assisting the Board of Directors in preparing and maintaining our Nomination Policy, specifically with respect to the members of the Advisory Committees, the Executive Board and officers who report directly to the CEO, in line with the applicable legal requirements and the best corporate governance practices; supporting the Board of Directors in the process of selecting and appointing the CEO, as well as evaluating the appointment by the latter of the other members of the Executive Board and other officers who report directly to the CEO; monitoring the succession plan for the Executive Board and other officers who report directly to the CEO, including their successors; periodically evaluating and recommending

adjustments to corporate governance best practices, including with respect to the structure, size and composition of the Advisory Committees and the Executive Board, based on research and evaluations by external institutions and advisors, identifying, selecting and recommending to the Board of Directors potential candidates to be members of the Advisory Committees, to replace any absences, impediments and vacancy of positions, pursuant to our bylaws, and supporting the Chairperson of the Board of Directors in organizing the process for performance evaluation of Vale's Board of Directors and Advisory Committees, among other matters. The current members of the Personnel, Compensation, and Governance Committee are Fernando Jorge Buso Gomes (*coordinator*), José Maurício Pereira Coelho, Sandra Maria Guerra Azevedo, Arthur Prado Silva and Ana Sílvia Corso Matte (*external specialist*).

- The *Finance Committee*, which is responsible for evaluating the structure and conditions of investment and divestment transactions, including mergers, consolidations and spin-offs in which Vale is involved, evaluating the compatibility and consistency between the compensation level of shareholders and the parameters established in the annual budget and financial scheduling, as well as Vale's general policy on dividends and capital structure, evaluating Vale's annual budget and annual investment plan, evaluating Vale's annual funding plan and indebtedness limits, evaluating current and capital investments, monitoring the financial execution of capital expenditure projects, ongoing budget and cash flow, monitoring financial risks and controls, preparing and approving the Finance Committee's annual work plan, among other matters. The current members of the Finance Committee are Fernando Jorge Buso Gomes (*coordinator*), Gilmar Dalilo Cezar Wanderley, Adriano Cives Seabra, Ken Yasuhara and Murilo César Lemos dos Santos Passos.
- The *Operational Excellence and Risk Committee*, which is responsible for, among others, ensuring that the Company has structure and practices that ensure effectiveness in identifying and managing operational, geotechnical and operational continuity risks, encouraging and monitoring the development of a culture of risk awareness in all company decisions, as well as proactive behavior in managing them, monitoring Vale's Integrated Risk Map and Operational and Geotechnical Risk Matrix, especially risks with critical and very critical impacts, as well as proposing improvements in the mitigation plans, supporting the Board of Directors in setting the Company's limits of operational and geotechnical risk exposure, as well as the level of risk tolerance for the risk matrix of these matters, establishing the quadrants corresponding to the unacceptable level of risk and the level of continuous monitoring, monitoring risk events and operational controls from the perspective of the Integrated Risk Map, including those related to the safety of dams, waste dumps, sediment containment dykes and water reservoirs in the Company's mines, monitoring Vale's Governance Model, known as the Vale Production System ("VPS") ensuring the standardization of processes, policies, and best practices to enable continuously more productive, safe and environmentally responsible operations, and ensuring the integrity of the Company's assets, evaluating from a risk perspective the onerous assignment or transfer of assets, including mining rights, in addition to the waiver of rights and other transactions that are not provided for among the duties of the other Advisory Committees to the Board of Director. The current members of the Operational Excellence and Risk Committee are Eduardo de Oliveira Rodrigues Filho (*coordinator*), Hugo Serrado Stoffel, José Luciano Duarte Penido, Roger Allan Downey and Antonio Queiroz.
- The *Sustainability Committee*, which is responsible for reviewing and making recommendations on matters related to Sustainability and Environment, and the way such matters are approached in our strategic planning; evaluating, complementing and

recommending changes in our socio-environmental strategies, and monitoring their implementation; advising the Board of Directors in the analysis of initiatives related to mineral research; evaluating our policies and conduct related to Safety, the Environment, Health, Community Relationships, Human Rights, Communication and Institutional Relations; evaluating our performance regarding Sustainability, proposing challenges and improvements based on a long-term vision; evaluating and proposing our participation in national or international initiatives and adherence to technical standards or agreements related to socio-environmental matters; monitoring the preparation and disclosure of the sustainability report; evaluating our projects, initiatives and investment proposals from the perspective of sustainability, in addition to making possible recommendations to the Board of Directors; monitoring the scope of operations and effectiveness in the department of institutional relations in dealing with regulatory entities and other institutional relationships associated with sustainability topics; evaluating policies and proposals for donations, as well as non-obligatory expenses related to the topics under its responsibility, which are under the purview of the Board of Directors; preparing and approving an annual work plan of the Committee, as well as monitoring the remedial actions related to the dam rupture in Brumadinho and Samarco's dam rupture in Mariana, ensuring that the guiding concepts established by the Independent Ad Hoc Consulting Committee for Support and Reparation (CIAE-AR) are applied. The current members of the Sustainability Committee are José Luciano Duarte Penido (coordinator), Johan Albino Ribeiro, Marcel Juviniانو Barros, Marcelo Gasparino da Silva, Luiz Carlos Affonso (*external specialist*) and Carlos Alberto de Oliveira Roxo (*external specialist*).

- The *Audit Committee*, which is responsible, primarily, for supervising the quality and integrity of the financial reports, ensuring compliance with legal, statutory and regulatory standards, internal controls, the effectiveness and sufficiency of the risk management processes, supervising the activities of internal and independent auditors, for advising our Board of Directors with respect to, among other matters, the appointment and dismissal of our independent auditors; evaluating quarterly, interim, and annual financial reporting; overseeing the work performed by our internal auditors and internal controls department; monitoring our exposure to risk; monitoring and making recommendations regarding the correction or improvement of internal policies; monitoring and making recommendations regarding related party transactions and mechanisms to address conflicts of interest; and establishing procedures for the receipt, retention and treatment of complaints related to accounting, controls and audit issues, as well as procedures for the confidential anonymous submission of concerns regarding such matters. The current members of the Audit Committee are Isabella Saboya de Albuquerque (*coordinator*), Luciana Pires Dias and Sergio Ricardo Romani (*external financial specialist*).
- The *Nomination Committee*, which is responsible for assisting the Board of Directors in the elaboration and maintenance of our Nomination Policy, applicable to the members of the Board of Directors, in accordance with the legal requirements and the best corporate governance practices; periodically assessing and recommending adjustments in the structure, size and composition of the Board of Directors, as well as the balance of experience, knowledge and diversity of profiles, in line with best practices of corporate governance and based on market research and assessments by external consulting firms and institutions; assessing and recommending the profiles of candidates for positions in the Board of Directors, according to criteria and guidelines set forth in the Nomination Policy; selecting and recommending potential candidates for positions in the Board of Directors; selecting and recommending to the Board of Directors potential candidates in case of absences, impediments or vacancies; preparing and/or updating the Board of Directors'

succession plan to be approved by the end of each term, so as to maintain a balance of experience, knowledge and diversity of the members' profile; and preparing and approving the Committee's work plan; among other matters. The current members of the Nomination Committee are Pedro Pullen Parente, Alexandre Gonçalves Silva and José Maurício Pereira.

- The *Innovation Committee*, created in March 2021, will be responsible for analyzing new technologies aiming to improve our business. As of the date hereof, our Board of Directors have not yet approved the committee's charter nor has it appointed the committee's members.

Our bylaws provide that the Board of Directors, at its discretion, may also establish other committees for its consulting support to fulfill tasks beyond those set forth for the permanent committees.

INDEPENDENT AD HOC ADVISORY COMMITTEES TO THE BOARD OF DIRECTORS CREATED IN RESPONSE TO DAM RUPTURE IN BRUMADINHO

Following dam rupture in Brumadinho, our Board of Directors also established three independent ad hoc advisory committees to support the board in matters relating to the dam rupture. The first two committees concluded their work in 2020. In March 2020, our Board of Directors decided to extend the term of the CIAESB for one year.

- *Independent Ad Hoc Consulting Committee for Investigation (CIAEA)*. Established to conduct an independent investigation into the causes of the dam rupture. On February 20, 2020, the CIAEA provided its investigation report to our Board of Directors. On March 20, 2020, we announced a detailed plan with deadlines for the implementation of measures to address the committee's recommendations.
- *Independent Ad Hoc Consulting Committee for Support and Reparation (CIAE-AR)*. Established to monitor our measures to support the affected community and to remediate the impacted area, and our provision of resources for this purpose, and to recommend measures to our Board of Directors in connection with these matters. On February 20, 2020, the committee provided its final report to our Board of Directors.
- *Independent Ad Hoc Consulting Committee for Dam Safety (CIAESB)*. Established to evaluate safety conditions of our dams, prioritizing upstream structures, structures in alert zones, among others, with purpose of identifying and recommending measures to strengthen safety at these structures, based on national and international advanced methodologies. The committee is responsible for examining the action plans proposed by our management regarding the safety of the dams, governance related to security management plans and to recommend measures for their improvement. The committee is chaired by Flávio Miguez de Mello, and also includes Willy Alvarenga Lacerda and Pedro Cesar Repetto, all independent members with unblemished reputation and notable technical expertise. We expect that the committee will issue a final report to our Board of Directors by the end of April 2021.

EXECUTIVE OFFICERS

The executive officers are responsible for day-to-day operations and the implementation of the general policies and guidelines set forth by our Board of Directors. Our bylaws provide for a minimum of six and a maximum of 11 executive officers. The executive officers hold weekly meetings and hold additional meetings when called by any executive officer. Under Brazilian corporate law, executive officers must be domiciled in Brazil.

The executive officers are appointed and may be removed by our Board of Directors at any time. Since our shareholders' meeting held on March 12, 2021, our bylaws provide for the appointment of executive officers for three-year terms. The following table lists our current executive officers.

Officer	Year of appointment	Position
Eduardo de Salles Bartolomeo	2019	Chief Executive Officer
Luciano Siani Pires	2012	Chief Financial Officer and Executive Officer for Investor Relations
Marcello Magistrini Spinelli	2019	Executive Officer (Ferrous Minerals)
Carlos Henrique Senna Medeiros	2019	Executive Officer (Safety and Operational Excellence)
Luiz Eduardo Frões do Amaral Osorio	2017	Executive Officer (Institutional Relations and Communication)
Alexandre Gomes Pereira	2017	Executive Officer (Business Support)
Maria Luiza de Oliveira Pinto e Paiva	2021	Executive Officer (Sustainability)
Alexandre Silva D'Ambrósio	2021	Executive Officer (General Counsel)
Marina Barrenne de Artagão Quental	2021	Executive Officer (People)

Below is a summary of the business experience, activities and areas of expertise of our current executive officers.

EDUARDO DE SALLES BARTOLOMEO	Born:	1964
Chief Executive Officer	Appointed:	2019
	Business experience:	<ul style="list-style-type: none"> • Chairman of the Board of Directors of Login Logística Intermodal • Executive Officer for Base Metals of Vale Canada • Director of Vale • Coordinator of Vale's Governance, Compliance and Risk Committee • Member of Finance Committee and Strategic Committee of Vale • CEO of Nova Transportadora do Sudeste • Director of Arteris S.A. • CEO of BHG—Brazilian Hospitality Group • Head of Logistical Operations of Vale • Director of MRS Logística S.A. • CEO of Petroflex

<p>LUCIANO SIANI PIRES Chief Financial Officer, Executive Officer for Investor Relations</p>	<p>Born: Appointed:</p>	<p>1970 2012</p>
	<p>Other current activities and director or officer positions:</p>	<ul style="list-style-type: none"> • Chairman of the Board of Directors of VLI S.A • Director of The Mosaic Company
	<p>Business experience:</p>	<ul style="list-style-type: none"> • Member of Finance Committee of Vale • Global Officer of Strategic Planning and Global Officer of Human Resources and Governance of Vale • Alternate Director of Vale • Director of Valepar • Director of Telemar Participações S.A. • Director of Suzano Papel e Celulose S.A. • Several executive positions at BNDES, including Executive Secretary and Chief of Staff of the Presidency and Head of Capital Markets and Head of Export Finance • Consultant at McKinsey & Company
<p>MARCELLO MAGISTRINI SPINELLI Executive Officer for Ferrous Minerals</p>	<p>Born: Appointed:</p>	<p>1973 2019</p>
	<p>Business experience:</p>	<ul style="list-style-type: none"> • CEO of VLI Logística S.A. • CEO of Ferrovia Centro Atlântica • Director of Ferrovia Norte e Sul • Various positions at Vale, including Logistics Officer
<p>CARLOS HENRIQUE SENNA MEDEIROS Executive Officer for Safety and Operational Excellence</p>	<p>Born: Appointed:</p>	<p>1963 2019</p>
	<p>Business experience:</p>	<ul style="list-style-type: none"> • Executive President for North and Central America of Ball Corporation • Chairman of the Board of Directors of Envases de Centro América • Executive President for South America of Ball Corporation • Executive President for South America of Rexam PLC
<p>LUIZ EDUARDO FRÓES DO AMARAL OSORIO Executive Officer for Institutional Relations and Communication</p>	<p>Born: Appointed:</p>	<p>1974 2017</p>
	<p>Other current activities and director or officer positions:</p>	<ul style="list-style-type: none"> • Director of Instituto Brasileiro de Mineração (“IBRAM”)
	<p>Business experience:</p>	<ul style="list-style-type: none"> • Executive Vice-President of Legal and Company Relations of CPFL Energia S.A. • Director of CPFL Energias Renováveis S.A. • Vice-Chairman of the Board of Directors of Instituto CPFL • Executive Director of International Markets and Vice President for Sustainable Development and External Affairs of Raízen

ALEXANDRE GOMES PEREIRA Executive Officer for Global Business Support	Born: Appointed:	1969 2017
	Business experience:	<ul style="list-style-type: none"> • Senior Vice-President and Global Chief Information Officer of Vale based in Canada • Global IT Services Director of Vale • Global Chief Information Officer, Base Metals, of Vale Inco
MARIA LUIZA DE OLIVEIRA PINTO E PAIVA Executive Officer for Sustainability	Born: Appointed:	1963 2021
	Business experience:	<ul style="list-style-type: none"> • Executive Officer for Sustainability of Suzano S.A. • Executive Officer for Sustainability of Fibria S.A.
ALEXANDRE SILVA D'AMBRÓSIO Executive Officer—General Counsel	Born: Appointed:	1962 2021
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> • Officer of Vale International S.A. • Director of Vale New Caledonia • Director of PT Vale Indonesia
	Business experience:	<ul style="list-style-type: none"> • Executive Vice President of Banco Santander (Brasil) S.A. • Director of Santander Security Services Ltda • Executive Vice President of the Votorantim Group
MARINA BARRENNE DE ARTAGÃO QUINTAL Executive Officer—People	Born: Appointed:	1964 2017
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> • Member of Deliberative Board of the Rio de Janeiro Sectional of the Brazilian Association of Human Resources Professionals (ABRH/RJ)—professional class association.
	Business experience:	<ul style="list-style-type: none"> • Vice President for Human Resources at Raízen Energia S.A. • President of Raízen Foundation • Human Resource director of Shell Brasil

FISCAL COUNCIL

We have a Fiscal Council established in accordance with Brazilian law. The primary responsibilities of the Fiscal Council under Brazilian corporate law are to monitor management's activities, review the company's financial statements, and report its findings to the shareholders.

Brazilian law requires the members of a Fiscal Council to meet certain eligibility requirements. A member of our Fiscal Council cannot (i) hold office as a member of the Board of Directors, Fiscal Council or advisory committee of any company that is a competitor of Vale or otherwise has a conflicting interest with Vale, unless compliance with this requirement is expressly waived by shareholder vote, (ii) be an employee or member of senior management or the Board of Directors of Vale or its subsidiaries or affiliates, or (iii) be a spouse or relative within the third degree by affinity or consanguinity of an officer or director of Vale.

Members of the Fiscal Council are elected by our shareholders for one-year terms. The current members of the Fiscal Council and their respective alternates were elected on April 30, 2020. The terms of the members of the Fiscal Council expire at the next annual shareholders' meeting following election.

Our Fiscal Council shall be composed of three to five members. The holders of our golden shares are entitled to appoint one member. The following table lists the current and alternate members of the Fiscal Council.

<u>Current member</u>	<u>Year first elected</u>	<u>Alternate</u>	<u>Year first elected</u>
Marcelo Amaral Moraes	2004	Vacant	—
Raphael Manhães Martins(1).....	2015	Sueli Barselli Marinho(1)	2020
Marcus Vinícius Dias Severini.....	2017	Vacant	—
Cristina Fontes Doherty	2020	Nelson de Menezes Filho.....	2019
Bruno Funchal(2).....	2020	Vacant(2)	—

(1) Appointed by minority shareholders of common shares.

(2) Appointed by the holder of golden shares.

Below is a summary of the business experience, activities and areas of expertise of the members of our Fiscal Council.

MARCELO AMARAL MORAES	Born:	1967
	First elected:	2004
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> • Director of CPFL Energia S.A. • Member of the Fiscal Council of Gol Linhas Aéreas Inteligentes S.A. • Member of the Fiscal Council of Linx S.A. • Member of the Fiscal Council of Ultrapar Participações S.A.
	Business experience:	<ul style="list-style-type: none"> • Member of the Board of Directors of CPFL Energia S.A. • President of the Fiscal Council of Aceco TI S.A. • Member of the Board of Directors of Eternit S.A. • Managing Director of Capital Dynamics Investimentos Ltda.
RAPHAEL MANHÃES MARTINS	Born:	1983
	First elected:	2015
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> • Attorney for Faoro Advogados • Member of the Fiscal Council of OI S.A.—Em Recuperação Judicial
	Business experience:	<ul style="list-style-type: none"> • Director and Member of the Fiscal Council of companies of Grupo Light S.A. • Director of Eternit S.A. • Member of the Fiscal Council of companies of the JHSF Participações S.A. Group

MARCUS VINÍCIUS DIAS SEVERINI	Born:	1957
	First elected:	2017
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> Member of the Audit Committee of Valia
	Business experience:	<ul style="list-style-type: none"> Member of the Fiscal Council of BRF S.A. Member of the Fiscal Council of Mills Serviços e Soluções de Engenharia S.A. Controller of Vale
CRISTINA FONTES DOHERTY	Born:	1965
	First elected:	2020
	Business experience:	<ul style="list-style-type: none"> Member of the Fiscal Council of Invepar S.A. Alternate Member of the Board of Directors of CSP—Companhia Siderúrgica do Pecém Alternate Member of the Board of Directors of Thyssenkrupp Companhia Siderúrgica do Atlântico Member of the Financial-Operational Committee of California Steel Director of Vale Oman
BRUNO FUNCHAL	Born:	1976
	First elected:	2020
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> National Treasury Secretary Chairman of the Fiscal Council of Caixa Econômica Federal Professor at FUCAPE Business School
	Business experience:	<ul style="list-style-type: none"> Program Director at the Special Secretariat of Finance of the Ministry of Economy Finance Secretary of the State of Espírito Santo Member of the Fiscal Council of Sociedade Brasileira de Econometria Member of the Working Group of the Ministry of Finance regarding the New Bankruptcy Managing Partner of AlphaMar Investimentos

AUDIT COMMITTEE

On March 11, 2020, our Board of Directors established an Audit Committee in accordance the governance rules of Novo Mercado segment of B3.

Under our bylaws and the Audit Committee’s charter, (i) our Audit Committee shall have at least three members, (ii) each member must comply with the independence requirements of our bylaws of the Novo Mercado listing rules, (iii) at least one member must be an independent member of our Board of Directors, (iv) at least one member must not be a member of our Board of Directors and (v) at least one member must be must satisfy accounting / financial expertise requirements of the CVM. All members of our Audit Committee are appointed by the Board of Directors. The terms of the members of the Audit Committee expire at the end of the term of the members of the Board of Directors or upon removal approved by the Board of Directors, pursuant to the Audit Committee’s charter.

We are subject to Rule 10A-3 under the Exchange Act, which requires, absent an exemption, that a listed company maintains a standing Audit Committee composed of members of the Board of Directors that

meet specified requirements. Prior to the creation of our Audit Committee, we relied on our Fiscal Council, which had certain additional powers to allow it to meet the requirements for exemption under paragraph (c)(3) of Rule. Since the establishment of our Audit Committee in accordance the governance rules of Novo Mercado segment of B3, we rely on our Audit Committee to meet the exemption requirements under paragraph (c)(3) of Rule 10A-3, and the Fiscal Council will no longer have expanded powers.

The following table lists the current members of the Audit Committee.

Current member	Year first elected
Isabella Saboya de Albuquerque(1)	2020
Luciana Pires Dias(2)	2020
Sergio Ricardo Romani(2)(3)	2020

(1) Member of our Board of Directors.

(2) Not a member of our Board of Directors.

(3) Accounting / financial expert.

Below is a summary of the business experience, activities and areas of expertise of the members of our Audit Committee.

ISABELLA SABOYA DE ALBUQUERQUE	Please see summary under Board of Directors.	
LUCIANA PIRES DIAS	Born:	1976
	First elected:	2020
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> • Partner at L. Dias Advogados • Member of the Audit Committee of B3 S.A.—Bolsa, Brasil, Balcão • Professor at Fundação Getúlio Vargas • Member of the Audit Committee of CERC Serviços de Desenvolvimento de Sistemas para Recebíveis Ltda. • Director of BNDES Participações S.A.
	Business experience:	<ul style="list-style-type: none"> • Member of the Audit Committee of Banco Nacional de Desenvolvimento Econômico e Social—BNDES • Member of the Technical Committee of CERC Serviços de Desenvolvimento de Sistemas para Recebíveis Ltda. • Professor at Fundação Getúlio Vargas • Finance Director at Comissão de Valores Mobiliários—CVM
SERGIO RICARDO ROMANI	Born:	1959
	First elected:	2020
	Other current activities and director or officer positions:	<ul style="list-style-type: none"> • Partner at SR Assessoria e Consultoria de Negócios Ltda.
	Business experience:	<ul style="list-style-type: none"> • Partner and CEO for Latin America South at Ernst & Young (EY) (1983-2019)

MANAGEMENT COMPENSATION

Under our bylaws, our shareholders are responsible for establishing the aggregate compensation we pay to the members of our Board of Directors, Board of Executive Officers, Fiscal Council and Board Committees. Once the total compensation has been approved at our annual shareholders' meeting, the Board of Directors, with the support of the Personnel, Compensation and Governance Committee, allocates the compensation among its members and the members of the Board of Executive Officers, Fiscal Council and Board Committees. Compensation proposals and policies are prepared with the support of the Personnel, Compensation and Governance Committee, which makes recommendations to our Board of Directors regarding the annual global compensation of the executive officers.

- As a global company, we require management with a deep knowledge of our business and market and unlimited dedication. Attracting and retaining talent, and engaging and motivating the professionals holding strategic positions, especially our executive officers, is critical for our success.
- The compensation proposals are based on benchmarking against the compensation policies and practices of the top global mining companies and large global companies in other similar industries, and various other factors, such as the directors' and officers' responsibilities, time devoted to their duties, professional competence and reputation, market practices in the places where we operate, and the alignment of short- and long-term strategies, shareholder returns and the sustainability of the business.
- On January 27, 2019, in the context of events of exceptional severity, the Board of Directors determined the suspension of all variable compensation payments to our executive officers and certain other Vale leaders. We made a payment under the Performance Shares Units (PSU) program on January 15, 2019, prior to the suspension and prior to dam rupture in Brumadinho. As we continue to work towards the reparation of the impacts caused by dam rupture in Brumadinho and investigation progresses, the Board of Directors has decided to resume variable compensation to executives who are not involved in the investigation discussions related to dam rupture in Brumadinho. As a result, payments of variable compensation and long-term incentive grants suspended in 2019 were made in 2020 to these executives. With respect to the executives who have been removed from their activities for judicial reasons related to dam rupture in Brumadinho, our Board of Directors understood that short-term and long-term variable compensation should remain suspended in 2021 and individually discussed and defined with each executive who has been removed.
- In 2020, we implemented a number of improvements in our Compensation Policy with respect to the compensation of our executive officers, including (a) an increased focus on ESG matters, with impacts on compensation, (b) a more robust process of evaluating the individual performance of executive officers with compensation impacts, (c) a new governance model for the approval of compensation matters, (d) discussions on cultural transformation and human capital and (e) a comprehensive action plan involving relevant and significant improvements in the compensation of executive officers for 2021.
- Examples of recent improvements in compensation, approved in 2020 and to be applied from 2021 onwards, include (a) inclusion of clawback clauses, (b) review of benefits and severance packages, (c) changes in the organizational structure, with new executive officers positions, (d) early renewal process of contracts, and (e) increase in the long-term incentive portion of the compensation of the executive officers.

EXECUTIVE OFFICERS

Payments in 2020

As of December 31, 2020, we had six executive officers: the Chief Executive Officer and five executive officers. For the year ended December 31, 2020, including severance payments made to former executive officers, the average annual compensation paid to our executive officers was R\$23.8 million, the highest annual compensation paid to an executive officer was R\$31.5 million and the lowest annual compensation was R\$6.6 million, in each case net of taxes. The average annual compensation corresponds to the total aggregate compensation paid to executive officers in 2020 divided by the monthly average number of active officers that received compensation during the year. The monthly average number of active officers that received compensation during 2020 was 6.35. For the year ended December 31, 2020, the total payments related to executive officers' compensation packages is set forth in the table below.

	For the year ended December 31, 2020
	(R\$ million)
Annual fixed compensation	24.91
In-kind benefits and pension plans	4.36
Variable compensation	82.62
Total amount paid in 2020 to active executive officers	111.89
Severance	39.47
Total amount paid in 2020 to active and former executive officers	151.36
Other expenses(1)	14.06
Total expenditures related to executive officers' compensation packages	165.42

(1) Social security contributions on the compensation packages to active and former executives.

Principles of our compensation policy

One of the core principles for designing the compensation package is the alignment with our performance and return to our shareholders. In order to promote retention and increase the long-term commitment of executives to sustainable value creation, we have increased the weight of long-term incentives in executive compensation in 2020 and 2021:

- The compensation package offered to our Board of Executive Officers (other than the CEO), assuming the achievement of target average performance, is composed as follows: 31% fixed compensation, 31% short-term (performance target based) variable compensation and 38% long-term (share-based incentives) variable compensation (25% under the Matching Program and 14% under the PSU).
- The compensation package offered to our CEO, assuming the achievement of target performance, is composed as follows: 12% fixed compensation, 20% short-term (performance target-based) variable compensation and 68% long-term (share-based incentives) variable compensation (30% under the Matching Program and 38% of PSU).
- Members of our Board of Executive Officers may be individually entitled to additional compensation pursuant to exceptional arrangements approved by the Board of Directors.

Fixed and variable compensation

Fixed compensation and in-kind benefits include a base salary in cash, paid on a monthly basis, reimbursement for certain investments in private pension plans, health care, relocation expenses, life insurance, driver and car expenses.

Variable compensation consists of: (i) annual cash bonus, based on specific targets for each executive officer and on Vale's global cash generation, and individual performance evaluation, all approved by our Board of Directors, and (ii) payments tied to the performance of our shares under two programs, the Matching Program and the PSU.

- The short-term variable compensation component is based on our cash generation, taking into account economic and financial targets that reflect operating performance, as well as ESG-driven performance goals, directly related to health, safety, risk management and sustainability targets, and other goals related to strategic initiatives such as cultural transformation.
- Under our PSU program, the executive officers receive payments tied to our performance, based on: (1) our Total Shareholder Return (TSR) indicator compared to a preselected group of mining companies, during the three-year cliff vesting period and (2) the achievement of long-term ESG targets related to health and safety, clean and renewable energy in our electricity matrix, recovery and protection of degraded areas, reduction of specific use of new water, reduction of gas emissions and elimination of the main ESG gaps in relation to market best practices. We submitted a proposal for our upcoming 2021 annual shareholders' meeting to permit the delivery of actual shares in lieu of the payments under our PSU program.
- Under our Matching Program, members of our Board of Executive Officers shall purchase a certain number of common shares or ADRs in the market within a purchase window through the plan administrator. At the end of a three-year cycle, participants are entitled to receive a reward equivalent to the same number of common shares or ADRs held through the end of the cycle (except where exceptional arrangements have been approved by the Board of Directors). Participation in our Matching Program is mandatory for the members of our Board of Executive Officers in the years in which we pay enough cash bonuses. Members of our Board of Executive Officers cannot sell or transfer their common shares or ADRs at any time during the vesting period and must observe the Securities Trading Policy in order to sell or transfer Matching Program shares after the vesting period.

In addition, since 2019, a stock ownership guidelines (SOG) requisite was introduced, requiring executives to accumulate (through the share-based compensation programs) and maintain ownership of our shares, in an amount equivalent to at least 36 times the monthly fixed compensation for the CEO and 24 times the monthly fixed compensation for other executive officers.

As such, a large portion of the executive compensation package is at risk, and the mix offered can vary according to the performance achieved and the return to our shareholders (pay-for-performance) in each year.

Severance package

Our severance packages for qualified terminations may comprise: (i) a lump-sum severance payment, that may vary up to one-half the annual fixed compensation for executive officers and up to the annual fixed compensation for the CEO, paid shortly after the termination date; (ii) a potential non-compete agreement compensation, that may vary up to the annual fixed compensation, to be paid in equal quarterly installments after termination; (iii) payment of any long-term variable compensation grants (Matching and PSU programs), in the vesting of each current cycle; and (iv) payment of any short-term incentive plan (bonus), to be paid in April following the termination date. Severance expenditures in 2020 were related to three former executive officers who left the company in 2018, 2019 and 2020.

Other benefits and payments

Pension, retirement or similar benefits consist of our contributions to Valia, the manager of the pension plans sponsored by us.

Social security contributions are mandatory contributions we are required to make to the Brazilian government for our executive officers.

Vale has also entered into indemnification agreements with its officers.

BOARD OF DIRECTORS

As of December 31, 2020, our Board of Directors had 13 members. For the year ended December 31, 2020, the average annual compensation paid to the members of our Board of Directors was R\$0.9 million, the highest annual compensation paid to a member of the Board of Directors was R\$1.4 million and the lowest annual compensation was R\$0.7 million. The monthly average number of members that received compensation during 2020 was 13.25.

In 2020, we paid R\$ 14.6 million in aggregate to the members of our Board of Directors for services in all capacities, all of which was fixed compensation. There are no pension, retirement or similar benefits for the members of our Board of Directors. Vale has also entered into indemnification agreements with its directors.

As of December 31, 2020, the total number of common shares owned by our directors and executive officers was 1,237,675. None of our directors or executive officers beneficially owns 1% or more of any class of our shares.

FISCAL COUNCIL

As of December 31, 2020 our Fiscal Council had five members. We paid an aggregate of R\$2.0 million to members of the Fiscal Council in 2020. In addition, the members of the Fiscal Council are reimbursed for travel expenses related to the performance of their functions.

BOARD COMMITTEES

We paid an aggregate of R\$ 7.3 million to members of our permanent advisory committees in 2020. Directors who participate in advisory committees are entitled to receive, in addition to the compensation as a board member, compensation for participating in one or more committees. In 2020, we paid an aggregate of R\$3.3 million to the committee members that are also members of our Board of Directors and R\$4.1 million to other committee members. In addition, we paid an aggregate of R\$8.6 million to members of our independent ad hoc advisory committees in 2020. Members of our advisory committees are also reimbursed for travel expenses related to the performance of their duties.

EMPLOYEES

The following tables set forth the number of our employees by business and by location as of the dates indicated.

	As of December 31,		
	2020(1)	2019(1)	2018(1)
By business:			
Ferrous minerals.....	44,342	42,077	43,504
Coal	3,320	2,927	2,350
Base metals	13,762	13,738	14,349
Fertilizer nutrients(1)	—	—	12
Energy(2)	3,954	3,809	4,058
Corporate activities	8,938	8,598	5,997
Total	74,316	71,149	70,270

(1) Discontinued operations.

(2) Consists of Biopalma employees.

	As of December 31,		
	2020(1)	2019(1)	2018(1)
By location:			
South America.....	58,439	55,641	55,423
Brazil	58,249	55,439	55,230
North America.....	6,169	6,082	6,032
Europe	293	308	298
Asia	4,454	4,455	4,475
Oceania	1,263	1,384	1,378
Africa	3,698	3,279	2,664
Total	74,316	71,149	70,270

(1) Since January 2017, we include in our total workforce figures all fixed-term contract employees, trainees and employees hired through our affirmative action program for Persons with Disabilities.

We negotiate wages and benefits with a large number of unions worldwide that represent our employees. We have collective agreements with unionized employees at our operations in Brazil, Canada, Indonesia, Malawi, Mozambique, and Oman.

WAGES AND BENEFITS

Wages and benefits for Vale and its subsidiaries are generally established on a company-by-company basis. Our benefits policy is aligned with our attraction and retention strategy, in accordance with applicable laws and market practice in the countries where we operate. We provide an attractive and competitive benefits package ensuring health, well-being, protection and life quality. Among the main benefits offered are medical and dental assistance, life insurance, private pension plans and short-and long-term disability benefits.

We establish our wage and benefits programs for Vale S.A. and its subsidiaries, other than Vale Canada. In November 2020, we reached a one-year agreement with the Brazilian unions providing for a salary increase of 4.5% beginning in November 2020. The provisions of our collective bargaining agreements with unions also apply to our non-unionized employees.

Vale Canada also establishes wages and benefits for its unionized employees through collective bargaining agreements. In 2020, collective bargaining took place with one of the unions at our Ontario Operations. For non-unionized employees, Vale Canada undertakes an annual review of salaries and

benefits. We provide these employees and their dependents with other benefits, including a flexible health care benefit plan.

PENSION PLANS

Brazilian employees of Vale and of most of its Brazilian subsidiaries are eligible to participate in pension plans managed by Valia. Most of the participants in plans held by Valia are participants in a plan named "Vale Mais," which Valia implemented in 2000. This plan is primarily a defined contribution plan with a defined benefit feature relating to service prior to 2000 and another defined benefit feature to cover temporary or permanent disability, pension and financial protection to dependents in case of death. Valia also operates a defined benefit plan, closed to new participants since May 2000, with benefits based on years of service, salary and social security benefits. This plan covers retired participants and their beneficiaries, as well as a relatively small number of employees that declined to transfer from the old plan to the "Vale Mais" plan when it was established in May 2000.

Most employees within our Base Metals operations participate in defined benefit pension plans and defined contribution pension plans. The defined benefit plans have been closed to new participants since 2009, and most new employees within our Base Metals operations are eligible to participate in defined contribution pension plans.

PERFORMANCE-BASED COMPENSATION

All Vale parent-company employees may receive incentive compensation each year in an amount based on the performance of Vale, which can range from 0 to 200% of a market-based reference amount, depending on certain targets set, and the cash generation in each period. Similar incentive compensation arrangements are in place at our subsidiaries.

Qualifying management personnel are eligible to participate in the PSU and Matching Program. See description of these programs under *Management and Employees—Management compensation—Executive officers*.

VI. ADDITIONAL INFORMATION

LEGAL PROCEEDINGS

We and our subsidiaries are defendants in numerous legal actions in the ordinary course of business, including civil, administrative, tax and labor proceedings. The most significant proceedings are discussed below. Except as otherwise noted below, the amounts claimed, and the amounts of our provisions, are stated as of December 31, 2020. See note 26 to our consolidated financial statements for further information.

LEGAL PROCEEDINGS RELATED TO DAM RUPTURE IN BRUMADINHO

We are engaged in several investigations and legal proceedings relating to dam rupture in Brumadinho, and other investigations and legal proceeding may be brought in the future. We have been actively seeking non-judicial alternatives to promote a more expedited reparation and remediation to the victims and to settle the various legal proceedings relating to the dam rupture. We reinforce our commitment to fair, swift and equitable reparation of all the affected parties, and will vigorously contest proceedings we believe are without merit.

a) Global Settlement and other settlement agreements.

On February 4, 2021, we entered into the Global Settlement with the Government of the State of Minas Gerais, the Public Defender Office of the State of Minas Gerais (*Defensoria Pública de Minas Gerais*), public prosecutors of the State of Minas Gerais (*Ministério Público do Estado de Minas Gerais*—“MPMG”) and federal prosecutors (*Ministério Público Federal*—“MPF”) for the reparation and remediation of environmental and social damages resulting from the dam rupture. See *Overview—Business overview—Rupture of tailings dam in Brumadinho*.

Pursuant to this agreement, we settled the claims for socio-economic and socio-environmental damages brought by the State of Minas Gerais and the MPMG under public civil actions before the 2nd Public Treasury Court in the city of Belo Horizonte. Under these public civil actions, the authorities were claiming economic and environmental damages resulting from the dam rupture and sought a broad range of injunctions ordering us to take specific remediation and reparation actions. In July 2019, the court decided that we are liable for the damages caused by the dam rupture, and the Global Settlement settled the quantification of damages. The Global Settlement does not cover claims for individual damages and any unknown, future and subsequent damages (*danos desconhecidos, futuros e supervenientes*).

We have also entered into other settlement agreements with public authorities to establish frameworks for individual indemnification of the victims. An affected party or a group of affected parties has the option to pursue individual claims against us directly, or to settle its claims under an expedited out-of-court settlement process based on the framework we agreed with the authorities under these other settlement agreements. These other settlement agreements settled certain other judicial proceedings brought against us by public authorities. See *Overview—Business overview—Rupture of tailings dam in Brumadinho*.

b) Public civil action and investigation under the Brazilian Clean Company Act

We are a defendant in a public civil action brought by the MPMG against us, before a state court in the city of Brumadinho, claiming that we had concealed relevant information about the stability of the Brumadinho dam by presenting a false declaration of stability prior to the Brumadinho dam rupture. The MPMG alleges that this has adversely affected oversight by public authorities concerning the stability of

the dam and allegedly allowed us to omit relevant information about the dam and its risks. The MPMG claims that this alleged conduct comprises interference with the oversight of public authorities that is prohibited under the Brazilian Clean Company Act (Federal Law No. 12,846/2013).

In May 2020, the court granted a preliminary injunction, requested by the MPMG, ordering that we post bond in the amount of approximately R\$7.9 billion to secure the payment of fines and the potential loss of assets, rights and other values in case the action is eventually decided against us. In June 2020, the Court of Appeals of the State of Minas Gerais partially suspended the injunction that ordered us to post bond, pending a decision on our appeal against this injunction. We will continue to vigorously contest this action, which we believe is without merit.

In January 2021, the court in the city of Brumadinho declared that it had no jurisdiction over the case, directing it to the 1st Public Treasury Court in the city of Belo Horizonte. The MPMG has appealed and a decision is pending.

In addition to the public civil action, we are being investigated by state and federal public authorities for alleged violations under the Brazilian Clean Company Act (Federal Law No. 12,846/2013) in connection with inspection and monitoring activities of public authorities relating to the Brumadinho dam.

c) Putative class action in the United States

We and certain of our current and former executive officers have been named defendants in putative securities class action suits, under U.S. federal securities laws, brought before federal courts in New York by holders of our securities. These complaints were consolidated through an amended complaint brought by the lead plaintiff in October 2019 before the United States District Court for the Eastern District of New York, captioned *In re: Vale S.A. Securities Litigation*, No. 19 Civ. 526 (RJD) (E.D.N.Y.). The lead plaintiff alleges that we made false and misleading statements or omitted to make disclosures concerning the risks of the operations of the Brumadinho dam and the adequacy of the related programs and procedures. The lead plaintiff has not specified an amount of alleged damages in the action.

In May 2020, our motion to dismiss was denied by the United States District Court for the Eastern District of New York. The proceeding is now in the discovery phase. Given the preliminary status of the actions, it is not possible at this time to determine a range of outcomes or to make reliable estimates of the potential exposure. We will vigorously contest these claims.

d) Criminal proceedings and investigations

In January 2020, the MPMG brought criminal charges against 16 individuals (including former executive officers of Vale and current and former employees) for a number of potential crimes, including homicide, and against Vale S.A. for alleged environmental crimes. These charges were accepted by the state criminal judge in the city of Brumadinho on February 14, 2020, and a criminal proceeding against these individuals and Vale is ongoing. Vale intends to vigorously defend itself against the criminal claims, and we cannot estimate when a decision on this criminal proceeding will be issued. The criminal action is currently suspended while the MPMG organizes the relevant documents to enable defendants to defend themselves properly.

In addition, the MPF and the federal police are conducting a separate investigation into the causes of the dam rupture in Brumadinho, which may result in additional criminal proceedings.

In September 2019, the federal police concluded an investigation on potential fraud and forgery of documents in connection with the certification of stability of the Brumadinho dam prior to the dam rupture, and recommended that prosecutors bring criminal actions against us and some of our employees.

e) Public civil action brought by labor union

We are a defendant in a public civil action brought by a labor union in Brumadinho before a labor court in the city of Betim, Minas Gerais, claiming that is the legitimate party to defend the interest of certain workers affiliated with the union and who were victims of the dam rupture. The labor union requests compensation in the amount of R\$3 million for each deceased worker, as well as the attachment of R\$471.6 million in our bank accounts. This proceeding is still ongoing, and the request for attachment of our assets has not been reviewed by the court yet. We will continue to vigorously contest this action, which we believe is without merit.

f) Investigations by the CVM and the SEC

We are cooperating with the CVM and the SEC by providing documents and other information related to the Brumadinho dam rupture in connection with ongoing investigations by both agencies. These investigations relate to Vale's disclosure of relevant information to shareholders, investors and the market in general, especially regarding the conditions and management of our dams. The CVM and SEC investigations may result in fines and administrative penalties either through negotiated resolutions or court proceedings.

g) Public civil action brought by federal prosecutors regarding our internal policies

We are a defendant in a public civil action brought by the MPF before the 14th Federal Court in the city of Belo Horizonte against us, the ANM and the CVM, requesting a judicial intervention on us, until we restructure and improve our internal policies relating to safety and prevention of disasters. The MPF claims that the court appoint a supervisor reporting directly to the court and with managing powers to report any pattern of behavior within Vale that would suggest contempt or carelessness towards environmental or human risks related to mining activities. The MPF has also requested an injunction to suspend the distribution of our dividends. In November 2020, the ANM, the CVM and we presented defenses, asserting that the injunction and final request are unreasonable, since we have heavily invested in safety and disaster prevention, including with the implementation of new processes and committees. On March 5, 2021, the court dismissed the action, holding that the intervention requested by the MPF in the management and risk assessment of a company would be inadmissible. The MPF may appeal this decision, in which case we will continue to vigorously contest this action, which we believe is without merit.

h) Arbitration proceedings in Brazil filed by shareholders and a class association

We are a defendant in three arbitrations that have been filed before the arbitration chamber of B3 by: (i) 166 minority shareholders, (ii) a class association allegedly representing our minority shareholders, and (iii) foreign investment funds. In these three proceedings, the plaintiffs allege that we were aware of the risks associated with the Brumadinho dam, and failed to disclose it to the shareholders, which would be required under the Brazilian applicable laws and the rules of the CVM. Based on such argument, plaintiffs claim compensation for losses caused by the decrease in the value of our shares. Specifically in the arbitration filed by the foreign investment funds, the plaintiffs estimated the amount of the alleged losses at approximately R\$1.8 billion. We disagree with these alleged estimated losses, and believe that the claim is without merit. These proceedings are in early stages, and we will vigorously contest them.

i) Public civil actions relating to evacuation of communities

We are defendants in three public civil actions brought by the MPMG against us claiming a number of injunction reliefs and socioeconomic damages resulting from the evacuation of communities located in the self-rescue zones of certain of our dams located in Ouro Preto, Nova Lima and Barão de Cocais. Pursuant to settlement agreements celebrated or court decisions, we are required to make monthly emergency payments, and fund temporary housing, transportation, medicines, among other measures, to the affected individuals. In addition to the emergency payments and related measures, prosecutors claim substantial amounts of socioeconomic damages. These lawsuits are still in progress.

j) Other proceedings

We are a defendant in a number of investigations, arbitrations and proceedings brought by individuals, business entities, investors, associations, unions, non-governmental organizations and other entities seeking remediation and compensation for environmental, property and personal damages resulting from the Brumadinho dam failure, including alleged violations of securities laws. These investigations, arbitrations and proceedings include requests for significant amounts in damages, injunctions, pre-judgment attachment of assets and seizure of our bank accounts. Most of them are in early stages, and we cannot reasonably estimate their impact. Other investigations, arbitrations and proceedings relating to the rupture of the tailings dam in Brumadinho may be brought in the future.

LEGAL PROCEEDINGS RELATED TO THE RUPTURE OF SAMARCO'S TAILINGS DAM

We are engaged in several legal proceedings relating to the rupture of Samarco's tailings dam in the city of Mariana, in the state of Minas Gerais.

a) Public civil action brought by federal prosecutors and framework agreements

We are a defendant in several legal proceedings brought by governmental authorities and civil associations claiming socioenvironmental and socioeconomic damages and a number of specific remediation measures as a result of the rupture of Samarco's Fundão dam. Following a decision of the Superior Court of Justice (*Superior Tribunal de Justiça*—"STJ"), these proceedings were consolidated before the 12th Federal Court of Belo Horizonte. The two main proceedings were (i) the public civil action brought by the states of Minas Gerais and Espírito Santo, certain federal and state authorities and certain public entities in November 2015 and (ii) the public civil action brought by federal prosecutors (*Ministério Público Federal*—"MPF") in March 2016.

We have entered into two main settlement agreements with the authorities for reparation and remediation of the damages resulting from the rupture of Fundão dam.

- In March 2016, we, together with Samarco and BHPB, entered into a framework agreement with the federal government, the state governments of Espírito Santo and Minas Gerais and certain other federal and state authorities (the "Framework Agreement" or *Termo de Transação e Ajustamento de Conduta*—TTAC). Under the Framework Agreement, Samarco, BHPB and Vale created Fundação Renova, an independent foundation to implement reparation and remediation of damages resulting from the rupture of Fundão dam. The Framework Agreement established 42 socioenvironmental and socioeconomic programs in the region impacted by the Fundão dam failure, and created a governance mechanism for implementation. The agreement has a 15-year term, renewable for successive one-year periods until all the obligations thereunder have been performed.

- In June 2018, Vale, Samarco, BHPB, the MPF, state prosecutors, public defenders and attorneys general, among other parties entered into another framework agreement to improve the governance mechanism of Fundação Renova and establish a process for potential revisions to the remediation programs provided under the Framework Agreement and establishing, among other things, a process for potential revisions to the remediation programs provided under the Framework Agreement based on the findings of experts to be hired by Samarco to advise the MPF (the “June 2018 Agreement” or *Termo de Ajuste de Conduta—TAC Governança*). The June 2018 Agreement terminated certain lawsuits, including public civil actions that had been filed by the Brazilian federal government and the states of Minas Gerais and Espírito Santo, and contemplates the future termination of other public civil actions upon agreement over the remediation programs that are current under review by experts.
- In January 2020, at the request of the parties, the 12th Federal Court authorized the commencement of specific collateral proceedings to address certain topics considered priority and that were not resolved through the governance mechanisms of the framework agreements. For each of these priority topics, the court established specific obligations to be met by public authorities, Fundação Renova, Vale, Samarco and BHPB.
 - As part of one of these proceedings, in August 2020, the court approved the “*Agenda Integrada*” program, a settlement agreement among Fundação Renova, the states of Minas Gerais and Espírito Santo and an association of mayors of cities along the Doce river, providing for the allocation of approximately R\$882 million to investments in education, infrastructure, and health in the region impacted by the rupture of the Samarco dam.
 - In another specific proceeding, the court issued in July 2020 a decision providing guidelines for compensations to be paid to residents of the city of Baixo Guandu, followed by other decisions setting simplified parameters for the compensation of workers (mainly informal workers whose activities are difficult to prove), in at least 20 cities and villages in the states of Minas Gerais and Espírito Santo. These parameters may be reflected throughout other cities along the Doce river. As of March 10, 2021, more than 6,500 affected workers had received payments through this new simplified compensation mechanism. In October 2020, the MPF sought the annulment of the decisions that recognized the new simplified system. The Court of Appeals rejected the MPF’s request for preliminary injunction, but a decision on the merits of the request is still.

In October 2020, the MPF required the resumption of its public civil action due to a deadlock in the engagement of experts to assist the MPF in the review of the existing programs, as contemplated in the June 2018 Agreement. The request will be reviewed by 12th Federal Court after Samarco, Vale and BHP present their responses in due time.

On February 24, 2021, public prosecutors of the State of Minas Gerais (*Ministério Público do Estado de Minas Gerais—“MPMG”*) filed a public civil action against Samarco, BHPB, Fundação Renova, and us, claiming moral damages in the amount of R\$10 billion and requesting an injunction for a judicial intervention on Fundação Renova and, after a transition period, the extinction of Fundação Renova. These requests are based on allegations by the prosecutors of Renova’s lack of independence and autonomy, breach of the Framework Agreement and misuse of powers. We will vigorously contest this action, which we believe to be without merit.

b) Criminal proceeding

In October 2016, the MPF filed criminal charges before the federal court of Ponte Nova, state of Minas Gerais, against us (Vale S.A.), certain of our employees and a former officer, among other corporate and individual defendants. The court has dismissed part of these charges, but accepted charges of environmental crimes against Vale S.A. and one of our employees relating to an alleged omission in the provision of relevant information of environmental interest, false statements and fraud in a public filing, in connection with the alleged failure to disclose that tailings from our Alegria mine were discharged at the Fundão dam. A criminal proceeding against us and one of our employees is ongoing.

In March 2020, the court scheduled a number of hearings to collect defense witnesses' testimonies, but hearings were suspended due to the COVID-19 pandemic. In October 2020, the scheduling of depositions of defense witnesses resumed in some cities. We cannot estimate when a final decision on the case will be issued. We will vigorously contest this action. If we are criminally convicted, we may be subject to penalties to be imposed by the court, in the proportion to the environmental damage caused and our responsibility. Potential sanctions include fines, suspension of activities, prohibition from entering into contracts with the public administration, pecuniary obligations to support environmental programs or projects, obligation to remediate environmental damages or maintain public spaces, and obligation to pay compensation to environmental or cultural public entities.

c) Class action in the United States

We were also named a defendant in an action captioned Banco Safra S.A.—Cayman Islands Branch v. Samarco Mineração S.A., et al., No. 16 Civ. 8800 (RMB) (S.D.N.Y.). The suit was brought as a putative class action on behalf of holders of bonds issued by Samarco, alleging violations of the U.S. federal securities laws on the basis of alleged false and misleading statements or omissions concerning the risks of operations of Samarco's Fundão dam and the adequacy of the related programs and procedures.

In June 2019, U.S. District Court for the Southern District of New York dismissed the complaint. In March 2020, the plaintiff filed its opening appeal brief to the U.S. Court of Appeals for the Second Circuit, and in June 2020 defendants filed a response. In January 2021, the parties presented oral arguments and in March 2021 the Second Circuit denied the plaintiff's appeal.

d) Tax proceeding

In September 2018, the federal tax authorities filed a request before a federal court in Belo Horizonte for an order seizing Vale's assets to secure the payment of Samarco's federal tax and social security debts, in the amount of approximately R\$11 billion (as of June 2018). In May 2019, a favorable decision was issued dismissing the claim without prejudice, due to lack of procedural interest. The General Attorney for the National Treasury (*Procuradoria Geral da Fazenda Nacional*—PGFN) filed an appeal to the local court, and a court ruling is pending.

e) Other proceedings

Vale has been named as a defendant in a number of private actions, before different state and federal courts in the states of Minas Gerais and Espírito Santo, brought by individuals, business entities, municipalities and other entities seeking remediation and compensation for environmental, property and personal damages resulting from the Fundão dam rupture. These proceedings include requests for significant amounts in damages, injunctions, pre-judgment attachment of assets and seizure of our bank

accounts. Vale has settled part of these suits, and continues to defend itself in a number of these proceedings.

Samarco is engaged in several other investigations and proceedings claiming damages resulting from the dam rupture. Immediately after the dam rupture, the environmental authority of the state of Minas Gerais and the DNPM (currently, the ANM) commenced an investigation into the causes of the dam rupture, and ordered the suspension of Samarco's operations pending the conclusion of these investigations.

LEGAL PROCEEDINGS REGARDING SAFETY REQUIREMENTS AT OTHER DAMS

We were involved in a number of other public civil actions in which public prosecutors and other authorities seek to suspend or restrict our operations or obtain injunctions compelling us to implement safety measures at other existing tailings dams. Most of these lawsuits were already dismissed as a consequence of several agreements we entered into with public prosecutors and the state of Minas Gerais, but some are still ongoing.

Maravilhas II and III litigation

In October 2017, before the rupture of the Brumadinho dam, public prosecutors of the State of Minas Gerais (Ministério Público do Estado de Minas Gerais—"MPMG") brought public civil actions challenging our environmental licenses for the construction of the Maravilhas III tailings dam, which is expected to support our operations in the Vargem Grande mining complex, in our Southern System. After the rupture of the Brumadinho dam, the MPMG filed a request for a preventive injunction seeking to discontinue the project, but the request was rejected by the court. This proceeding is still ongoing. If the construction of this dam is interrupted, our ability to resume operations in the mining complex of Vargem Grande could be adversely impacted.

In October 2018, before the rupture of the Brumadinho dam, the MPMG brought a public civil action related to Maravilhas II and III tailings dam seeking, among others requests, an injunction ordering us to refrain from disposing tailings in such dams. The injunction request was initially granted by the court, but in July 2019 the decision was reversed by the Court of Appeals of the State of Minas Gerais. This proceeding is still ongoing.

In April 2019, the MPMG brought a public civil action related to the Maravilhas II tailings dam, requesting injunctions ordering us to (i) refrain from disposing tailings, operating, constructing or making other interventions on the dam; (ii) refrain from increasing the risks of other structures in the mining complex where Maravilhas II is situated; and (iii) review technical studies and other documents related to the dam, and conduct an external audit on the structure. The injunction requests were granted by the state court of the city of Itabirito. The Maravilhas II tailings dam supports our operations in the Vargem Grande complex, which had been suspended since February 2019 and have partially resumed. These proceedings were partially dismissed following an agreement signed by the parties in September 2019. No agreement has been reached regarding the prohibition of measures that could potentially increase the risks of the structure.

LEGAL PROCEEDINGS SEEKING SUSPENSION OF CERTAIN OPERATIONS IN THE STATE OF PARÁ

Since 2012, the MPF and associations representing indigenous communities Xikrin and Kayapó, located in the state of Pará, have brought various legal proceedings against us seeking monetary compensation and

a broad range of injunctive reliefs as a result of alleged irregularities in the licensing process, impact of our certain iron ore and base metals mining activities in these communities.

In November 2020, we entered into an agreement with the MPF, the state of Pará and associations (the “November 2020 Preliminary Agreement”) pursuant to which we agreed (i) the suspension of all these legal proceedings for one year from November 2020, while the parties agree on a comprehensive settlement agreement and (ii) the payment of certain amounts for the benefit of the indigenous communities Xikrin and Kayapó, in the amount of approximately R\$26 million during this one-year period. The November 2020 Preliminary Agreement has been homologated by the federal court in the city of Redenção, which is in charge of the Onça Puma litigation, and remains subject to approval of the courts in charge of the other proceedings. Below is a description of each proceeding:

a) Onça Puma litigation

In 2012, the MPF brought a public civil action against the state of Pará and us, before a federal court in the city of Redenção, seeking the suspension of our nickel operations in Onça Puma, due to the alleged impact on the Xikrin do Cateté and Kayapó indigenous communities located close to the mining site. The federal prosecutors (*Ministério Público Federal*—“MPF”) contend that (i) our operations would be contaminating the water of the Catete River, which crosses the communities, (ii) we have failed to comply with certain conditions under our environmental licenses, and (iii) the state of Pará was not competent to grant environmental license to this operation.

From September 2017 through June 2019, our mining activities and our nickel processing plant in Onça Puma were suspended as a result of injunctions issued by the Federal Court of Appeals (*Tribunal Regional Federal*—TRF) in favor of the MPF in this proceeding. This injunction was reversed in September 2019 by the Federal Supreme Court (*Supremo Tribunal Federal*—“STF”), subject to the compliance with certain conditions and the release of certain judicial deposits in favor of the indigenous communities. This proceeding is currently suspended as a result of the November 2020 Preliminary Agreement.

In 2020, the same associations representing the indigenous community of Xikrin brought other public civil actions against Vale before the federal court of the municipality of Redenção, seeking the suspension of our nickel operations in Onça Puma, in the state of Pará, based on arguments similar to those made by the MPF in the 2012 public civil action. We will vigorously contest these actions and expect these actions to be suspended as a result of the November 2020 Preliminary Agreement while a global settlement agreement is negotiated.

b) S11D litigation

In May 2016, associations representing the indigenous community of Xikrin do Cateté brought a public civil action before a federal court in the city of Marabá against Vale, the Federal Environmental Agency (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*—“IBAMA”), the Federal Indigenous Agency (*Fundação Nacional do Índio*—“FUNAI”) and the National Bank of Economic and Social Development (*Banco Nacional de Desenvolvimento Econômico e Social*—“BNDES”), seeking the suspension of the environmental permitting process of our S11D mine. The associations contend that FUNAI and IBAMA have failed to conduct the appropriate studies regarding the affected indigenous communities during the environmental permitting process, and consequently that the indigenous groups affected by this mine have not provided the required consent. The plaintiffs also requested a monthly payment for each association until the defendants conclude the studies. In January 2017, the court denied plaintiffs’ request for an injunction to suspend our S11D mine.

We expect this action to be suspended as a result of the November 2020 Preliminary Agreement while a global settlement agreement is negotiated. A decision of the federal court in Marabá recognizing the suspension of the proceeding is still pending.

c) Salobo litigation

In July 2018, associations representing the indigenous community of Xikrin do Cateté brought a public civil action against Vale, IBAMA and FUNAI before a federal court in the city of Marabá seeking the suspension of the environmental permitting process of our Salobo mine. The associations contend that FUNAI and IBAMA have failed to conduct the appropriate studies regarding the affected indigenous communities during the environmental permitting process and contends that our operations would be contaminating the water of the Itacaiúnas River and consequently that the indigenous groups affected by this mine have not provided the required consent. The plaintiffs also requested a monthly payment for each association until the defendants conclude the studies. In July 2019, the court partially granted an injunction requested by the Indigenous Associations, ordering Vale and Salobo to prepare the Indigenous Component Study of the Salobo Mine project, but rejected all other requests filed by the plaintiff, including the request to shut down the project.

We expect this action to be suspended as a result of the November 2020 Preliminary Agreement while a global settlement agreement is negotiated. A decision of the federal court in Marabá recognizing the suspension of the proceeding is still pending.

d) Alemão project litigation

In 2020, associations representing the indigenous community of Xikrin brought a public civil action against Vale before a federal court in the city of Marabá, claiming irregularities in the environmental permitting process for our Alemão copper project in the city of Parauapebas, in the state of Pará, and seeking the suspension of the environmental permitting process until we complete an Indigenous Component Study (ICS), which the community contends is required due to the proximity of the future mine to the Xikrin indigenous reserve land. Plaintiffs also requested a compensation payment regarding our operations in the Igarapé Bahia Mine, on the basis that we allegedly failed to conduct the relevant studies and implement appropriate mitigation actions. These proceedings are in early stages, and we believe that these lawsuits are without merit.

We expect this action to be suspended as a result of the November 2020 Preliminary Agreement while a global settlement agreement is negotiated. A decision of the federal court in Marabá recognizing the suspension of the proceeding is still pending.

LEGAL PROCEEDINGS SEEKING CANCELLATION OF LICENSES OR SUSPENSION OF OPERATIONS IN THE STATE OF MINAS GERAIS AND ESPÍRITO SANTO

a) Mar Azul, Tamanduá and Capão Xavier litigation

In June 2020, a civil association that represents owners of properties located in the proximities of the Mar Azul, Tamanduá and Capão Xavier mines brought a public civil action against the state of Minas Gerais, the ANM and us, before a federal court in the state of Minas Gerais, requesting the cancellation of our mining and environmental licenses to operate the Mar Azul, Tamanduá and Capão Xavier mines in our Southern System. Plaintiff also filed for an injunction to suspend such environmental licenses and, consequently, our operations at these mines, alleging, among other matters, that our mining activities at these mines are contaminating water springs in the region. We submitted a response to this request for

injunction and the lower court issued a decision declaring the court's lack of jurisdiction and submitted the case to the Belo Horizonte state court. The plaintiff filed an appeal and a decision on the appeal is pending. We will vigorously contest this action, which we believe is without merit. Our mining operations at the Mar Azul and Tamanduá mines are currently suspended, and the production at the Capão Xavier mine is approximately 6.5 million tons on an annual basis.

b) Viga litigation

In September 2020, the municipality of Jeceaba, state of Minas Gerais, filed a public civil action before the local court against us. Under this proceeding an injunction was granted determining that we refrain from (i) disposing tailings in Dam 7, a tailings dam located at our Viga mine in the Southern System, without the required location and operating permits, and (ii) carrying out works at Dam 7 without the required construction permit. In December 2020, the location and operating permits for Dam 7 were issued in a preliminary decision subject to immediate appeal on a separate claim. We have filed an administrative request for the issuance of the construction permit and a decision from the municipality of Jeceaba is currently pending. If the required permits for 2021 are not issued, we may be required to halt our operations at the Viga concentration plant, with a potential estimated impact to our iron ore production of approximately 330 thousand tons of iron ore per month.

c) Vargem Grande litigation

In June 2019, public prosecutors of the State of Minas Gerais (*Ministério Público do Estado de Minas Gerais*—"MPMG") filed a public civil action against us, before a state court in Nova Lima, state of Minas Gerais, seeking a preliminary injunction, ordering that that we refrain from emitting noise at levels exceeding certain limits in our operations in the Vargem Grande complex, under penalty of paying a fine in the amount of R\$2 million reais per infraction, as well as the payment of an indemnity for material damages in an amount to be determined. The preliminary injunction requested by the MPMG and the interlocutory appeal were dismissed by the court. In November, 2020, a homeowners association joined the proceeding as an assistant to the MPMG. This association requested the reexamination of the preliminary injunction, and in November 2020 this request was denied by the court. We believe these suits are without merits and will continue to vigorously contest them.

d) Tubarão litigation

In September 2019, a civil association brought a public civil action against us, before a state court in Vitória, state of Espírito Santo, claiming that the licensing process for the expansion of our operations at the Tubarão Complex failed to fulfill formal requirements and consider environmental impacts; and established emission parameters different than the ones that had been set forth in the relevant Environmental Impact Study. In this proceeding, the plaintiff filed for an injunction seeking the suspension of Tubarão Complex operating license. We filed our defense and in October 2020 the court rejected plaintiff's request for the injunction. We will vigorously contest this action, which we believe is without merit.

ITABIRA SUITS

We are a defendant in two separate actions brought by the municipality of Itabira, in the Brazilian state of Minas Gerais. In the first action, filed in August 1996, the municipality of Itabira alleges that our Itabira iron ore mining operations have caused environmental and social harm, and claims damages with respect to the alleged environmental degradation of the site of one of our mines, as well as the immediate restoration of the affected ecological complex and the performance of compensatory environmental

programs in the region. The damages sought, as adjusted from the date of the claim, amount to approximately R\$5.673 billion. An expert report favorable to Vale has been issued, but the court granted the municipality's request for additional expert evidence. The preparation of this additional expert evidence is pending. Both parties agreed to suspend the action until the presentation of an expert report, and to reconvene to discuss a potential settlement after such expert report is presented.

In the second action, filed in September 1996, the municipality of Itabira claims the right to be reimbursed for expenses it has incurred in connection with public services rendered as a consequence of our mining activities. The damages sought, as adjusted from the date of the claim, amount to approximately R\$6.7 billion. This proceeding was suspended for a settlement negotiation, but has resumed its normal course as the parties have not reached an agreement, and the evidence production phase will follow. We believe these suits are without merits and will continue to vigorously contest them.

MINISTRY OF LABOR PROCEEDING

In February 2015, following an inspection in the facilities of a company that provided transportation services to us between our mines Mina do Pico and Mina de Fábrica in the state of Minas Gerais, the Ministry of Labor determined that this transportation company had failed to comply with certain obligations relating to health, safety, overtime and other labor matters. By adopting a broad interpretation of the law, the Ministry of Labor concluded that its employees were working in conditions similar to slavery. Upon learning of the findings, we promptly remediated the problems and we eventually terminated the agreement with the transportation company. Nevertheless, the Ministry of Labor commenced two administrative proceedings against us, one alleging illegal outsourcing and another alleging that the illegally outsourced employees were working in conditions similar to slavery. In December 2018, the regional labor court upheld Vale's annulment action and confirmed that the outsourcing of the transportation services in this case was lawful. However, in March 2019 the courts confirmed administrative decision that determined that we had employees in conditions similar to slavery. We appealed this decision and will continue to vigorously contest this action.

OTHER ENVIRONMENTAL CRIMINAL PROCEEDINGS

- In February 2019, public prosecutors of the State of Maranhão (*Ministério Público do Estado do Maranhão*—"MPMA") commenced an environmental criminal proceeding against Vale S.A. and certain of our former executive officers before a criminal court in the city of São Luis, for alleged discharges of iron ore particles in the atmosphere in 2011. We submitted our preliminary defense in April 2019, and a decision is pending. If the court rejects our preliminary defense, we will submit our defense on the merits of the case. If eventually we are convicted in this proceeding, we may be required to pay fines. In October 2020 our former executive officers was excluded from the proceeding. This proceeding is in an early stage, and we cannot reasonably estimate the timing for a decision on the merits. We will continue to vigorously contest this action.
- In May 2020, public prosecutors of the State of Minas Gerais (*Ministério Público do Estado de Minas Gerais*—"MPMG") presented criminal charges against us and one of our employees alleging that we have committed environmental crimes through an environmental intervention carried out in our mineral development center located in the city of Santa Luzia, state of Minas Gerais, without legal authorization, which led to the suppression of seventy-one tree specimens. The criminal charges were accepted by the court in June 2020, and we submitted our written defenses. We believe this proceeding is without merit and we will vigorously contest this action.

PUBLIC CIVIL ACTION RELATED TO THE STELLAR BANNER VESSEL

In February 2020, a vessel owned and operated by the South Korean company Polaris Shipping suffered damage and run aground after leaving the Ponta da Madeira Maritime Terminal, in the state of Maranhão, loaded with approximately 295 Mt of iron ore produced by us. We supported the ship owner with technical-operational and preventive measures to safely remove the fuel and iron ore cargo from the vessel. Despite all efforts during the salvage operation, the damage to the structure of the vessel was too severe and with the approval by the Brazilian maritime authority and the Federal Environmental Agency (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis*—IBAMA) the bulk carrier was sunk in June 2020 together with a small part of the cargo that could not be removed from the ship. Although the sinking of the vessel proceeded as planned, in December 2020 the MPF filed a public civil action against us seeking compensation for alleged environmental damage resulting from the incident and reimbursement of the expenses incurred by public authorities in connection with the salvage operation. We are currently waiting for summons to present our defense. As this proceeding is in an early stage, we cannot reasonably estimate its impact.

CLAIMS INVOLVING OUR PARTICIPATING DEBENTURES (DEBENTURES PARTICIPATIVAS)

Our participating debentures are governed by a debenture deed, which provides that premium payments are due once sales volumes at reference assets attain specified thresholds. We have made all payments in compliance with applicable provisions of the debenture deed and the privatization prospectus (edital). Certain holders of our participating debentures have brought claims against us, alleging that premium payments should have been triggered by production volumes, rather than sales volumes. If successful, these claims would affect the timing of premium payments, and may require us to recognize one-time payments to the claimants based on the initial premium payments that were allegedly owed and not paid. The value of the claims asserted to date has been immaterial to our financial condition. We believe that these claims are meritless, and do not recognize any obligation to make premium payments prior to the time specifically provided by the debenture deed. We have in the past, and intend to continue to, vigorously defend our position with respect to these claims through all available means.

TAX PROCEEDINGS

We and our subsidiaries are defendants in numerous tax proceedings. The most significant proceedings are discussed below. Except as otherwise noted, the amounts stated below are the total amounts claimed under the proceedings (including remote, possible and probable losses), stated as of December 31, 2020. We recognize provisions for probable losses, for which a reliable estimate can be made, based on reports and technical assessments and on management's assessment. See note 26 to our consolidated financial statements for further information.

a) CFEM-related proceedings

We are engaged in numerous administrative and judicial proceedings related to the mining royalty known as CFEM. For more information about CFEM, see *Information on the Company—Regulatory matters—Royalties and other taxes on mining activities*. These proceedings arise from assessments by the ANM (former "DNPM"), which main discussions involve the deduction of taxes, insurance and transportation costs indicated in the corresponding invoice of CFEM payments, in addition to CFEM charges on pellet sales and the revenues from sales made by our foreign subsidiaries. The aggregate amount claimed in the pending assessments is approximately R\$11.1 billion, including interest and penalties through December 31, 2020.

We are contesting these claims using all the available means under Brazilian law, including challenges in administrative tribunals and in the judicial courts. We have received some favorable and unfavorable decisions, and such decisions have not yet become final.

The ANM's assessments were initially based on the interpretation that the applicable statute of limitation for CFEM claims would be 20 years. We challenged all the assessments, contending that these claims were subject to a 5-year statute of limitation. In December 2015, the Attorney General's Office issued a legal opinion concluding that CFEM claims are subject to a 10-year statute of limitations, consistent with the decisions of the Superior Court of Justice (*Superior Tribunal de Justiça*—"STJ"). The ANM then conducted a review of the charges and, in April 2020, informed us of the exclusion of charges that are time barred according to the Attorney General's Office's opinion, and of the deduction of amounts that had already been paid by us. We have submitted our manifestation regarding the amounts indicated by the ANM.

b) ICMS tax assessments and legal proceedings

We are engaged in several administrative and court proceedings relating to charges of value-added tax on services and circulation of goods ("ICMS") and related penalties by the tax authorities of different Brazilian states. In these proceedings, the main allegations of the tax authorities are: (i) undue crediting of ICMS; (ii) failure to comply with certain accessory obligations; (iii) incidence of ICMS on electricity purchases, (iv) requirement to pay ICMS/DIFAL (an ICMS supplemental tax rate) in connection with goods that are brought into the State of Pará, and (v) ICMS incidence on our own transportation activities. As of December 31, 2020, the aggregate amount claimed in these proceedings was R\$4.3 billion.

Regarding the transportation of the iron ore, the tax authorities of the State of Minas Gerais contend that we should have paid ICMS and penalties. We understand that ICMS is not applicable to this activity because the ore is transported by us to our own facilities. In December 2018, the judicial court issued a final decision in our favor with respect to the tax assessment covering activities in 2009 and 2010 in an aggregate amount of R\$632 million. With respect to activities in 2011, 2012 and 2013, the amount in dispute is R\$1.1 billion (included in the amount mentioned above). The State of Minas Gerais has filed appeals which are pending judgement in superior courts. We also expect a favorable outcome in this case.

There is a criminal proceeding involving former officers of our subsidiary MBR, alleging the practice of ICMS tax evasion with respect to ore re-sieving activity in MBR port facilities. We have already presented our defense and a decision is pending. We believe that the allegations are without merit.

c) Litigation on Brazilian taxation of foreign subsidiaries

We are engaged in legal proceedings concerning the contention of the Brazilian federal government that we should pay Brazilian corporate income tax (*Imposto sobre a Renda das Pessoas Jurídicas*—"IRPJ") and social contributions on the net income (*Contribuição Social sobre o Lucro Líquido*—"CSLL") on the profits of our non-Brazilian subsidiaries and affiliates.

In 2013, we significantly reduced the amount in dispute by participating in the REFIS, a federal tax settlement program for payment of amounts relating to IRPJ and CSLL. We have included in this program the charges related to the net income of our non-Brazilian subsidiaries and affiliates from 2003 to 2012. Under the REFIS, we paid R\$5.9 billion in 2013, and we have been paying the remaining R\$16.3 billion in monthly installments, bearing interest at the SELIC rate. SELIC is a variable interest rate, established by the Brazilian central bank, used to update federal tax obligations in Brazil. As of December, 31, 2020, the SELIC rate was 2.9% per annum (as compared to 5.9% per annum on December 31, 2019). As of December 31, 2020, the remaining balance was R\$13.8 billion (US\$2.6 billion), to be paid in 94 further installments.

The discussion regarding the period between 1996 to 2002, which had not been included in REFIS, was resolved in our favor in a final decision of the Federal Tax Court of the state of Rio de Janeiro. This decision determined the full cancellation of the debt in the amount of R\$2.3 billion (as of December, 2019).

In 2003, we filed for an injunction to prevent IRPJ and CSLL taxation on the profits of our subsidiaries and affiliates abroad. In 2014, the STJ issued us a favorable decision and the federal government appealed this decision. Currently, judgement by the Federal Supreme Court (*Supremo Tribunal Federal*—"STF") is pending.

d) Assessments and legal proceedings related to PIS/COFINS tax credits

We have received several tax assessments from the Brazilian federal tax authority contending that we incorrectly claimed PIS and COFINS tax credits. PIS and COFINS are taxes imposed by the Brazilian government on our gross revenues. Brazilian tax legislation allows taxpayers to use PIS and COFINS tax credits, such as those related to the acquisition of inputs for the production process and other items. Tax authorities claim, mainly, that (i) some credits were not related to the production process, and (ii) we have not submitted adequate evidence of the right to use the tax credits. We are contesting these assessments in the administrative and judicial levels. The total amount in dispute is R\$5.7 billion as of December 31, 2020.

e) Income tax litigation

In 2004, a final unappealable decision of the STJ granted us the right to deduct the amounts we had paid as CSLL from our taxable income. In 2006, the Brazilian federal government filed a rescissory action (*ação rescisória*) against us, seeking to overturn the 2004 decision. After multiple appeals, in November 2019, the Federal Court of Appeals (*Tribunal Regional Federal*—TRF) reversed the 2004 decision. Consequently, we have decided not to deduct the CSLL from our taxable income for the year 2018 and subsequent years. We have filed appeals before the superior courts, which are pending judicial decision.

In November 2020, we received an assessment in the amount of R\$2.3 billion with respect to IRPJ and penalties for the years 2016 and 2017, relating to deductions of CSLL from our taxable income. We are contesting this assessment in the administrative level, and a decision is pending. For more information on uncertain tax positions, see note 8 to our consolidated financial statements.

f) Fines resulting from the rejection of federal tax offsets

We have received multiple assessments from the Brazilian federal tax authority imposing fines resulting from the rejection by the tax authority of certain tax offsets to federal tax debts. In these cases, the tax authority alleged that these offsets were made with improper tax credits, and issued assessments imposing fines of 50% on the amount of the rejected offsets. We are challenging these assessments. We are also challenging the tax offset rejection in other administrative proceedings. If we succeed in these separate administrative proceedings, we expect the related fines to be cancelled. The legal grounds for these fines are currently being discussed by another company in a leading case before the STF, and a favorable decision to this other company will be applicable to all taxpayers, including us. As of December 31, 2020, the total amount of fines imposed under these assessments were R\$1.5 billion. We may receive new assessments.

g) Assessment related to interest on shareholders' equity

In February 2021, we received assessments for the collection of IRPJ, CSLL and penalties in the amount of R\$3.4 billion due to the rejection of the deduction of interest on shareholder's equity (*Juros sobre Capital Próprio*—"JCP") expenses from our 2017 taxable income. The tax authorities have rejected the JCP deductions on the grounds of alleged violation of the accrual basis of accounting and non-compliance with the deductibility requirements. In addition to above-mentioned collection, the tax authorities imposed a reduction of our tax losses, with a corresponding tax impact of R\$698 million, including penalties and interest. We will file an administrative appeal to challenge this assessment.

h) Transfer pricing tax assessment

We received tax assessments charging IRPJ and CSLL for the period of 2015 to 2017. Tax authorities claim that we have unduly deducted intermediation costs from the transfer pricing basis related to iron, copper and manganese sales to our foreign controlled company. We may receive similar tax assessments for other fiscal years. As of December 31, 2020, the total amount in dispute is R\$3.6 billion, in addition to the reduction of our tax losses in 2015, 2016, and 2017, with a corresponding tax impact of R\$1.88 billion, including penalties and interest. We are challenging these assessments in administrative proceedings, and a decision is pending. For more information on uncertain tax positions, see note 8 to our consolidated financial statements.

i) Proceeding related to income tax paid abroad

We are a party in an administrative proceeding charging IRPJ and CSLL in the amount of R\$2.2 billion due to the partial approval of the tax offset for the year 2016. Tax authorities allege that we have failed to comply with the applicable rules relating to the offset in Brazil of income taxes paid abroad. We believe that this charge is undue and we will present our defense.

j) Other tax proceedings

See note 26 to our consolidated financial statements for additional information about these and other tax proceedings in which we are involved, including certain administrative and judicial proceedings relating to the collection of ISS by Brazilian municipalities.

UPDATES ON OTHER PROCEEDINGS

As reported in our annual report on Form 20-F for prior years, we were a party in a putative class action on behalf of holders of our ADRs in the United States related to the failure of Samarco's Fundão dam. In February 2020, the parties submitted a motion to the court to approve a proposed stipulation settlement agreement, and in June 2020, the court approved the settlement.

BYLAWS

COMPANY OBJECTIVES AND PURPOSES

Our corporate purpose is defined by our bylaws to include:

- the exploration of mineral deposits in Brazil and abroad by means of research, extraction, processing, industrialization, transportation, shipment and commerce of mineral goods;
- the building and operation of railways and the provision of our own or unrelated-party rail traffic;
- the building and operation of our own or unrelated-party maritime terminals, and the provision of shipping activities and port services;
- the provision of logistics services integrated with cargo transport, including inflow management, storage, transshipment, distribution and delivery, all within a multimodal transport system;
- the production, processing, transport, industrialization and commercialization of any and all sources and forms of energy, including the production, generation, transmission, distribution and commercialization of our own products, derivatives and sub products;
- engagement, in Brazil or abroad, in other activities that may be of direct or indirect consequence for the achievement of our corporate purposes, including research, industrialization, purchases and sales, importation and exportation, the development, industrialization and commercialization of forest resources and the provision of services of any kind whatsoever; and
- the establishment or participation, in any fashion, in other companies, consortia or associations directly or indirectly related to our business purpose.

COMMON SHARES AND GOLDEN SHARES

Set forth below is certain information concerning our authorized and issued share capital and a brief summary of certain significant provisions of our bylaws and Brazilian corporate law. This description does not purport to be complete and is qualified by reference to our bylaws (an English translation of which we have filed with the SEC) and to Brazilian corporate law.

Our bylaws authorize the issuance of up to 7 billion common shares based solely on the approval of the Board of Directors without any additional shareholder approval.

The Brazilian government holds 12 golden shares of Vale. Our bylaws do not provide for the conversion of golden shares into common shares. In addition, the golden shares do not have any preference upon our liquidation and there are no redemption provisions associated with the golden shares.

Voting Rights

The golden shares are preferred shares that entitle the holder to veto any proposed action relating to the following matters:

- a change in our name;

- a change in the location of our head office;
- a change in our corporate purpose as regards mining activities;
- any liquidation of the Company;
- any disposal or winding up of activities in any of the following parts of our iron ore mining integrated systems: mineral deposits, ore deposits, mines, railways, or ports and maritime terminals;
- any change in the bylaws relating to the rights afforded to the classes of capital stock issued by us; and
- any change in the bylaws relating to the rights afforded the golden shares.

Under Brazilian corporate law and applicable CVM regulations, minority shareholders representing at least 5% of our voting capital have the right to demand that a cumulative voting procedure be applied in any specific shareholder's meeting. When cumulative voting is applied, each common share has as many votes as there are board members and each holder of common shares has the right to cast all of its vote on one candidate of our Board of Directors or to distribute its votes among several candidates.

See—*Shareholders' meetings* below for more information on the exercise of the voting rights of each share.

Shareholders' meetings

Our Ordinary General Shareholders' Meeting is convened by April of each year for shareholders to resolve upon our financial statements, distribution of profits, election of Directors and Fiscal Council Members, if necessary, and compensation of senior management. Extraordinary General Shareholders' Meetings are convened by the Board of Directors as necessary in order to decide all other matters relating to our corporate purposes and to pass such other resolutions as may be necessary.

Pursuant to Brazilian corporate law, shareholders voting at a general shareholders' meeting have the power, among other powers, to:

- amend the bylaws;
- elect or dismiss members of the Board of Directors and members of the Fiscal Council at any time;
- establish the remuneration of senior management and members of the Fiscal Council;
- receive annual reports by management and accept or reject management's financial statements and recommendations including the allocation of net profits and the distributable amount for payment of the mandatory dividend and allocation to the various reserve accounts;
- authorize the issuance of convertible and secured debentures;

- suspend the rights of a shareholder in default of obligations established by law or by the bylaws;
- accept or reject the valuation of assets contributed by a shareholder in consideration for issuance of capital stock;
- pass resolutions to reorganize our legal form, to merge, consolidate or split us, to dissolve and liquidate us, to elect and dismiss our liquidators and to examine their accounts; and
- authorize management to file for bankruptcy or to request a judicial restructuring.

Pursuant to CVM recommendations, all general shareholders' meetings, including the annual shareholders' meeting, require no fewer than 30 days' notice to shareholders prior to the scheduled meeting date. Where any general shareholders' meeting is adjourned, 8 days' prior notice to shareholders of the reconvened meeting is required. Pursuant to Brazilian corporate law, this notice to shareholders is required to be published no fewer than three times, in the *Diário Oficial do Estado do Rio de Janeiro* and in a newspaper with general circulation in the city where we have our registered office, in Rio de Janeiro—*Valor Econômico—Estado do Rio de Janeiro* is the newspaper currently designated for this purpose. Such notice must contain the agenda for the meeting and, in the case of an amendment to our bylaws, an indication of the meeting's subject matter. In addition, under our bylaws, the holder of the golden shares is entitled to a minimum of 15 days' prior formal notice to its legal representative of any general shareholders' meeting to consider any proposed action subject to the veto rights accorded to the golden shares.

A shareholders' meeting may be held if shareholders representing at least one-quarter of the voting capital are present, except, subject to other exceptions, for meetings convened to amend our bylaws, which require a quorum of at least two-thirds of the voting capital. If no such quorum is present, notice must again be given in the same manner described above, and a meeting may then be convened without any specific quorum requirement, subject to the minimum quorum and voting requirements for certain matters, as discussed below.

Except as otherwise provided by law, resolutions of a shareholders' meeting are passed by a simple majority vote, abstentions not being taken into account. Under Brazilian corporate law, the approval of shareholders representing at least one-half of the issued and outstanding voting shares is required for the types of action described below, as well as, in the case of the first two items below, a majority of issued and outstanding shares of the affected class:

- creating a new class of preferred shares with greater privileges than the golden shares or changing a priority, preference, right, privilege or condition of redemption or amortization of the golden shares;
- reducing the mandatory dividend;
- changing the corporate purposes;
- merging us with another company or consolidating or splitting us;
- participating in a centralized group of companies as defined under Brazilian corporate law;
- dissolving or liquidating us; and

- canceling any ongoing liquidation of us.

Whenever the shares of any class of capital stock are entitled to vote, each share is entitled to one vote. Annual shareholders' meetings must be held by April 30 of each year. Shareholders' meetings are called, convened and presided over by the chairperson or, in case of his absence, by the vice-chairperson of our Board of Directors. In the case of temporary impediment or absence of the chairperson or vice-chairperson of the Board of Directors, the shareholders' meetings may be chaired by a director or other person especially appointed by the chairperson of the Board of Directors.

A shareholder may be represented at a general shareholders' meeting by a proxy appointed in accordance with applicable Brazilian law not more than one year before the meeting, who must be a shareholder, a company officer, a lawyer or a financial institution. If the proxy document is in a foreign language, it must be accompanied by corporate documents or a power of attorney, as applicable, each duly translated into Portuguese by a sworn translator. Notarization and consularization of proxies and supporting documents is not required. Proxies and supporting documents in English or Spanish do not require translation.

Holders of our ADRs are not entitled to vote directly in our shareholders meetings. Holders of ADRs should exercise their voting right pursuant to the depositary agreement. For more information see *Exhibit 2* to this annual report.

Redemption rights

Our common shares and golden shares are not redeemable, except that a dissenting shareholder is entitled under Brazilian corporate law to obtain redemption upon a decision made at a shareholders' meeting approving any of the items listed above, as well as:

- any decision to transfer all of our shares to another company in order to make us a wholly owned subsidiary of such company, a stock merger;
- any decision to approve the acquisition of control of another company at a price which exceeds certain limits set forth in Brazilian corporate law; or
- in the event that the entity resulting from (i) a merger, (ii) a stock merger as described above or (iii) a spin-off that we conduct fails to become a listed company within 120 days of the general shareholders' meeting at which such decision was taken.

The right of redemption triggered by shareholder decisions to merge, consolidate or to participate in a centralized group of companies may only be exercised if our shares do not satisfy certain tests of liquidity, among others, at the time of the shareholder resolution. The right of redemption lapses 30 days after publication of the minutes of the relevant general shareholders' meeting, unless the resolution is subject to confirmation by the holder of golden shares (which must be made at a special meeting to be held within one year), in which case the 30-day term is counted from the publication of the minutes of the special meeting.

We would be entitled to reconsider any action giving rise to redemption rights within 10 days following the expiration of such rights if the redemption of shares of dissenting shareholders would jeopardize our financial stability. Any redemption pursuant to Brazilian corporate law would be made at no less than the book value per share, determined on the basis of the last balance sheet approved by the shareholders; provided that if the general shareholders' meeting giving rise to redemption rights occurred more than 60 days after the date of the last approved balance sheet, a shareholder would be entitled to demand that

his or her shares be valued on the basis of a new balance sheet dated within 60 days of such general shareholders' meeting.

Preemptive rights

Each of our shareholders has a general preemptive right to subscribe for shares in any capital increase, in proportion to his or her shareholding. A minimum period of 30 days following the publication of notice of a capital increase is assured for the exercise of the right, and the right is transferable. Under our bylaws and Brazilian corporate law, and subject to the requirement for shareholder approval of any necessary increase to our authorized share capital, our Board of Directors may decide not to extend preemptive rights to our shareholders, or to reduce the 30-day period for the exercise of preemptive rights, in each case with respect to any issuance of shares, debentures convertible into shares or warrants in the context of a public offering.

Tag-along rights and mandatory tender offers

In accordance with Novo Mercado listing rules and our bylaws:

- in case of a transfer of control, the purchaser must conduct a tender offer to purchase any and all of our common shares for the same price paid for the voting shares representing control;
- in case of a proposed delisting from the Novo Mercado segment of B3, the controlling shareholder must conduct a public offer to acquire any and all of our common shares for a price corresponding to the economic value of the shares, as determined in an independent appraisal valuation; and
- any shareholder who acquires 25% of our outstanding capital stock must, within 30 days after the date in which such shareholder achieved the 25% stake, make a tender offer for any and all of our common shares (*oferta pública para aquisição*) for a price equal to the greatest of (i) the economic value of the shares, (ii) 120% of the weighted average price of our common shares in the 60 trading days preceding the announcement of the tender offer and (iii) 120% of the highest price paid by the purchaser in the 12 months before achieving the 25% stake.

Calculation of distributable amount

At each Annual shareholders' meeting, the Board of Directors is required to recommend, based on the executive officers' proposal, how to allocate our earnings for the preceding fiscal year. For purposes of Brazilian corporate law, a company's net income after income taxes and social contribution taxes for such fiscal year, net of any accumulated losses from prior fiscal years and amounts allocated to employees' and management's participation in earnings represents its "net profits" for such fiscal year. In accordance with Brazilian corporate law, an amount equal to our net profits, as further reduced by amounts allocated to the legal reserve, to the fiscal incentive investment reserve, to the contingency reserve or to the unrealized income reserve established by us in compliance with applicable law (discussed below) and increased by reversals of reserves constituted in prior years, is available for distribution to shareholders in any given year. Such amount, the adjusted net profits, is referred to herein as the distributable amount. We may also establish discretionary reserves, such as reserves for investment projects.

Brazilian corporate law provides that all discretionary allocations of net profits, including discretionary reserves, the contingency reserve, the unrealized income reserve and the reserve for investment projects, are subject to approval by the shareholders voting at the annual meeting and can be transferred to capital or used for the payment of dividends in subsequent years. The fiscal incentive investment reserve and legal reserve are also subject to approval by the shareholders voting at the annual meeting and may be transferred to capital but are not available for the payment of dividends in subsequent years.

The sum of certain discretionary reserves may not exceed the amount of our paid-in capital. When such limit is reached, our shareholders may vote to use the excess to pay in capital, increase capital or distribute dividends.

Our calculation of net profits and allocations to reserves for any fiscal year are determined on the basis of the unconsolidated financial statements of our parent company, Vale S.A., in *reais*, prepared in accordance with Brazilian corporate law. Our consolidated financial statements have been prepared in accordance with IFRS using U.S. dollars as the reporting currency and, although our allocations to reserves and dividends will be reflected in these financial statements, investors will not be able to calculate such allocations or required dividend amounts from our consolidated financial statements in U.S. dollars.

Mandatory dividend

The Brazilian corporate law and our bylaws require us to distribute to our shareholders, in the form of dividends or interest on shareholders' equity, an annual amount equal to not less than 25% of the distributable amount, referred to as the mandatory dividend, unless the Board of Directors advises our shareholders at our general shareholders' meeting that payment of the mandatory dividend for the preceding year is not advisable in light of our financial condition. To date, our Board of Directors has never determined that payment of the mandatory dividend was not advisable. The Fiscal Council must review any such determination and report it to the shareholders. In addition to the mandatory dividend, our Board of Directors may recommend to the shareholders payment of dividends from other funds legally available therefore. Any payment of interim dividends will be netted against the amount of the mandatory dividend for that fiscal year. The shareholders must also approve the recommendation of the Board of Directors with respect to any required distribution. The amount of the mandatory dividend is subject to the size of the legal reserve, the contingency reserve, and the unrealized income reserve. The amount of the mandatory dividend is not subject to the size of the discretionary tax incentive reserve. See *Additional Information—Bylaws—Common shares and golden shares—Calculation of distributable amount*.

Distributions classified as interest on shareholders' equity

Brazilian companies are permitted to pay limited amounts to shareholders and treat such payments as an expense for Brazilian income tax purposes. Our bylaws provide for the distribution of interest on shareholders' equity as an alternative form of payment to shareholders. The interest rate applied is limited to the Brazilian long-term interest rate, or TJLP, for the applicable period. The deduction of the amount of interest paid cannot exceed the greater of (1) 50% of net income (after the deduction of the provision of social contribution on net profits and before the deduction of the provision of the corporate income tax) before taking into account any such distribution for the period in respect of which the payment is made or (2) 50% of the sum of retained earnings and profit reserves. Any payment of interest on shareholders' equity is subject to Brazilian withholding income tax. See *Additional Information—Taxation—Brazilian tax considerations*. Under our bylaws, the amount paid to shareholders as interest on shareholders' equity (net of any withholding tax) may be included as part of any mandatory and minimum dividend. Under Brazilian corporate law, we are obligated to distribute to shareholders an amount sufficient to ensure that the net amount received, after payment by us of applicable Brazilian withholding

taxes in respect of the distribution of interest on shareholders' equity, is at least equal to the mandatory dividend.

Form and transfer of shares

Our common shares and golden shares are in book-entry form registered in the name of each shareholder. The transfer of such shares is made under Brazilian corporate law, which provides that a transfer of shares is effected by our transfer agent, Banco Bradesco, upon presentation of valid share transfer instructions to us by a transferor or its representative. When common shares are acquired or sold on a Brazilian stock exchange, the transfer is effected on the records of our transfer agent by a representative of a brokerage firm or the stock exchange's clearing system. Transfers of shares by a foreign investor are made in the same way and are executed by the investor's local agent, who is also responsible for updating the information relating to the foreign investment furnished to the Central Bank of Brazil.

The B3 operates a central clearing system through *Companhia Brasileira de Liquidação e Custódia*, or CBLC. A holder of our shares may participate in this system and all shares elected to be put into the system will be deposited in custody with CBLC (through a Brazilian institution that is duly authorized to operate by the Central Bank of Brazil and maintains a clearing account with CBLC). The fact that such shares are subject to custody with the relevant stock exchange will be reflected in our registry of shareholders. Each participating shareholder will, in turn, be registered in the register of our beneficial shareholders that is maintained by CBLC and will be treated in the same way as registered shareholders.

PARTICIPATING DEBENTURES

At the time of the first stage of our privatization in 1997, we issued Brazilian law governed debentures known in Brazil as "*debêntures participativas*" to our then-existing shareholders. The terms of the debentures were established to ensure that our pre-privatization shareholders, including the Brazilian government, would participate alongside us in potential future financial benefits that we derive from exploiting certain mineral resources that were not taken into account in determining the minimum purchase price of our shares in the privatization. In accordance with the debentures deed, holders have the right to receive semi-annual payments equal to an agreed percentage of our net revenues (revenues less value-added tax, transport fee and insurance expenses related to the trading of the products) from certain identified mineral resources that we owned at the time of the privatization, to the extent that we exceed defined thresholds of sales volume relating to certain mineral resources, and from the sale of mineral rights that we owned at that time. Our obligation to make payments to the holders will cease when all the relevant mineral resources are exhausted, sold or otherwise disposed of by us.

We made available for withdrawal by holders of participating debentures US\$183 million in 2020, US\$ 194 million in 2019 and US\$ 148 million in 2018. See note 21 to our consolidated financial statements for a description of the terms of the debentures.

In our annual report on Form 20-F for prior years, we referred to the participating debentures as "shareholder debentures", and in our consolidated financial statements as "participative stockholders' debentures."

EXCHANGE CONTROLS AND OTHER LIMITATIONS AFFECTING SECURITY HOLDERS

Under Brazilian corporate law, there are no restrictions on ownership of our capital stock by individuals or legal entities domiciled outside Brazil. However, the right to convert dividend payments and proceeds from the sale of common shares into foreign currency and to remit such amounts outside Brazil is subject to restrictions under foreign investment legislation, which generally requires, among other things, that the relevant investment be registered with the Central Bank of Brazil. These restrictions on the remittance of foreign capital abroad could hinder or prevent the depositary bank and its agents for the common shares represented by ADSs from converting dividends, distributions or the proceeds from any sale of common shares or rights, as the case may be, into U.S. dollars and remitting such amounts abroad. Delays in, or refusal to grant any required government approval for conversions of Brazilian currency payments and remittances abroad of amounts owed to holders of ADSs could adversely affect holders of ADRs.

Under CMN Resolution 4,373 of 2014 (“Resolution 4,373”), foreign investors, defined to include individuals, legal entities, mutual funds and other collective investment entities, domiciled or headquartered outside Brazil, may invest in almost all financial assets and engage in almost all transactions available in the Brazilian financial and capital markets, provided that they:

- i. appoint at least one representative in Brazil, with powers to perform actions relating to its investment,
- ii. complete the appropriate foreign investor registration form,
- iii. register as a foreign investor with the CVM, and register its foreign investment with the Central Bank of Brazil, and
- iv. appoint a custodian, duly licensed by the Central Bank of Brazil, if the Brazilian representative in item (i) is not a financial institution.

Resolution 4,373 specifies the manner of custody and the permitted means for trading securities held by foreign investors under the resolution. The offshore transfer or assignment of securities or other financial assets held by foreign investors pursuant to Resolution 4,373 is prohibited, except for transfers resulting from a corporate reorganization, or occurring upon the death of an investor by operation of law or will.

Resolution 4,373 also provides for the issuance of depositary receipts in foreign markets in respect of shares of Brazilian issuers. It provides that the proceeds from the sale of ADSs by holders of ADRs outside Brazil are not subject to Brazilian foreign investment controls and holders of ADSs who are not residents of a low-tax jurisdiction (*país com tributação favorecida*), as defined by Brazilian law, will be entitled to favorable tax treatment.

An electronic registration has been issued to the custodian in the name of the depositary with respect to the ADSs. Pursuant to this electronic registration, the custodian and the depositary are able to convert dividends and other distributions with respect to the underlying shares into foreign currency and to remit the proceeds outside Brazil. If a holder exchanges ADSs for common shares, the holder must, within five business days, seek to obtain its own electronic registration with the Central Bank of Brazil under Law 4,131 of 1962 and Resolution 4,373. Thereafter, unless the holder has registered its investment with the Central Bank of Brazil, such holder may not convert into foreign currency and remit outside Brazil the proceeds from the disposition of, or distributions with respect to, such common shares.

Under Brazilian law, whenever there is a serious imbalance in Brazil’s balance of payments or reasons to foresee a serious imbalance, the Brazilian government may impose temporary restrictions on the

Exchange Controls and Other Limitations Affecting Security Holders

remittance to foreign investors of the proceeds of their investments in Brazil, and on the conversion of Brazilian currency into foreign currencies. Such restrictions may hinder or prevent the custodian or holders who have exchanged ADSs for underlying common shares from converting distributions or the proceeds from any sale of such shares, as the case may be, into U.S. dollars and remitting such U.S. dollars abroad. In the event the custodian is prevented from converting and remitting amounts owed to foreign investors, the custodian will hold the *reais* it cannot convert for the account of the holders of ADRs who have not been paid. The depositary will not invest the *reais* and will not be liable for interest on those amounts. Any *reais* so held will be subject to devaluation risk against the U.S. dollar.

TAXATION

The following summary contains a description of the principal Brazilian and U.S. federal income tax consequences of the ownership and disposition of common shares or ADSs. You should know that this summary does not purport to be a comprehensive description of all the tax considerations that may be relevant to a holder of common shares or ADSs.

Holders of common shares or ADSs should consult their own tax advisors to discuss the tax consequences of the purchase, ownership and disposition of common shares or ADSs, including, in particular, the effect of any state, local or other national tax laws.

Although there is at present no treaty to avoid double taxation between Brazil and the United States, both countries' tax authorities have been having discussions that may result in the execution of such a treaty. In this regard, the two countries signed a Tax Information Exchange Agreement on March 20, 2007, which the Brazilian government approved in May 2013. We cannot predict whether or when such a treaty will enter into force or how, if entered into, such a treaty will affect the U.S. holders, as defined below, of common shares or ADSs.

BRAZILIAN TAX CONSIDERATIONS

The following discussion summarizes the principal Brazilian tax consequences of the acquisition, ownership and disposition of common shares or ADSs by a holder not deemed to be domiciled in Brazil for purposes of Brazilian taxation ("Non-Resident Holder"). It is based on the tax laws of Brazil and regulations thereunder in effect on the date hereof, which are subject to change (possibly with retroactive effect). This discussion does not specifically address all of the Brazilian tax considerations applicable to any particular Non-Resident Holder. Therefore, Non-Resident Holders should consult their own tax advisors concerning the Brazilian tax consequences of an investment in common shares or ADSs.

Shareholder distributions

For Brazilian corporations, such as Vale, distributions to shareholders are classified as either dividend or interest on shareholders' equity.

Dividends

Amounts distributed as dividends will generally not be subject to Brazilian withholding income tax if the distribution is paid only from profits for the corresponding year, as determined under Brazilian tax principles. Dividends paid from profits generated before January 1, 1996 may be subject to Brazilian withholding income tax at varying rates depending on the year the profits were generated. Dividends paid from sources other than profits as determined under Brazilian tax principles may be subject to withholding tax.

Interest on shareholders' equity

Amounts distributed as interest on shareholders' equity are generally subject to withholding income tax at the rate of 15%, except where:

- i. the beneficiary is exempt from tax in Brazil, in which case the distribution will not be subject to withholding income tax;
- ii. the beneficiary is located in a jurisdiction that does not impose income tax or where the maximum income tax rate is lower than 17% (a "Low Tax Jurisdiction") or where internal

legislation imposes restrictions on the disclosure of the shareholding structure or the ownership of the investment, as listed by the Brazilian federal tax authority in which case the applicable withholding income tax rate is 25%; or

- iii. the effective beneficiary is resident in Japan, in which case the applicable withholding income tax rate is 12.5%.

Interest on shareholders' equity is calculated as interest rate on the sum of the following accounts: (i) share capital, (ii) capital reserves, (iii) profits reserves, (iv) treasury stocks and (v) accumulated losses. The interest rate applied may not exceed the TJLP, the benchmark Brazilian long-term interest rate. In addition, the amount of distributions classified as interest on shareholders' equity may not be more than the greater of (1) 50% of net income (after the deduction of social contribution on net profits but before taking into account such payment of interest and the provision for corporate income tax) for the period in respect of which the payment is made and (2) 50% of the sum of retained earnings and profit reserves.

Payments of interest on shareholders' equity are deductible for the purposes of corporate income tax and social contribution on net profit, to the extent of the limits described above. The tax benefit to the Company in the case of a distribution by way of interest on shareholders' equity is a reduction in the Company's corporate tax charge by an amount equivalent to 34% of such distribution.

Taxation of capital gains

Taxation of Non-Resident Holders on capital gains depends on the status of the holder as either:

- (i) a holder that is not resident or domiciled in a Low Tax Jurisdiction, or in a jurisdiction where internal legislation imposes restrictions on the disclosure of shareholding structure or the ownership of the investment, and that has registered its investment in Brazil in accordance with Resolution 4,373 (a "4,373 Holder"), or (ii) a holder of ADSs; or
- any other Non-Resident Holder.

Investors identified in items (i) or (ii) are subject to favorable tax treatment, as described below.

Capital gains realized by a Non-Resident Holder from the disposition of "assets located in Brazil" are subject to taxation in Brazil. Common shares qualify as assets located in Brazil, and the disposition of such assets by a Non-Resident Holder may be subject to income tax on the gains assessed, in accordance with the rules described below, regardless of whether the transaction is carried out with another non-Brazilian resident or with a Brazilian resident.

There is some uncertainty as to whether ADSs qualify as "assets located in Brazil" for this purpose. Arguably, the ADSs do not constitute assets located in Brazil and therefore the gains realized by a Non-Resident Holder on the disposition of ADSs to another non-Brazilian resident should not be subject to income tax in Brazil. However, it is not certain that the Brazilian courts will uphold this interpretation of the definition of "assets located in Brazil" in connection with the taxation of gains realized by a Non-Resident Holder on the disposition of ADSs. Consequently, gains on a disposition of ADSs by a Non-Resident Holder (whether in a transaction carried out with another Non-Resident Holder or a person domiciled in Brazil) may be subject to income tax in Brazil in accordance with the rules applicable to a disposition of shares.

Although there are arguments to the contrary, the deposit of common shares in exchange for ADSs may be subject to Brazilian income tax if the acquisition cost of the shares being deposited is lower than the average price, determined as either:

- the average price per common share on the Brazilian stock exchange in which the greatest number of such shares were sold on the day of deposit; or
- if no common shares were sold on that day, the average price on the Brazilian stock exchange in which the greatest number of common shares were sold in the 15 trading sessions immediately preceding such deposit.

The positive difference between the average price of the common shares calculated as described above and their acquisition cost will be considered to be a capital gain subject to income tax in Brazil. In some circumstances, there are grounds to conclude that such taxation is not applicable with respect to any 4,373 Holder, provided such holder is not located in a Low Tax Jurisdiction.

The withdrawal of common shares by holders in exchange for ADSs is not subject to Brazilian income tax, subject to compliance with applicable regulations regarding the registration of the investment with the Central Bank of Brazil.

For the purpose of Brazilian taxation, the income tax rules on gains related to disposition of common shares vary depending on:

- the domicile of the Non-Resident Holder;
- the method by which such Non-Resident Holder has registered his investment with the Central Bank of Brazil; and
- how the disposition is carried out, as described below.

The gain realized as a result of a transaction on a Brazilian stock exchange is the difference between: (i) the amount in Brazilian currency realized on the sale or disposition and (ii) the acquisition cost, without any adjustment for inflation, of the securities that are the subject of the transaction.

Under the applicable rules, any gain realized by a Non-Resident Holder on a sale or disposition of common shares carried out on the Brazilian stock exchange is:

- exempt from income tax where the Non-Resident Holder (i) is a 4,373 Holder; and (ii) is not located in a Low Tax Jurisdiction;
- subject to income tax at a rate of 15% where the Non-Resident Holder (i) is not a 4,373 Holder and (ii) is not resident or domiciled in a Low Tax Jurisdiction; or
- subject to income tax at a rate of 25% where the Non-Resident Holder (i) is not a 4,373 Holder and (ii) is resident or domiciled in a Low Tax Jurisdiction.

The above summary applies to different investment scenarios. The understanding of tax authorities may change from time to time and you should consult your tax advisors with regard to the application of the rates to your specific case.

The sale or disposition of common shares carried out on the Brazilian stock exchange is subject to withholding tax at the rate of 0.005% on the sale value. This withholding tax can be offset against the eventual income tax due on the capital gain. A 4,373 Holder that is not resident or domiciled in a Low Tax Jurisdiction is not subject to this withholding tax.

Since January 1, 2017, the capital gains realized by Non-Residents Holders and individuals resident in Brazil are subject to income tax (i) at progressive rates ranging from 15% to 22.5%, where the Non-Resident Holder is not a 4,373 Holder and is not resident or domiciled in a Low Tax Jurisdiction or (ii) at a rate of 25% where the Non-Resident Holder is resident or domiciled in a Low Tax Jurisdiction.

With respect to transactions arranged by a broker that are conducted on the Brazilian non-organized over-the-counter market, a withholding income tax at a rate of 0.005% on the sale value is levied on the transaction and can be offset against the eventual income tax due on the capital gain.

In the case of a redemption of common shares or ADSs or a capital reduction by a Brazilian corporation, the positive difference between the amount received by any Non-Resident Holder and the acquisition cost of the common shares or ADSs being redeemed is treated as capital gain and is therefore generally subject to income tax at the progressive rate from 15% to 22.5%, while the 25% rate applies to residents in a Low Tax Jurisdiction.

Any exercise of pre-emptive rights relating to our common shares will not be subject to Brazilian taxation. Any gain realized by a Non-Resident Holder on the disposition of pre-emptive rights relating to common shares in Brazil will be subject to Brazilian income taxation in accordance with the same rules applicable to the sale or disposition of common shares.

Tax on foreign exchange and financial transactions

Foreign exchange transactions

Brazilian law imposes a tax on foreign exchange transactions, or an IOF/Exchange Tax, due on the conversion of *reais* into foreign currency and on the conversion of foreign currency into *reais*. Currently, for most foreign currency exchange transactions, the rate of IOF/Exchange Tax is 0.38%.

The outflow of resources from Brazil related to investments held by a Non-Resident Holder in the Brazilian financial and capital markets is currently subject to IOF/Exchange Tax at a zero percent rate. In any case, the Brazilian government may increase such rates at any time, up to 25%, with no retroactive effect.

Transactions involving securities

Brazilian law imposes a tax on transactions involving securities, or an IOF/Securities Tax, including those carried out on the Brazilian stock exchange. The rate of IOF/Securities Tax applicable to transactions involving publicly traded securities in Brazil is currently zero. The rate of IOF/Securities Tax applicable to a transfer of shares traded on the Brazilian stock exchange to back the issuance of depositary receipts has also been zero since December 24, 2013. However, the Brazilian Government may increase such rates at any time up to 1.5% of the transaction amount per day, but the tax cannot be applied retroactively.

Other Brazilian taxes

There are no Brazilian inheritance, gift or succession taxes applicable to the ownership, transfer or disposition of common shares or ADSs by a Non-Resident Holder, except for gift and inheritance taxes

which are levied by some states of Brazil on gifts made or inheritances bestowed by a Non-Resident Holder to individuals or entities resident or domiciled within such states in Brazil. There are no Brazilian stamp, issue, registration, or similar taxes or duties payable by holders of common shares or ADSs.

U.S. FEDERAL INCOME TAX CONSIDERATIONS

This summary does not purport to be a comprehensive description of all the U.S. federal income tax consequences of the acquisition, holding or disposition of the common shares or ADSs. This summary applies to U.S. holders, as defined below, who hold their common shares or ADSs as capital assets and does not apply to special classes of holders, such as:

- certain financial institutions,
- insurance companies,
- dealers in securities or foreign currencies,
- tax-exempt organizations,
- securities traders who elect to account for their investment in common shares or ADSs on a mark-to-market basis,
- persons holding common shares or ADSs as part of hedge, straddle, conversion or other integrated financial transactions for tax purposes,
- holders whose functional currency for U.S. federal income tax purposes is not the U.S. dollar,
- partnerships or other holders treated as “pass-through entities” for U.S. federal income tax purposes (or partners therein), or
- persons owning, actually or constructively through attribution rules, 10% or more of our voting shares or the total value of all classes of shares.

This discussion is based on the Internal Revenue Code of 1986, as amended to the date hereof, administrative pronouncements, judicial decisions and final, temporary and proposed Treasury Regulations, all as in effect on the date hereof. These authorities are subject to differing interpretations and may be changed, perhaps retroactively, so as to result in U.S. federal income tax consequences different from those discussed below. There can be no assurance that the U.S. Internal Revenue Service (the “IRS”) will not challenge one or more of the tax consequences discussed herein or that a court will not sustain such a challenge in the event of litigation. This summary does not address the Medicare tax on net investment income, the alternative minimum tax, U.S. federal estate and gift taxes, or any aspect of state, local or non-U.S. tax law.

YOU SHOULD CONSULT YOUR TAX ADVISORS WITH REGARD TO THE APPLICATION OF THE U.S. FEDERAL INCOME TAX LAWS TO YOUR PARTICULAR SITUATIONS AS WELL AS ANY TAX CONSEQUENCES ARISING UNDER THE LAWS OF ANY STATE, LOCAL OR NON-U.S. TAXING JURISDICTION.

This discussion is also based, in part, on representations of the depositary and the assumption that each obligation in the deposit agreement and any related agreement will be performed in accordance with its terms.

For purposes of this discussion, you are a “U.S. holder” if you are a beneficial owner of common shares or ADSs that is, for U.S. federal income tax purposes:

- a citizen or resident alien individual of the United States,
- a corporation created or organized in or under the laws of the United States or of any political subdivision thereof, or
- otherwise subject to U.S. federal income taxation on a net income basis with respect to common shares or ADSs.

The term U.S. holder also includes certain former citizens of the United States.

In general, if you are the beneficial owner of American depositary receipts evidencing ADSs, you will be treated as the beneficial owner of the common shares represented by those ADSs for U.S. federal income tax purposes. Deposits and withdrawals of common shares by you in exchange for ADSs will not result in the realization of gain or loss for U.S. federal income tax purposes. Your tax basis in such common shares will be the same as your tax basis in such ADSs, and the holding period in such common shares will include the holding period in such ADSs.

Taxation of dividends

The gross amount of a distribution paid on ADSs or common shares, including distributions paid in the form of payments of interest on capital for Brazilian tax purposes, out of our current or accumulated earnings and profits (as determined for U.S. federal income tax purposes) generally will be taxable to you as foreign source dividend income and generally will not be eligible for the dividends-received deduction allowed to corporate shareholders under U.S. federal income tax law. The amount of any such distribution will include the amount of Brazilian withholding taxes, if any, withheld on the amount distributed. To the extent that a distribution exceeds our current and accumulated earnings and profits, such distribution will be treated as a nontaxable return of capital to the extent of your basis in the ADSs or common shares, as the case may be, with respect to which such distribution is made, and thereafter as a capital gain.

We do not expect to maintain calculations of our earnings and profits in accordance with U.S. federal income tax principles. You therefore should expect that distributions generally will be treated as dividends for U.S. federal income tax purposes.

You generally will be required to include dividends paid in *reais* in income in an amount equal to their U.S. dollar value calculated by reference to an exchange rate in effect on the date such distribution is received by the depositary, in the case of ADSs, or by you, in the case of common shares. If the depositary or you do not convert such *reais* into U.S. dollars on the date they are received, it is possible that you will recognize foreign currency loss or gain, which generally would be treated as ordinary loss or gain from sources within the United States, when the *reais* are converted into U.S. dollars. If you hold ADSs, you will be considered to receive a dividend when the dividend is received by the depositary.

Subject to certain exceptions for short-term and hedged positions, the U.S. dollar amount of dividends received by certain non-corporate taxpayers, including individuals, will be subject to taxation at the preferential rates applicable to long-term capital gains if the dividends are “qualified dividends.” Dividends paid on the ADSs will be treated as qualified dividends if (i) the ADSs are readily tradable on an established securities market in the United States and (ii) the Company was not, in the year prior to the year in which the dividend was paid, and is not, in the year in which the dividend is paid, a passive foreign

investment company (“PFIC”). The ADSs are listed on the New York Stock Exchange and will qualify as readily tradable on an established securities market in the United States so long as they are so listed. Based on Vale’s audited financial statements and relevant market and shareholder data, Vale believes that it was not treated as a PFIC for U.S. federal income tax purposes with respect to its 2019 or 2020 taxable years. In addition, based on Vale’s audited financial statements and its current expectations regarding the value and nature of its assets, the sources and nature of its income, and relevant market and shareholder data, Vale does not anticipate becoming a PFIC for its 2021 taxable year.

Based on existing guidance, it is not entirely clear whether dividends received with respect to common shares will be treated as qualified dividends (and therefore whether such dividends will qualify for the preferential rates of taxation applicable to long-term capital gains), because the common shares are not themselves listed on a U.S. exchange. You should consult your own tax advisors regarding the availability of the reduced dividend tax rate in light of your own particular circumstances.

Subject to generally applicable limitations and restrictions, you may be entitled to a credit against your U.S. federal income tax liability, or a deduction in computing your U.S. federal taxable income, for Brazilian income taxes withheld by us. You must satisfy minimum holding period requirements to be eligible to claim a foreign tax credit for Brazilian taxes withheld on dividends. The limitation on foreign taxes eligible for credit is calculated separately for specific categories of income. For this purpose dividends paid by us on our common shares or ADSs will generally constitute “passive income.” Foreign tax credits may not be allowed for withholding taxes imposed in respect of certain short-term or hedged positions in securities or in respect of arrangements in which a U.S. holder’s expected economic profit is insubstantial. You should consult your own tax advisors concerning the implications of these rules in light of your particular circumstances.

Taxation of capital gains

Upon a sale or exchange of common shares or ADSs, you generally will recognize a capital gain or loss for U.S. federal income tax purposes equal to the difference, if any, between the amount realized on the sale or exchange and your adjusted tax basis in the common shares or ADSs. This gain or loss will be long-term capital gain or loss if your holding period in the common shares or ADSs exceeds one year. The net amount of long-term capital gain recognized by individual U.S. holders generally is subject to taxation at preferential rates. Your ability to use capital losses to offset income is subject to limitations.

Any gain or loss generally will be U.S. source gain or loss for U.S. foreign tax credit purposes. Consequently, if a Brazilian withholding tax is imposed on the sale or disposition of ADSs or common shares, and you do not receive significant foreign source income from other sources, you may not be able to derive effective U.S. foreign tax credit benefits in respect of such Brazilian withholding tax. You should consult your own tax advisor regarding the application of the foreign tax credit rules to your investment in, and disposition of, ADSs or common shares.

If a Brazilian tax is withheld on the sale or disposition of common shares or ADSs, the amount realized by a U.S. holder will include the gross amount of the proceeds of such sale or disposition before deduction of the Brazilian tax. See—*Brazilian tax considerations* above.

Foreign financial asset reporting

Certain U.S. holders that own “specified foreign financial assets” with an aggregate value in excess of US\$50,000 on the last day of the taxable year or US\$75,000 at any time during the taxable year are generally required to file an information statement along with their tax returns, currently on IRS Form 8938, with respect to such assets. “Specified foreign financial assets” include any financial accounts

held at a non-U.S. financial institution, as well as securities issued by a non-U.S. issuer that are not held in accounts maintained by financial institutions. Higher reporting thresholds apply to certain individuals living abroad and to certain married individuals. Regulations extend this reporting requirement to certain entities that are treated as formed or availed of to hold direct or indirect interests in “specified foreign financial assets” based on certain objective criteria. The understatement of income attributable to “specified foreign financial assets” in excess of US\$5,000 extends the statute of limitations with respect to the tax return to six years after the return was filed. U.S. holders who fail to report the required information could be subject to substantial penalties. You are encouraged to consult with your own tax advisors regarding the possible application of these rules, including the application of the rules to your particular circumstances.

Information reporting and backup withholding

Information returns may be filed with the IRS in connection with distributions on the common shares or ADSs and the proceeds from their sale or other disposition. You may be subject to U.S. federal backup withholding tax on these payments if you fail to provide your taxpayer identification number or comply with certain certification procedures or otherwise establish an exemption from backup withholding. If you are required to make such a certification or to establish such an exemption, you generally must do so on IRS Form W-9.

Backup withholding is not an additional tax. The amount of any backup withholding from a payment to you will be allowed as a credit against your U.S. federal income tax liability and may entitle you to a refund, provided that the required information is timely furnished to the IRS.

A holder that is a non-U.S. corporation or a non-resident alien individual may be required to comply with certification and identification procedures in order to establish its exemption from information reporting and backup withholding.

EVALUATION OF DISCLOSURE CONTROLS AND PROCEDURES

Our management, with the participation of our chief executive officer and chief financial officer, has evaluated the effectiveness of our disclosure controls and procedures as of December 31, 2020. There are inherent limitations to the effectiveness of any system of disclosure controls and procedures, including the possibility of human error and the circumvention or overriding of the controls and procedures. Accordingly, even effective disclosure controls and procedures can only provide reasonable assurance of achieving their control objectives.

Our chief executive officer and chief financial officer have concluded that as of December 31, 2020 our disclosure controls and procedures were effective to provide reasonable assurance that information required to be disclosed by us in the reports filed or submitted under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the applicable rules and forms, and that it is accumulated and communicated to our management, including our chief executive officer and chief financial officer, as appropriate to allow timely decisions regarding required disclosure.

MANAGEMENT'S REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING

Our management is responsible for establishing and maintaining adequate internal control over financial reporting. Our internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. Our internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Company; (ii) provide reasonable assurance that transactions are recorded to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of management and directors of the Company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of our assets that could have a material effect on the financial statements. Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of the effectiveness to future periods are subject to the risk that controls may become inadequate and that the degree of compliance with the policies or procedures may deteriorate.

Our management has assessed the effectiveness of Vale's internal control over financial reporting as of December 31, 2020 based on the criteria established in "Internal Control—Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on such assessment and criteria, our management has concluded that our internal control over financial reporting was effective as of December 31, 2020. The effectiveness of our internal control over financial reporting as of December 31, 2020 has been audited by PricewaterhouseCoopers Auditores Independentes, an independent registered public accounting firm, as stated in their report which appears herein.

Our management identified no change in our internal control over financial reporting during our fiscal year ended December 31, 2020 that has materially affected or is reasonably likely to materially affect our internal control over financial reporting.

CORPORATE GOVERNANCE

Under NYSE rules, foreign private issuers are subject to more limited corporate governance requirements than U.S. domestic issuers. As a foreign private issuer, we must comply with four principal NYSE corporate governance rules: (1) we must satisfy the requirements of Exchange Act Rule 10A-3 relating to Audit Committees; (2) our chief executive officer must promptly notify the NYSE in writing after any executive officer becomes aware of any non-compliance with the applicable NYSE corporate governance rules; (3) we must provide the NYSE with annual and interim written affirmations as required under the NYSE corporate governance rules; and (4) we must provide a brief description of any significant differences between our corporate governance practices and those followed by U.S. companies under NYSE listing standards. The table below briefly describes the significant differences between our practices and the practices of U.S. domestic issuers under NYSE corporate governance rules.

Since 2018, we also report our compliance with the Code of Best Practices for Corporate Governance of the Brazilian Corporate Governance Institute (IBGC), as required by Brazilian regulations. The code is based on the “comply or explain” principle, and we currently fully comply with 89% of the practices recommended by the IBGC and partially comply with 10% of practices recommended by the code.

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.01	A listed company must have a majority of independent directors.	Currently, we do not have a majority of independent directors. However, since March 2021, our bylaws require that at least seven directors be independent. Following the election of the members of the Board of Directors in our 2021 annual shareholders’ meeting, we expect that the majority of our directors will be independent, as required by our recently-amended bylaws.
303A.03	The non-management directors of a listed company must meet at regularly scheduled executive sessions without management.	We do not have any management directors. Our directors meet at regularly scheduled sessions without management.
303A.04	A listed company must have a nominating/corporate governance committee composed entirely of independent directors, with a written charter that covers certain minimum specified duties.	<p>We do not have a nominating/corporate governance committee composed entirely of independent directors. However, we do have a Personnel, Compensation and Governance Committee and a Nomination Committee, which are advisory committees to the Board of Directors (which may include members who are not directors) with written charters that cover similar specified duties.</p> <p>According to its charter, the Personnel, Compensation and Governance Committee is responsible, among other matters, for:</p> <ul style="list-style-type: none"> ● supporting the Board of Directors in the process of selecting and appointing the CEO, and evaluating the appointment, by the latter, of the other members of the Executive Board and other officers who report directly to the CEO; ● supporting the Board of Directors in the elaboration and maintenance of a Nomination Policy, specifically with respect to the members of advisory committees, members of the Executive Board, and other officers who report directly to the CEO, in accordance with legal requirements and best corporate governance practices; ● evaluating the company’s human resources general policies as submitted by the Executive Board to the Board of Directors;

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
		<ul style="list-style-type: none"> ● monitoring the development of the succession plan for the Executive Board other officers who report directly to the CEO, as well as their successors, taking into account the expected experience and knowledge for such positions; ● periodically evaluating and recommending adjustments to corporate governance best practices concerning the structure, size and composition of the Executive Board and the advisory committees, as well as the balance of experiences, knowledge and diversity of the profiles and style of leadership of their members, based on market research and evaluations by institutions and external consultants; ● identifying and recommending potential candidates for the Board of Directors to be submitted by the Board of Directors at the Ordinary General Shareholders' Meeting, and also recommending potential candidates to be members of the advisory Committees, including in case absences, impediments and vacancies, pursuant to our bylaws; ● supporting the Chairperson of the Board of Directors in organizing the process for performance evaluation of the Board of Directors and Advisory Committees; ● evaluating proposals for modifying the corporate governance documents, such as the Bylaws, the Code of Conduct and Internal Rules of Vale's Advisory Committees and Board of Directors, in addition to other policies and documents which are not the responsibility of other committees; ● promoting, monitoring and ensuring the development and efficacy of the Vale's governance model, assuring that all initiatives are in line with best practices and are in synergy; ● annually reviewing and recommending the necessary changes to improve Vale's corporate governance; and ● evaluating and monitoring updates related to current norms, regulations and recommendations, in addition to practices and market trends that may impact our activities regarding corporate governance. <p>According to its charter, the Nomination Committee is responsible, among other matters, for:</p> <ul style="list-style-type: none"> ● assisting the Board of Directors in the elaboration and maintenance of the Nomination Policy, applicable to the members of the Board of Directors, in line with the applicable legal requirements and the best corporate governance practices; ● periodically assessing and recommending adjustments in the structure, size and composition of the Board of Directors, as well as the balance of experience, knowledge and diversity of profiles, in line with best practices of corporate governance and based on market research and assessments by external consulting firms and institutions;

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.05	A listed company must have a compensation committee composed entirely of independent directors, with a written charter that covers certain minimum specified duties.	<ul style="list-style-type: none"> ● assessing and recommending the profiles of candidates for positions in the Board of Directors, according to criteria and guidelines set forth in the Nomination Policy; ● identifying, selecting and recommending potential candidates for positions in the Board of Directors; ● identifying, selecting and recommending to the Board of Directors potential candidates in case of absences, impediments or vacancies; ● preparing and/or updating the Board of Directors' succession plan to be approved by the end of each term, so as to maintain a balance of experience, knowledge and diversity of the members' profile; and ● preparing and approving the Committee's work plan. <p>According to its charter, the Nomination Committee shall be composed of three members, the Chairperson of our Board of Directors and two independent members. For this purpose, an independent member is a person who complies with the independence standards of the Novo Mercado segment of B3, pursuant to which such person may not (i) be a controlling shareholder of Vale; (ii) have its vote subject to a shareholders agreement; (iii) be a relative, to the second degree, of any director or executive of Vale; or (iv) have been an employee or executive of Vale in the past three years. The Novo Mercado rules also provide for other situations that require a case-by-case analysis of such person's independence.</p> <p>We do not have a compensation committee composed entirely of independent directors.</p> <p>However, we have a Personnel, Compensation and Governance Committee, which is an advisory committee to the Board of Directors (which may include an independent member who is not a director). This committee is responsible for:</p> <ul style="list-style-type: none"> ● evaluating Vale's general human resources policies as submitted by the Executive Board to the Board of Directors; ● evaluating and adjusting the compensation model of members of the Executive Board and the proposal for the distribution of the annual overall budget for the compensation of our management; and ● aiding the Board of Directors in setting and monitoring goals for the performance evaluation of the Executive Board and other leaders who report directly to the CEO.

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.06 303A.07	A listed company must have an Audit Committee with a minimum of three independent directors who satisfy the independence requirements of Rule 10A-3 under the Exchange Act, with a written charter that covers certain minimum specified duties.	<p>We do not have an Audit Committee with three independent members who satisfy the independence requirements of Rule 10A-3 under the Exchange Act. In lieu of appointing an Audit Committee composed of independent members of the Board of Directors, we have established an Audit Committee that complies with the listing rules of the Novo Mercado segment of B3 (the Brazilian Stock Exchange). Our Audit Committee meets the requirements for the exemption under Exchange Act Rule 10A-3(c)(3).</p> <p>Under our bylaws and the Audit Committee's charter, and pursuant to the Novo Mercado listing rules, our Audit Committee shall have between three and five members. In addition, (i) all the members of our Audit Committee must comply with the independence requirements of the Novo Mercado listing rules, (ii) at least one of the members of our Audit Committee must be an independent member of the Board of Directors, (iii) at least one of the members of our Audit Committee must not be a member of the Board of Directors or any other of our corporate bodies, and (iv) at least one of the members of our Audit Committee must satisfy audit/financial expertise requirements of the CVM. The requirement of audit/financial expertise may be satisfied by the same person that satisfies the requirements described items (ii) or (iii) above.</p> <p>The responsibilities of the Audit Committee are set forth in its charter. Under our bylaws, the charter must give the Audit Committee responsibility for the matters required under Novo Mercado listing rules, as well as responsibility for:</p> <ul style="list-style-type: none"> • having means and establishing procedures to be used by the company to receive, process and handle accusations, complaints and information about (a) non-compliance with legal and normative provisions applicable to the company, in addition to internal regulations and codes, (b) accounting issues, (c) internal controls, and (d) audit matters; as well as ensuring specific procedures to guarantee confidentiality and to protect whistleblower anonymity and the rights of the investigated party; • providing its opinion and assistance to the Board of Directors in the hiring, compensation and removal of independent auditor services; • supervising the work of internal auditors, the area of internal controls and the area responsible for preparing the company's financial statements; • supervising and evaluating the work of the external auditors, in order to evaluate their independence, the quality of services provided and the suitability of services provided related to the needs of the company, and telling the company's management at any point to retain compensation of the external auditors; and

Section	NYSE corporate governance rule for U.S. domestic issuers	Our approach
303A.08	Shareholders must be given the opportunity to vote on all equity-compensation plans and material revisions thereto, with limited exemptions set forth in the NYSE rules.	Under Brazilian corporate law, shareholder pre-approval is required for the adoption of any equity compensation plans.
303A.09	A listed company must adopt and disclose corporate governance guidelines that cover certain minimum specified subjects.	We have not published corporate governance guidelines.
303A.10	A listed company must adopt and disclose a code of business conduct and ethics for directors, officers and employees, and promptly disclose any waivers of the code for directors or executive officers.	We have adopted a code of conduct, which applies to our directors, officers and employees. We report each year in our annual report on Form 20-F any waivers of the code of conduct granted for directors or executive officers. Our code of conduct has a scope that is similar, but not identical, to that required for a U.S. domestic company under the NYSE rules.
303A.12	<p>a) Each listed company CEO must certify to the NYSE each year that he or she is not aware of any violation by the company of NYSE corporate governance listing standards.</p> <p>b) Each listed company CEO must promptly notify the NYSE in writing after any executive officer of the listed company becomes aware of any non-compliance with any applicable provisions of this Section 303A.</p> <p>c) Each listed company must submit an executed Written Affirmation annually to the NYSE. In addition, each listed company must submit an interim Written Affirmation as and when required by the interim Written Affirmation form specified by the NYSE.</p>	We are subject to (b) and (c) of these requirements, but not (a).

CODE OF CONDUCT

We have a Code of Conduct that applies to the members of our Board of Directors and our Board of Executive Officers, including the chief executive officer and the chief financial officer, our employees, interns, suppliers and any person acting on behalf of Vale or its subsidiaries.

Our Code of Conduct gathers the fundamental principles that underpin our business, and is part of Vale's Ethics and Compliance Program, which is monitored by the Audit Committee, the Conduct and Integrity Committee and the Compliance Office. Our Code of Conduct was revised in November 2020 and is now a principle-based document, which connects directly with our company's purpose and values.

We have posted the Code of Conduct on our website, at: <http://www.vale.com> (under English Version/Investors/Corporate Governance/Policies). We have not granted any implicit or explicit waivers from any provision of our Code of Conduct since its adoption.

Whistleblower Channel

Any breaches of our policies and standards can be reported by anyone, including employees, contractors, suppliers, members of affected communities and other stakeholders, via our Whistleblower Channel, which is available in 8 languages. Our Whistleblower Channel is operated by an independent company and managed by our Compliance Office, an independent department that reports directly to the Board of Directors. Our Whistleblower Channel is structured to guarantee confidentiality and to protect whistleblower anonymity and the rights of the investigated party.

In 2020, our Whistleblower Channel received 4,670 complaints and closed 4,562 cases, of which (i) 284 referred to complaints that were not investigated due to lack of information or pertinence to the scope of the Whistleblower Channel, (ii) 121 were consultations, which were answered by the Whistleblower Channel, but did not lead to an investigation, and (iii) 4,157 led to investigations, which confirmed violations of Vale's Code of Conduct in 36% of these cases. All confirmed violations triggered correction plans, which are presented by managers and approved by the Whistleblower Channel. As a general rule, these plans contain measures to promote process improvements, training initiatives and feedback to employees. Depending on the seriousness of the allegations, employees involved may be subject to administrative measures, such as warnings, suspensions or terminations. Suppliers involved in serious violations of the Code of Conduct are also subject to punitive measures, such as fines or contract termination.

Investigations by Vale's Whistleblower Channel in 2020 resulted in 2,261 corrective actions, including the termination of 181 employees.

PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table summarizes the fees for professional services and other services rendered to us by our independent auditors PricewaterhouseCoopers Auditores Independentes (“PwC”) in 2020 and 2019

	Year ended December 31,	
	2020	2019
	(US\$ thousand)	
Audit fees	5,851	6,144
Audit-related fees	286	6
Other fees	—	—
Total fees	<u>6,137</u>	<u>6,150</u>

“Audit fees” are the aggregate fees of PwC for the audit of our annual financial statements, the audit of the statutory financial statements of our subsidiaries, and reviews of interim financial statements and attestation services that are provided in connection with statutory and regulatory filings or engagements. They also include fees for services that only the independent auditor reasonably can provide, including the provision of comfort letters and consents in connection with statutory and regulatory filings and the review of documents filed with the SEC and other capital markets or local financial reporting regulatory bodies. “Audit-related fees” are fees charged by PwC for assurance and related services that are reasonably related to the performance of the audit or review of our financial statements and are not reported under “Audit fees.”

INFORMATION FILED WITH SECURITIES REGULATORS

We are subject to various information and disclosure requirements in those countries in which our securities are traded, and we file financial statements and other periodic reports with the CVM, B3 and the SEC.

- **Brazil.** Vale's Common Shares are listed on B3 in São Paulo, Brazil. As a result, we are subject to the information and disclosure requirements of Brazilian Corporate Law, as amended. We are also subject to the periodic disclosure requirements of CVM rules applicable to listed companies and to B3's "Novo Mercado" Corporate Governance Requirements. Our CVM filings are available from the CVM at <http://www.cvm.gov.br> or from B3 at <http://www.b3.com.br>. In addition, they may be accessed at our website, <http://www.vale.com>.
- **United States.** As a result of our ADSs being listed on the New York Stock Exchange, we are subject to the information requirements of the Securities Exchange Act of 1934, as amended, and accordingly file reports and other information with the SEC. Reports and other information filed by us with the SEC available to the public from the SEC at <http://www.sec.gov>. In addition, as with all of our security filings, they may be accessed at our website, <http://www.vale.com>. Such filings and other information on our website are not incorporated by reference in this annual report on Form 20-F. You may also inspect Vale's reports and other information at the offices of the New York Stock Exchange, 11 Wall Street, New York, New York 10005, on which Vale's ADSs are listed. For further information on obtaining copies of Vale's public filings at the New York Stock Exchange, you should call (212) 656-5060.

EXHIBITS

Exhibit Number

1	Bylaws of Vale S.A., as of March 12, 2021
2	Description of Securities registered under Section 12 of the Exchange Act
4.1	Framework Agreement, dated March 2, 2016, by and among Vale S.A., BHP Billiton Brasil Ltda, Samarco Mineração S.A., the Federal Government of Brazil, the states of Espirito Santo and Minas Gerais and certain other public authorities in Brazil, incorporated by reference to Exhibit 4.12 to BHP Billiton Ltd.'s annual report on Form 20-F dated September 21, 2016 (File Nos. 001-09526 and 001-31714, Accession No. 0001193125-16-715037)
4.2	Global Settlement Agreement dated February 4, 2021, by and among Vale S.A., the Government of the State of Minas Gerais, the Public Defender Office of the State of Minas Gerais, public prosecutors of the State of Minas Gerais and federal prosecutors.
8	List of subsidiaries
12.1	Certification of Chief Executive Officer of Vale pursuant to Rules 13a-14 and 15d-14 under the Securities Exchange Act of 1934
12.2	Certification of Chief Financial Officer of Vale pursuant to Rules 13a-14 and 15d-14 under the Securities Exchange Act of 1934
13.1	Certification of Chief Executive Officer and Chief Financial Officer of Vale, pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
15.1	Consent of PricewaterhouseCoopers Auditores Independentes
15.2	Consent of KPMG Auditores Independentes
15.3	Consent of McElroy Bryan Geological Services Pty Ltd
101	Interactive Data File

The amount of long-term debt securities of Vale or its subsidiaries authorized under any individual outstanding agreement does not exceed 10% of Vale's total assets on a consolidated basis. Vale hereby agrees to furnish the SEC, upon its request, a copy of any instruments defining the rights of holders of its long-term debt or of its subsidiaries for which consolidated or unconsolidated financial statements are required to be filed.

GLOSSARY

Alumina	Aluminum oxide. It is the main component of bauxite, and extracted from bauxite ore in a chemical refining process. It is the principal raw material in the electro-chemical process from which aluminum is produced.
Aluminum	A white metal that is obtained in the electro-chemical process of reducing aluminum oxide.
Austenitic stainless steel	Steel that contains a significant amount of chromium and sufficient nickel to stabilize the austenite microstructure, giving to the steel good formability and ductility and improving its high temperature resistance. They are used in a wide variety of applications, ranging from consumer products to industrial process equipment, as well as for power generation and transportation equipment, kitchen appliances and many other applications where strength, corrosion and high temperature resistance are required.
B3	B3 S.A.—Brasil, Bolsa, Balcão (formerly BM&FBOVESPA), a stock exchange located in São Paulo, Brazil.
Bauxite	A rock composed primarily of hydrated aluminum oxides. It is the principal ore of alumina, the raw material from which aluminum is made.
Beneficiation	A variety of processes whereby extracted ore from mining is reduced to particles that can be separated into ore-mineral and waste, the former suitable for further processing or direct use.
CFR	Cost and freight. Indicates that all costs related to the transportation of goods up to a named port of destination will be paid by the seller of the goods.
Class 2	Low purity nickel, containing higher levels of deleterious elements and predominantly iron-bearing, that is primarily destined to the stainless steel market
Coal.....	Coal is a black or brownish-black solid combustible substance formed by the decomposition of vegetable matter without access to air. The rank of coal, which includes anthracite, bituminous coal (both are called hard coal), sub-bituminous coal, and lignite, is based on fixed carbon, volatile matter, and heating value.
Cobalt	Cobalt is a hard, lustrous, silver-gray metal found in ores, and used in the preparation of magnetic, wear-resistant, and high-strength alloys (particularly for jet engines and turbines). Its compounds are also used in the production of inks, paints, catalysts and battery materials.
Coke	Coal that has been processed in a coke oven, for use as a reduction agent in blast furnaces and in foundries for the purposes of transforming iron ore into pig iron.
Coking coal	Hard coking coal is the highest value segment of the metallurgical coal market segments (see metallurgical coal) because of its high strength factors to form a strong coke.
Concentration.....	Physical, chemical or biological process to increase the grade of the metal or mineral of interest.
Copper	A reddish brown metallic element. Copper is highly conductive, both thermally and electrically. It is highly malleable and ductile and is easily rolled into sheet and drawn into wire.
Copper anode.....	Copper anode is a metallic product of the converting stage of smelting process that is cast into blocks and generally contains 99% copper grade, which requires further processing to produce refined copper cathodes.
Copper cathode.....	Copper plate with purity higher than or equal to 99.9% that is produced by an electrolytic process.

Copper concentrate	Material produced by concentration of copper minerals contained in the copper ore. It is the raw material used in smelters to produce copper metal.
CVM	The <i>Comissão de Valores Mobiliários</i> (Brazilian Securities and Exchange Commission).
DWT	Deadweight ton. The measurement unit of a vessel's capacity for cargo, fuel oil, stores and crew, measured in metric tons of 1,000 kg. A vessel's total deadweight is the total weight the vessel can carry when loaded to its maximum permitted load line.
Electrowon copper cathode.....	Refined copper cathode is a metallic product produced by an electrochemical process in which copper is recovered from an electrolyte and plated onto an electrode. Electrowon copper cathodes generally contain 99.99% copper grade.
Ferroalloys	Manganese ferroalloys are alloys of iron that contain one or more other chemical elements. These alloys are used to add these other elements into molten metal, usually in steelmaking. The principal ferroalloys are those of manganese, silicon and chromium.
FOB	Free on board. It indicates that the purchaser pays for shipping, insurance and all the other costs associated with transportation of the goods to their destination.
Gold	A precious metal sometimes found free in nature, but usually found in conjunction with silver, quartz, calcite, lead, tellurium, zinc or copper. It is the most malleable and ductile metal, a good conductor of heat and electricity and unaffected by air and most reagents.
Grade.....	The proportion of metal or mineral present in ore or any other host material.
Hematite Ore	Hematite is an iron oxide mineral, but also denotes the high-grade iron ore type within the iron deposits.
Iron ore pellets	Agglomerated ultra-fine iron ore particles of a size and quality suitable for particular iron making processes. Our iron ore pellets range in size from 8 mm to 18 mm.
Itabirite ore	Itabirite is a banded iron formation and denotes the low-grade iron ore type within the iron deposits.
Lower Class 1	High purity nickel, containing lower levels of deleterious elements, that is used in low premium applications (e.g., foundry)
Lump ore.....	Iron ore or manganese ore with the coarsest particle size in the range of 6.35 mm to 50 mm in diameter, but varying slightly between different mines and ores.
Manganese ore	A hard brittle metallic element found primarily in the minerals pyrolusite, hausmannite and manganite. Manganese ore is essential to the production of virtually all steels and is important in the production of cast iron.
Metallurgical coal	Coal used in the production of steel, comprising multiple segments, including hard coking coal (see hard coking coal), semi-hard coking coal, semi-soft coking coal, all used to produce coke to feed a blast furnace; and, PCI (pulverized coal injection) coal used for direct injection fuel source into the blast furnace (see PCI). A bituminous hard coal with a quality that allows the production of coke. Normally used in coke ovens for metallurgical purposes.
Mineral deposit(s)	A mineralized body that has been intersected by a sufficient number of closely spaced drill holes and/or underground/surface samples to support sufficient tonnage and grade of metal(s) or mineral(s) of interest to warrant further exploration-development work.
Mineral resource(s)	A concentration or occurrence of minerals of economic interest in such form and quantity that could justify an eventual economic extraction. The location, quantity, grade, geological characteristics and continuity of a mineral resource are known, estimated or interpreted from specific geological evidence through drill holes, trenches and/or outcrops. Mineral resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured Resources.

Mt	Million metric tons
Mtpy	Million metric tons per year.
Nickel	A silvery white metal that takes on a high polish. It is hard, malleable, ductile, somewhat ferromagnetic, and a fair conductor of heat and electricity. It belongs to the iron-cobalt group of metals and is chiefly valuable for the alloys it forms, such as stainless steel and other corrosion-resistant alloys.
Nickel laterite	Deposits are formed by intensive weathering of olivine-rich ultramafic rocks such as dunite, peridotite and komatite.
Nickel matte	An intermediate smelter product that must be further refined to obtain pure metal.
Nickel pig iron	A low-grade nickel product, made from lateritic ores, suitable primarily for use in stainless steel production. Nickel pig iron typically has a nickel grade of 1.5-6% produced from blast furnaces. Nickel pig iron can also contain chrome, manganese, and impurities such as phosphorus, sulfur and carbon. Low-grade ferro-nickel (FeNi) produced in China through electric furnaces is often also referred to as nickel pig iron.
Nickel sulfide	Formed through magmatic processes where nickel combines with sulfur to form a sulfide phase. Pentlandite is the most common nickel sulfide ore mineral mined and often occurs with chalcopyrite, a common copper sulfide mineral.
Ntk	Net ton (the weight of the goods being transported excluding the weight of the wagon) kilometer.
Open-pit mining	Method of extracting rock or minerals from the earth by their removal from an open pit. Open-pit mines for extraction of ore are used when deposits of commercially useful minerals or rock are found near the surface; that is, where the overburden (surface material covering the valuable deposit) is relatively thin or the material of interest is structurally unsuitable for underground mining.
Oxides	Compounds of oxygen with another element. For example, magnetite is an oxide mineral formed by the chemical union of iron with oxygen.
Palladium	A silver-white metal that is ductile and malleable, used primarily in automobile-emissions control devices, and electrical applications.
PCI	Pulverized coal injection. Type of coal with specific properties ideal for direct injection via the tuyeres of blast furnaces. This type of coal does not require any processing or coke making, and can be directly injected into the blast furnaces, replacing lump cokes to be charged from the top of the blast furnaces.
Pelletizing	Iron ore pelletizing is a process of agglomeration of ultra-fines produced in iron ore exploitation and concentration steps. The three basic stages of the process are: (i) ore preparation (to get the correct fineness); (ii) mixing and balling (additive mixing and ball formation); and (iii) firing (to get ceramic bonding and strength).
PGMs	Platinum group metals. Consist of platinum, palladium, rhodium, ruthenium, osmium and iridium.
Phosphate	A phosphorous compound, which occurs in natural ores and is used as a raw material for primary production of fertilizer nutrients, animal feeds and detergents.
Pig iron	Product of smelting iron ore usually with coke and limestone in a blast furnace.
Platinum	A dense, precious, grey-white transition metal that is ductile and malleable and occurs in some nickel and copper ores. Platinum is resistant to corrosion and is used primarily in jewelry, and automobile-emissions control devices.

Precious metals	Metals valued for their color, malleability, and rarity, with a high economic value driven not only by their practical industrial use, but also by their role as investments. The widely-traded precious metals are gold, silver, platinum and palladium.
Primary nickel	Nickel produced directly from mineral ores.
Probable (indicated) reserves	Reserves for which quantity and grade and/or quality are computed from information similar to that used for proven (measured) reserves, but the sites for inspection, sampling and measurement are farther apart or are otherwise less adequately spaced. The degree of assurance, although lower than that for proven (measured) reserves, is high enough to assume continuity between points of observation.
Proven (measured) reserves	Reserves for which (i) quantity is computed from dimensions revealed in outcrops, trenches, working or drill holes; grade and/or quality are computed from the results of detailed sampling and (ii) the sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape, depth and mineral content of reserves are well-established.
Real, reais or R\$	The official currency of Brazil is the <i>real</i> (singular) (plural: <i>reais</i>).
Reserves (ore/mineral)	The part of a mineral deposit that could be economically and legally extracted or produced at the time of the reserve determination.
ROM	Run-of-mine. Ore in its natural (unprocessed) state, as mined, without having been crushed.
Secondary or scrap nickel	Stainless steel or other nickel-containing scrap.
Seaborne market	Comprises the total ore trade between countries using ocean bulk vessels.
Silver	A ductile and malleable metal used in photography, coins and medal fabrication, and in industrial applications.
Sinter feed (also known as fines)	Iron ore fines with particles in the range of 0.15 mm to 6.35 mm in diameter. Suitable for sintering.
Sintering	The agglomeration of sinter feed, binder and other materials, into a coherent mass by heating without melting, to be used as metallic charge into a blast furnace.
Slab	The most common type of semi-finished steel. Traditional slabs measure 10 inches thick and 30-85 inches wide (and average 20 feet long), while the output of the recently developed "thin slab" casters is two inches thick. Subsequent to casting, slabs are sent to the hot-strip mill to be rolled into coiled sheet and plate products.
Stainless steel	Alloy steel containing at least 10% chromium and with superior corrosion resistance. It may also contain other elements such as nickel, manganese, niobium, titanium, molybdenum, copper, in order to improve mechanical, thermal properties and service life. It is primarily classified as austenitic (200 and 300 series), ferritic (400 series), martensitic, duplex or precipitation hardening grades.
Thermal coal	A type of coal that is suitable for energy generation in thermal power stations, cement plants and other coal fired ovens/kilns in general industry.
Tpy	Metric tons per year.
Troy ounce	One troy ounce equals 31.103 grams.
Underground mining	Mineral exploitation in which extraction is carried out beneath the earth's surface.
Upper Class 1	High purity nickel, containing lower levels of deleterious elements, that is used in high premium applications (e.g., plating and super alloys)
U.S. dollars or US\$	The United States dollar.

SIGNATURES

The registrant hereby certifies that it meets all of the requirements for filing on Form 20-F and that it has duly caused and authorized the undersigned to sign this annual report on its behalf.

VALE S.A.

By: /s/ EDUARDO DE SALLES BARTOLOMEO

Name: Eduardo de Salles Bartolomeo

Title: Chief Executive Officer

By: /s/ LUCIANO SIANI PIRES

Name: Luciano Siani Pires

Title: Chief Financial Officer

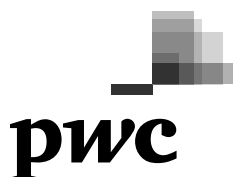
Date: March 23, 2021

Vale S.A. Financial Statements

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of
Vale S.A.

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated statement of financial position of Vale S.A. and its subsidiaries (the "Company") as of December 31, 2020 and 2019, and the related consolidated income statement, consolidated statement of comprehensive income, consolidated statement of changes in equity and consolidated statement of cash flows for each of the two years in the period ended December 31, 2020, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2020, based on criteria established in "Internal Control—Integrated Framework (2013)" issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2020 and 2019, and the results of its operations and its cash flows for each of the two years in the period ended December 31, 2020 in conformity with International Financial Reporting Standards as issued by the International Accounting Standards Board. Also, in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2020, based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the COSO.

The consolidated financial statements of the Company as of December 31, 2018 and for the year then ended were audited by other auditors whose report dated April 18, 2019 expressed an unqualified opinion on those financial statements.

Change in accounting principle

As discussed in Note 2(d) to the consolidated financial statements, the Company changed the manner in **which it accounts for leases on January 1st, 2019.**

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control over Financial Reporting. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

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T: +55 (21) 3232 6112, www.pwc.com.br*

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Critical Audit Matters

The critical audit matters communicated below are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that: (i) relate to accounts or disclosures that are material to the consolidated financial statements; and (ii) involved our especially challenging, subjective, or complex judgments. The communication of critical audit matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matters below, providing separate opinions on the critical audit matters or on the accounts or disclosures to which they relate.

Brumadinho's dam failure

As described in Note 23 to the consolidated financial statements, the Company has incurred costs and recorded provisions, as a consequence of the Brumadinho's dam failure, which occurred in January 25, 2019. The provision amounted to US\$ 6,864 million as of December 31, 2020. Management applied significant judgment in determining the value of these provisions, including subsequent reviews, which involved the use of significant estimates and assumptions with respect to: (i) the engineering projects and the total expected costs to carry out all de-characterization projects related to the dams built under the upstream method; and (ii) the valuation of the costs to carry out the remediation of the environmental and social impacts of the event in accordance with the agreements reached with the relevant authorities and others. The assumptions used in developing these estimates, with the support of management's specialists, included among others: (i) volume of the waste to be removed based

on historical data available and interpretation of the enacted laws and regulations; (ii) location availability for the tailings disposal; (iii) acceptance by the authorities of the proposed engineering methods and solution; and (iv) number of individuals entitled to the indemnification payments. In addition, as management has further disclosed, given the nature and uncertainties inherent in this type of event, the amounts recognized and disclosed will be reassessed by the Company and may be adjusted significantly in future periods, as new facts and circumstances become known.

The principal considerations for our determination that performing procedures relating to the Brumadinho's dam failure provisions is a critical audit matter are that there were significant judgments by management, including the use of specialists, when developing the estimates of: (i) the engineering projects and the total expected costs to carry out all de-characterization projects related to the dams, and (ii) valuation of the costs related to the agreements reached by the Company. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating the audit evidence related to the data, methods and assumptions used by management and its specialists in developing these estimates to evaluate management's valuation and significant assumptions used. Also, the audit effort involved the use of professionals with specialized skill and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management's estimates of cost and provision recorded in relation to the Brumadinho's dam failure. These procedures also included, among others, evaluating the methods and significant assumptions used by management in developing these estimates and cost provisions, and the assessment of costs in accordance with the agreements reached, and whether these were consistent with internal and external evidence available or obtained in other areas of the audit. The work of Company's specialists was used in performing the procedures to evaluate the reasonableness of these estimates. As a basis for using this work, the specialists' qualifications and objectivity were understood, as well as the methods and assumptions used by them. The procedures also included tests of the data used by the management's specialist and an understanding of the specialists' findings. In addition, professionals with specialized skill and knowledge were used to assist in evaluating the reasonableness of the assumptions used in the engineering projects set out by management.

Assessment of goodwill and other long lived non-financial assets for impairment

As described in Notes 4 and 18 to the consolidated financial statements, the Company's goodwill balance was US\$ 3,299 million as of December 31, 2020, comprised by the goodwill allocated to the Ferrous Minerals segment, in the amount of US\$ 1,373 million and the goodwill allocated to the Base Metals segment, in the amount of US\$ 1,926 million. As described in Note 18, management conducts an impairment test of goodwill on an annual basis, or more frequently if events or circumstances indicate that the carrying value of goodwill may be impaired. Management also evaluates impairment indicators for the other long lived non-financial assets, such as intangible, property plant and equipment and investments in associate companies and joint ventures. Potential impairment is identified by comparing the fair value less costs to disposal (FVLCD) of a cash generating unit (CGU) to its carrying value, including goodwill. Fair value is generally estimated by management using a discounted cash flow model. Management's cash flow projections for the CGUs included significant judgments and assumptions relating to (i) long-term future metal prices; and (ii) discount rates. During 2020, due to the decision to exit New Caledonian operation, included in Base Metals segment, the Company recorded an impairment charge of US\$ 882 million and then classified New Caledonian operation as held for sale.

The principal considerations for our determination that performing procedures relating to impairment tests for goodwill and other long lived non-financial assets is a critical audit matter are that there were significant judgments by management when developing the fair value measurement of each CGU. This in turn led to a high degree of auditor judgment, subjectivity, and effort in performing procedures and evaluating management's cash flow projections and significant assumptions, related to long-term future metal prices and discount rates. In addition, the audit effort involved the use of professionals with specialized skills and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of the controls related to management's goodwill and other long lived non-financial assets impairment assessment,

including controls over the valuation of each CGU. These procedures also included, among others (i) testing management's process for developing the fair value estimate; (ii) evaluating the appropriateness of the discounted cash flow model; (iii) testing the completeness and accuracy of the underlying data used in the model; and (iv) evaluating the reasonableness of the significant assumptions used by management related to the long-term future metal prices and discount rates. Evaluating these management's significant assumptions involved evaluating whether the assumptions used by management were reasonable considering (i) the current and past performance of each CGU; (ii) the consistency with external market and industry data; and (iii) whether these assumptions were consistent with evidence obtained in other areas of the audit. Professionals with specialized skill and knowledge were used to assist in the evaluation of the Company's discounted cash flow model, and the long-term future metal prices and the discount rate assumptions.

Tax litigation

As described in Note 26 to the consolidated financial statements, the Company recognized provisions for tax litigations in the amount of US\$ 485 million and disclosed contingent liabilities related to tax litigation in the amount of US\$ 6,911 million. The Company recognizes a provision for tax litigation in the consolidated financial statements for the resolution of pending litigation when the Company has a present obligation as a result of a past event and management determines that a loss is probable, and the amount of the loss can be reasonably estimated, with the support of Company's specialists. No provision for tax litigation is recognized in the consolidated financial statements for unfavorable outcomes when, after assessing the information available, (i) management concludes that it is not probable that a loss has been incurred in any of the pending litigation; or (ii) management is unable to estimate the loss or range of loss for any of the pending matters. In case of income tax pending litigations, management determines whether it is probable or not that taxation authorities will accept the uncertain tax treatment. If the Company concludes it is not probable that taxation authorities will accept the uncertain tax treatment, a provision for income tax is recognized. The Company also discloses the contingency in circumstances where management concludes: (i) no loss is probable or reasonably estimable, but it is reasonably possible that a loss may be incurred; or (ii) in case of income tax pending litigations, it is probable that the taxation authority will accept the uncertain tax treatment.

The principal considerations for our determination that performing procedures relating to tax litigation are a critical audit matter are that there were significant judgments by management when assessing the likelihood of a loss being incurred and when determining whether a reasonable estimate of the loss or range of loss and possible outcomes for each tax litigation claim can be made, which in turn led to a high degree of auditor judgment, subjectivity and effort in evaluating management's assessment of the loss contingencies associated with litigation claims. In addition, the audit effort involved the use of professionals with specialized skills and knowledge.

Addressing the matter involved performing procedures and evaluating audit evidence in connection with forming our overall opinion on the consolidated financial statements. These procedures included testing the effectiveness of controls relating to management's evaluation of tax litigation claims, including controls over determining whether a loss is probable and whether the amount of loss can be reasonably estimated, or whether it is probable the taxation authority will not accept the income tax pending litigation, as well as financial statement disclosures. These procedures also included, among others, obtaining and evaluating the letters of audit inquiry with internal and external legal counsel, evaluating the reasonableness of management's assessment regarding whether unfavorable outcomes is reasonably possible or probable and reasonably estimable and evaluating the sufficiency of the Company's tax litigation contingencies disclosures. The work of Company's specialists was used in performing the procedures to evaluate the reasonableness of the estimates related to the tax litigation claims. As a basis for using this work, the specialists' qualifications and objectivity were understood, as well as the methods and assumptions used by them. The procedures also included an evaluation of the specialists' findings. In addition, professionals with specialized skills and knowledge were used to assist in the evaluation of the reasonableness of the estimate or range of loss and possible outcomes of the main tax litigation claims.

/s/ PricewaterhouseCoopers Auditores Independentes
Rio de Janeiro, RJ, Brazil
February 25, 2021

We have served as the Company's auditor since 2019.



KPMG Auditores Independentes
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Report of Independent Registered Public Accounting Firm

To the Stockholders and Board of Directors of
Vale S.A.

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated statement of income, comprehensive income, changes in equity, and cash flows of Vale S.A. and its subsidiaries (the “Company”) for the year ended December 31, 2018, and the related notes (collectively, the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the results of operations of the Company and its cash flows for the year ended December 31, 2018, in conformity with International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audit included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audit also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audit provides a reasonable basis for our opinion.

Emphasis of matter—Subsequent Event

We draw attention to Note 3 to the consolidated financial statements of the Company, which describes the Brumadinho dam failure which occurred at the Company’s operating facilities on January 25, 2019. The Company’s management considered that the event is not a condition that existed at the end of the reporting period, and therefore did not require adjustments to the financial statements as of December 31, 2018.

/s/ KPMG Auditores Independentes

KPMG Auditores Independentes

We served as the Company’s auditor from 2014 to 2018.

Rio de Janeiro, RJ
April 18, 2019



Management's Report on Internal Control over Financial Reporting

The management of Vale S.A (Vale) is responsible for establishing and maintaining adequate internal control over financial reporting.

The Vale's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. The company's internal control over financial reporting includes those policies and procedures that: (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of the effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, and that the degree of compliance with the policies or procedures may deteriorate.

Vale's management has assessed the effectiveness of the company's internal control over financial reporting as of December 31, 2020 based on the criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on such assessment and criteria, Vale's management has concluded that the company's internal control over financial reporting are effective as of December 31, 2020.

The effectiveness of the company's internal control over financial reporting as of December 31, 2020 has been audited by PricewaterhouseCoopers Auditores Independentes, an independent registered public accounting firm, as stated in their report which appears herein.

February 25th, 2021.

Eduardo de Salles Bartolomeo
Chief Executive Officer

Luciano Siani
Chief Financial Officer and Investors Relations



Consolidated Income Statement
In millions of United States dollars, except earnings per share data

	Notes	Year ended December 31,		
		2020	2019	2018
Net operating revenue.....	4(d)	40,018	37,570	36,575
Cost of goods sold and services rendered	5(a)	(19,039)	(21,187)	(22,109)
Gross profit		20,979	16,383	14,466
Operating expenses				
Selling and administrative expenses	5(b)	(554)	(487)	(523)
Research and evaluation expenses		(443)	(443)	(373)
Pre-operating and operational stoppage	23	(887)	(1,153)	(271)
Brumadinho event	23	(5,257)	(7,402)	—
Other operating expenses, net	5(c)	(752)	(505)	(445)
		(7,893)	(9,990)	(1,612)
Impairment and disposals of non-current assets	18	(2,243)	(5,074)	(899)
Operating income		10,843	1,319	11,955
Financial income.....	6	375	527	423
Financial expenses.....	6	(3,283)	(3,746)	(2,314)
Other financial items, net	6	(1,903)	(194)	(3,066)
Equity results and other results in associates and joint ventures	14 and 24	(1,063)	(681)	(182)
Income (loss) before income taxes		4,969	(2,775)	6,816
Income taxes				
Current tax.....	8	(3,398)	(1,522)	(752)
Deferred tax		2,960	2,117	924
		(438)	595	172
Net income (loss) from continuing operations		4,531	(2,180)	6,988
Net income (loss) attributable to noncontrolling interests		(350)	(497)	36
Net income (loss) from continuing operations attributable to Vale's stockholders		4,881	(1,683)	6,952
Discontinued operations				
Loss from discontinued operations		—	—	(92)
Loss from discontinued operations attributable to Vale's stockholders		—	—	(92)
Net income (loss)		4,531	(2,180)	6,896
Net income (loss) attributable to noncontrolling interests		(350)	(497)	36
Net income (loss) attributable to Vale's stockholders		4,881	(1,683)	6,860
Earnings (loss) per share attributable to Vale's stockholders:				
Basic and diluted earnings (loss) per share:.....	9			
Common share (US\$)		0.95	(0.33)	1.32

The accompanying notes are an integral part of these financial statements.



Consolidated Statement of Comprehensive Income
In millions of United States dollars

	Year ended December 31,		
	2020	2019	2018
Net income (loss)	4,531	(2,180)	6,896
Other comprehensive income (loss):			
Items that will not be subsequently reclassified to income statement			
Translation adjustments	(9,160)	(1,677)	(6,762)
Retirement benefit obligations (note 27)	(88)	(126)	41
Fair value adjustment to investment in equity securities (note 19)	101	(184)	60
Transfer to reserve	—	—	(16)
Total items that will not be subsequently reclassified to income statement, net of tax	(9,147)	(1,987)	(6,677)
Items that may be subsequently reclassified to income statement			
Translation adjustments	4,203	1,111	3,899
Net investments hedge (note 19)	(578)	(74)	(543)
Cash flow hedge (note 19)	(105)	102	—
Transfer of realized results to net income	135	—	(78)
Total of items that may be subsequently reclassified to income statement, net of tax	3,655	1,139	3,278
Total comprehensive income (loss)	(961)	(3,028)	3,497
Comprehensive income (loss) attributable to noncontrolling interests	(318)	(512)	(84)
Comprehensive income (loss) attributable to Vale's stockholders	(643)	(2,516)	3,581
From continuing operations	(643)	(2,516)	3,589
From discontinued operations	—	—	(8)
	(643)	(2,516)	3,581

Items above are stated net of tax and the related taxes are disclosed in note 8.

The accompanying notes are an integral part of these financial statements.



Consolidated Statement of Cash Flows In millions of United States dollars

	Year ended December 31,		
	2020	2019	2018
Cash flow from operations (a)	17,030	15,623	15,365
Interest on loans and borrowings paid (note 22)	(755)	(1,186)	(1,121)
Derivatives received (paid), net (note 19)	(34)	(324)	(67)
Interest on participative stockholders' debentures paid (note 21)	(183)	(194)	(148)
Income taxes (including settlement program)	(1,736)	(1,809)	(1,128)
Net cash provided by operating activities	14,322	12,110	12,901
Cash flow from investing activities:			
Capital expenditures	(4,430)	(3,704)	(3,784)
Additions to investments (note 14)	(131)	(76)	(23)
Acquisition of subsidiary, net of cash (note 15)	-	(926)	-
Proceeds from disposal of assets and investments	426	142	1,481
Dividends received from associates and joint ventures (note 14)	173	353	245
Judicial deposits and restricted cash related to Brumadinho event (note 23)	(9)	(1,638)	-
Short-term investment	630	(828)	(50)
Investment fund applications	(824)	-	-
Other investments activities, net(i)	(504)	(312)	2,290
Net cash provided by (used in) investing activities	(4,669)	(6,989)	159
Cash flow from financing activities:			
Loans and borrowings from third-parties (note 22)	6,800	3,142	1,225
Payments of loans and borrowings from third-parties (note 22)	(6,064)	(5,417)	(7,841)
Payments of leasing (note 22)	(219)	(224)	-
Dividends and interest on capital paid to stockholders (note 28)	(3,350)	-	(3,313)
Dividends and interest on capital paid to noncontrolling interest	(14)	(184)	(182)
Share buyback program	-	-	(1,000)
Transactions with noncontrolling stockholders (note 15)	171	(812)	(17)
Net cash used in financing activities	(2,676)	(3,495)	(11,128)
Net cash used in discontinued operations	-	-	(46)
Increase in cash and cash equivalents	6,977	1,626	1,886
Cash and cash equivalents in the beginning of the year	7,350	5,784	4,328
Effect of exchange rate changes on cash and cash equivalents	(825)	(60)	(313)
Effects of disposals of subsidiaries, net of cash and cash equivalents	(15)	-	(117)
Cash and cash equivalents at end of the year	13,487	7,350	5,784
Non-cash transactions:			
Additions to property, plant and equipment—capitalized loans and borrowing costs	70	140	194
Cash flow from operating activities:			
Income (loss) before income taxes	4,969	(2,775)	6,816
Adjusted for:			
Provisions related to Brumadinho event (note 23)	4,748	6,550	-
Equity results and other results in associates and joint ventures (note 14)	1,063	681	182
Impairment and disposal of non-current assets (note 18)	2,243	5,074	899
Depreciation, depletion and amortization	3,234	3,726	3,351
Financial results, net (note 6)	4,811	3,413	4,957
Changes in assets and liabilities:			
Accounts receivable	(2,540)	(25)	(156)
Inventories	(180)	110	(817)
Suppliers and contractors(ii)	(267)	655	(376)
Provision—Payroll, related charges and other remunerations	222	(94)	(11)
Proceeds from streaming transactions (note 7)	-	-	690
Payments related to Brumadinho event (note 23)(iii)	(809)	(989)	-
Other assets and liabilities, net	(464)	(703)	(170)
Cash flow from operations (a)	17,030	15,623	15,365

(i) Includes loans and advances from/to related parties. For the year ended December 31, 2018, includes proceeds received from Nacala project finance (note 29) in the amount of US\$2,572.

(ii) Includes variable lease payments.

(iii) In addition, the Company has incurred in expenses in the amount of US\$510 and US\$730 for the year ended December 31, 2020 and 2019, respectively. Therefore, in 2020, the Company has disbursed a total amount of US\$1,319 in relation to the Brumadinho event (2019: US\$1,719).

The accompanying notes are an integral part of these financial statements.



Consolidated Statement of Financial Position
In millions of United States dollars

	Notes	December 31, 2020	December 31, 2019
Assets			
Current assets			
Cash and cash equivalents	22	13,487	7,350
Short-term investments	22	771	826
Accounts receivable	10	4,993	2,529
Other financial assets	13	329	607
Inventories	11	4,061	4,274
Recoverable taxes	12	509	922
Others		253	534
		24,403	17,042
Non-current assets			
Judicial deposits	26(c)	1,268	3,133
Other financial assets	13	1,784	2,661
Recoverable taxes	12	1,091	1,204
Deferred income taxes	8(a)	10,335	9,217
Others		651	583
		15,129	16,798
Investments in associates and joint ventures	14	2,031	2,798
Intangibles	16	9,296	8,499
Property, plant and equipment	17	41,148	46,576
		67,604	74,671
Total assets		92,007	91,713
Liabilities			
Current liabilities			
Suppliers and contractors		3,367	4,107
Loans, borrowings and leases	22	1,136	1,439
Other financial liabilities	13	1,906	1,404
Taxes payable		952	512
Settlement program ("REFIS")	8(d)	340	431
Liabilities related to associates and joint ventures	24	876	516
Provisions	25	1,826	1,230
Liabilities related to Brumadinho	23	1,910	1,568
De-characterization of dams	23	381	309
Dividends payable	28	1,220	1,560
Others		680	769
		14,594	13,845
Non-current liabilities			
Loans, borrowings and leases	22	13,891	13,408
Participative stockholders' debentures	21	3,413	2,584
Other financial liabilities	13	4,612	1,788
Settlement program ("REFIS")	8(d)	2,404	3,476
Deferred income taxes	8(a)	1,770	1,882
Provisions	25	8,434	8,493
Liabilities related to Brumadinho	23	2,665	1,415
De-characterization of dams	23	1,908	2,180
Liabilities related to associates and joint ventures	24	1,198	1,184
Streaming transactions	7	2,005	2,063
Others		292	402
		42,592	38,875
Total liabilities		57,186	52,720
Stockholders' equity			
Equity attributable to Vale's stockholders	28	35,744	40,067
Equity attributable to noncontrolling interests		(923)	(1,074)
Total stockholders' equity		34,821	38,993
Total liabilities and stockholders' equity		92,007	91,713

The accompanying notes are an integral part of these financial statements.



Consolidated Statement of Changes in Equity
In millions of United States dollars

	Share capital	Capital reserve	Profit reserves	Treasury stocks	Other reserves	Cumulative translation adjustments	Retained earnings	Equity attributable to Vale's stockholders	Equity attributable to noncontrolling interests	Total stockholders' equity
Balance at December 31, 2017	61,614	1,139	7,419	(1,477)	(2,289)	(22,948)	—	43,458	1,314	44,772
Net income	—	—	—	—	—	—	6,860	6,860	36	6,896
Other comprehensive income	—	—	(1,257)	—	134	(2,156)	—	(3,279)	(120)	(3,399)
Dividends and interest on capital of Vale's stockholders	—	—	—	—	—	—	(2,054)	(2,054)	—	(2,054)
Dividends of noncontrolling interest	—	—	—	—	—	—	—	—	(166)	(166)
Acquisitions and disposal of noncontrolling interest	—	—	—	—	—	—	—	—	(229)	(229)
Capitalization of noncontrolling interest advances	—	—	4,806	—	—	—	(4,806)	—	12	12
Appropriation to undistributed retained earnings	—	—	—	—	—	—	—	(1,000)	—	(1,000)
Share buyback program	—	—	—	(1,000)	—	—	—	—	—	(1,000)
Balance at December 31, 2018	61,614	1,139	10,968	(2,477)	(2,155)	(25,104)	—	43,985	847	44,832
Loss	—	—	—	—	—	—	(1,683)	(1,683)	(497)	(2,180)
Other comprehensive income	—	—	(428)	—	(298)	(107)	—	(833)	(15)	(848)
Interest on capital of Vale's stockholders	—	—	(1,767)	—	—	—	—	(1,767)	—	(1,767)
Dividends of noncontrolling interest	—	—	—	—	—	—	—	—	(87)	(87)
Acquisitions and disposal of noncontrolling interest	—	—	—	—	343	—	—	343	(1,350)	(1,007)
Capitalization of noncontrolling interest	—	—	—	—	—	—	—	—	28	28
Capitalization of noncontrolling interest advances	—	—	(1,683)	—	—	—	1,683	—	—	—
Allocation of loss	—	—	—	22	—	—	—	22	—	22
Treasury shares utilized in the year (note 28)	—	—	—	—	—	—	—	—	—	—
Balance at December 31, 2019	61,614	1,139	7,090	(2,455)	(2,110)	(25,211)	—	40,067	(1,074)	38,993
Net income (loss)	—	—	(1,448)	—	267	(4,343)	4,881	4,881	(350)	4,531
Other comprehensive income	—	—	(2,329)	—	—	—	(1,152)	(3,481)	—	(3,481)
Dividends and interest on capital of Vale's stockholders	—	—	—	—	—	—	—	—	(8)	(8)
Dividends of noncontrolling interest	—	—	—	—	—	—	—	—	455	242
Acquisitions and disposal of noncontrolling interest	—	—	—	—	(213)	—	—	(213)	22	22
Capitalization of noncontrolling interest advances	—	—	3,729	—	—	—	(3,729)	—	—	—
Appropriation to undistributed retained earnings	—	—	—	14	—	—	—	14	—	14
Treasury shares utilized in the year (note 28)	—	—	—	—	—	—	—	—	—	—
Balance at December 31, 2020	61,614	1,139	7,042	(2,441)	(2,056)	(29,554)	—	35,744	(923)	34,821

The accompanying notes are an integral part of these financial statements.





Notes to the Financial Statements

Expressed in millions of United States dollar, unless otherwise stated

1. Corporate information

Vale S.A. and its subsidiaries ("Vale" or the "Company") are iron ore and iron ore pellets producers, which are key raw materials for steelmaking, and nickel producers, which is used to produce stainless steel and metal alloys employed in the production process of several products. The Company also produces copper, metallurgical and thermal coal, manganese ore and, platinum group metals, gold, silver and cobalt. The information by segment is presented in note 4.

Vale S.A. (the "Parent Company") is a public company headquartered in the city of Rio de Janeiro, Brazil with securities traded on the stock exchanges of São Paulo—B3 S.A. (VALE3), New York—NYSE (VALE) and Madrid—LATIBEX (XVALO).

2. Basis of preparation of the financial statements

a) Statement of compliance

The consolidated financial statements of the Company ("financial statements") have been prepared and are being presented in accordance with International Financial Reporting Standards ("IFRS"), as issued by the International Accounting Standards Board ("IASB").

b) Basis of presentation

The financial statements have been prepared on a historical cost basis as adjusted to reflect: (i) the fair value of financial instruments measured at fair value through income statement or at fair value through the statement of comprehensive income; and (ii) impairment of assets.

These financial statements were authorized for issue by the Board of Directors on February 25, 2021.

c) Functional currency and presentation currency

The financial statements of the Company and its associates and joint ventures are measured using the currency of the primary economic environment in which the entity operates ("functional currency"), which in the case of the Parent Company is the Brazilian real ("R\$"). For presentation purposes, these financial statements are presented in United States dollar ("US\$") as the Company believes that this is how international investors analyze the financial statements.

The exchange rates used by the Company to translate its foreign operations are as follows:

	Closing rate			Average rate for the year ended		
	2020	2019	2018	2020	2019	2018
US Dollar ("US\$")	5.1967	4.0307	3.8748	5.1578	3.9461	3.6558
Canadian dollar ("CAD")	4.0771	3.1034	2.8451	3.8480	2.9746	2.8190
Euro ("EUR" or "€")	6.3779	4.5305	4.4390	5.8989	4.4159	4.3094

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

2. Basis of preparation of the financial statements (Continued)

d) Significant accounting policies

Significant accounting policies used in the preparation of these financial statements are disclosed in the respective notes and have been consistently applied to all years presented, except for the adoption of the IFRS 16—Leases from January 1, 2019 using the retrospective approach with the cumulative effect recognized as at the date of initial application. Accordingly, the comparative information has not been restated and 2018 financial information continues to be presented under IAS 17 and related interpretations. As disclosed in note 8(e), the Company also adopted IFRIC 23—Uncertainty over Income Tax Treatments from January 1, 2019.

In addition, certain new accounting standards and interpretations have been published that are not mandatory for December 31, 2020 reporting periods and have not been early adopted by the Company. These standards are not expected to have a material impact on the entity in future reporting periods.

e) Critical accounting estimates and judgments

The preparation of financial statements requires the use of critical accounting estimates and the application of judgment by management in applying the Company's accounting policies. These estimates are based on the experience, best knowledge, information available at the statement of financial position date and other factors, including expectations of future events that are believed to be reasonable under the circumstances. Changes in facts and circumstances may lead to the revision of these estimates. Actual future results may differ from estimates.

The significant estimates and judgments applied by the Company in the preparation of these financial statements are as follows:

Note	Significant estimates and judgments
7	Deferred revenue
8	Deferred income taxes
14	Consolidation
17	Mineral reserves and mine useful life
18	Impairment of non-current assets
19	Fair values estimate
23	Brumadinho dam failure
24	Liabilities related to associates and joint ventures
25	Asset retirement obligation
26	Litigation
27	Employee post-retirement obligations

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

3. Significant events in the current year

a) Main events

The financial position, cash flows and performance of the Company were particularly affected by the following events and transactions during the year ended December 31, 2020:

- In February 2021 (subsequent event), the Company entered into a Judicial Settlement for Integral Reparation (“Global Settlement”) with the State of Minas Gerais, the Public Defender of the State of Minas Gerais and the Federal and the State of Minas Gerais Public Prosecutors Offices, to repair the environmental and social damage resulting from the Dam I rupture. Thus, the Company recognized a loss of US\$3,872 (R\$19,924 million) in the income statement for the year ended December 31, 2020 (note 23).
- In 2020, as a consequence of the periodic review of the estimates for the de-characterization of the dam structures, the Company recognized US\$369 in addition to the provision already recorded. In addition, the Company also identified other structures that met the de-characterization criteria, resulting in an addition of US\$248 to the provision (note 23).
- In December 2020, the Company signed the early extension terms for its railways concessions related to Estrada de Ferro Carajás (“EFC”) and Estrada de Ferro Vitória a Minas (“EFVM”), for an additional thirty years period, from 2027 to 2057. As a result of the agreement, the Company recognized an intangible asset, which represents its right to use of both EFVM and EFC, and their related concession grants liabilities, in the aggregate amount of US\$2,312 (R\$12,016 million) (note 16).
- In 2020, the Company started looking for a potential buyer for Vale Nouvelle-Calédonie S.A.S. (“VNC”) and started studying the other options available to exit the operation. Following the negotiations that took place during the year, VNC’s assets and liabilities were classified as “held for sale” and measured at fair value, resulting in the recognition of an impairment loss in the amount of US\$382. In December 2020, the Company signed a binding put option agreement for the sale of its ownership interest in VNC for an immaterial consideration. The proposed transaction is expected to be concluded in the first quarter of 2021. Under this agreement, the Company has reserved the amount of the commitment to fund VNC in approximately US\$500 to continue VNC operations, including the commitment to invest in the conversion of the tailings deposition from wet to dry-stacking. Therefore, the Company recognized a loss related to VNC in the amount of US\$882, recognized in the in the income statement as “Impairment and disposals of non-current assets” for the year ended December 31, 2020 (note 18).
- In 2020, the Company tested the recoverability of its loan receivable from Nacala BV. The testing was triggered by the revisions undertaken on the coal volumes that are projected to be transported on the railway, resulting in a loss of US\$798, recognized in the income statement as “Impairment and disposals of non-current assets” for the year ended December 31, 2020 (note 18).

Notes to the Financial Statements (Continued)

Expressed in millions of United States dollar, unless otherwise stated

3. Significant events in the current year (Continued)

- During 2020, Fundação Renova reviewed the assumptions used on the preparation of the estimates incorporated into the mitigation and compensation programs. The periodic review resulted in an addition of US\$1,069 to the provision. In addition, Vale made available US\$166 for Samarco's working capital needs (2019: US\$102). This amount was recognized in the income statement as "Equity results and other results in associates and joint ventures" for the year ended December 31, 2020 (note 24).
- In July 2020, the Board of Directors approved the resumption of the stockholders' remuneration policy and paid the amount of US\$3,350 (R\$18,637 million) (note 28).
- In December 2020, the Company was notified by BNDESPar of the full exercise of the option to purchase 8% of VLI shares held by Vale. With the exercise of this option, Vale received US\$241 (R\$1,223 million) and holds 29.6% of VLI's total shares. This transaction resulted in a gain of US\$172, recognized in the income statement as "Equity results and other results in associates and joint ventures" for the year ended December 31, 2020 (note 15).
- In November 2020, the Company concluded the sale of Biopalma da Amazônia S.A. Reflorestamento Indústria e Comércio ("Biopalma") to Brasil Bio Fuels S.A. As a result of this transaction, a loss of US\$125 was recognized in the income statement as "Impairment and disposals of non-current assets" for the year ended December 31, 2020 (note 18).
- In August 2020, the conditions precedent of the agreement to sell the Company's stake in Henan Longyu were concluded and the Company received US\$156 as part of the consideration for the transaction. This transaction resulted in a gain of US\$116 due to the recycling of the cumulative translation adjustments at closing, which was recognized as "Equity results and other results in associates and joint ventures" in the income statement for the year ended December 31, 2020 (note 15).
- In October 2020, the Company concluded the agreement for the divestiture of PT Vale Indonesia Tbk ("PTVI") and received US\$278. The transaction with non-controlling interest resulted in a loss of US\$179, which was recognized in the Stockholders' Equity for the year ended December 31, 2020 (note 15).
- In September 2020, the Company decided to shut down its operations at the Simões Filho plant in Bahia, resulting in an impairment loss of US\$76, recognized in the income statement as "Impairment and disposals of non-current assets" for the year ended December 31, 2020 (note 18).
- In July 2020, Vale Overseas Limited issued guaranteed notes due July 2030, in the amount of US\$1,500 (note 22).
- In October 2020, the Company approved the incorporation of a joint venture to build and operate an expansion project for the Shulanghu Port facilities, located in China. Vale's capital

Notes to the Financial Statements (Continued)

Expressed in millions of United States dollar, unless otherwise stated

3. Significant events in the current year (Continued)

contribution to the project is estimated to range from US\$110 to US\$160. The construction of the project, which is expected to take up to three years, will start after both parties obtain the anti-trust and other regulatory approvals in China (note 15).

- On January 20, 2021 (subsequent event), the Company signed a Heads of Agreement (“HoA”) with Mitsui & Co., Ltd. (“Mitsui”), allowing both parties to structure Mitsui’s exit from the Moatize coal mine (“Vale Moçambique”) and the Nacala Logistics Corridor (“NLC”). The HoA determines that Vale will acquire Mitsui’s stake in the mine and logistics assets for an immaterial consideration and will undertake the obligation of the Nacala Corridor’s Project Finance in full, which has approximately US\$2,500 outstanding balance at December 31, 2020. In case of closing the transaction, Vale will also control NLC and, therefore, consolidate its assets and liabilities. The parties expect to conclude the transaction in 2021, which is subject to the execution of the definitive agreement and usual precedent conditions. In addition, the Company informed the market its divestiture decision in the coal segment, which may lead to the presentation of this segment as a discontinued operation in future financial statements depending on the Company’s assessment (note 15).

b) Coronavirus impact

A significant portion of the Company’s revenue derived from sales to customers in Asia and Europe, regions that have had their economic activities affected as a result of the pandemic. The Company also has an extensive logistics and supply chain, including several ports, distribution centers and suppliers that have operations in those affected regions.

The Company has taken several measures to monitor and prevent the effects of COVID-19, including health and safety measures for its employees (such as social distancing and remote working) and actions to secure the supply of materials essential to the Company’s production process.

The Company has pledged US\$109 to support humanitarian aid programs in the communities where the Company operates, with special focus on Brazil communities that have been more adversely affected by the pandemic. This amount was used to purchase medical supplies and equipment and were recognized as “Other operating expenses” in the income statement for the year ended December 31, 2020.

At this time, the effects of the pandemic have not caused significant impacts on its operations nor on the fair value of the Company’s assets and liabilities. However, unusual significant changes have occurred in the value of financial assets in many markets since the pandemic outbreak. However, if the pandemic continues for an extended period of time or increases in intensity in the regions where the Company operates, the Company’s financial conditions or results of operations may be adversely impacted.

Liquidity—As a precautionary measure to increase its cash position and preserve financial flexibility considering the uncertainties resulting from the COVID-19 pandemic, the Company temporary discontinued the nickel hedge program, through the sale of option contracts for the total amount of US\$230.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

3. Significant events in the current year (Continued)

Deferred income tax—On March 31, 2020, the government of Indonesia issued a regulation (“PERPPU-1”) to manage the economic impact of the global COVID-19 pandemic, which affects Indonesia’s tax policies. The 25% income tax rate was reduced to 22% in fiscal years 2020 and 2021 and will later be reduced to 20% as of fiscal year 2022. Therefore, the Company has measured the deferred income tax of PT Vale Indonesia Tbk (“PTVI”), considering the effective promulgation of the new income tax rate recognizing an income tax gain of US\$80 in the year ended December 31, 2020.

4. Information by business segment and by geographic area

The Company operated the following reportable segments during this year: Ferrous Minerals, Base Metals and Coal. The segments are aligned with products and reflect the structure used by Management to evaluate Company’s performance. The responsible bodies for making operational decisions, allocating resources and evaluating performance are the Executive Boards and the Board of Directors. The performance of the operating segments is assessed based on a measure of adjusted EBITDA.

The Company has created the Special Recovery and Development Board, which is in-charge of those measures related to the Brumadinho dam rupture (note 23) that reports to the CEO. The costs related to the Brumadinho event are not directly linked to the Company’s operating activities and, therefore, are under “Other”, as well as, revenues and costs of other products, services, research and development, investments in joint ventures and associates of other businesses and unallocated corporate expenses.

The information presented to the Executive Board on the performance of each segment is derived from the accounting records, adjusted for reallocations between segments.

The main activities of the operating segments are as follows:

Ferrous minerals—Comprise of the production and extraction of iron ore, iron ore pellets, manganese, other ferrous products and its logistic services.

Base metals—Include the production and extraction of nickel and its by-products (copper, gold, silver, cobalt, precious metals and others) and copper, as well as its by-products (gold and silver).

Coal—Comprise of the production and extraction of metallurgical and thermal coal and its logistic services.

Fertilizers (Discontinued operations)—Included the production of potash, phosphate, nitrogen and other fertilizer products, which was discontinued in 2018 (note 15).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

4. Information by business segment and by geographic area (Continued)

a) Adjusted EBITDA

The definition of Adjusted EBITDA for the Company is the operating income or loss plus dividends received and interest from associates and joint ventures, and excluding the amounts charged as (i) depreciation, depletion and amortization and (ii) impairment and disposal of non-current assets.

	Year ended December 31, 2020						
	Net operating revenue	Cost of goods sold and services rendered	Sales, administrative and other operating expenses	Research and evaluation	Pre operating and operational stoppage	Dividends received and interest from associates and joint ventures	Adjusted EBITDA
Ferrous minerals							
Iron ore	27,285	(8,171)	(187)	(127)	(534)	23	18,289
Iron ore pellets	4,242	(1,661)	11	(5)	(77)	116	2,626
Ferroalloys and manganese	225	(179)	–	(2)	(29)	–	15
Other ferrous products and services.....	326	(254)	3	(2)	–	2	75
	32,078	(10,265)	(173)	(136)	(640)	141	21,005
Base metals							
Nickel and other products..	4,995	(3,216)	(25)	(49)	(29)	–	1,676
Copper	2,175	(794)	(7)	(68)	(1)	–	1,305
	7,170	(4,010)	(32)	(117)	(30)	–	2,981
Coal.....	473	(1,456)	(15)	(28)	–	95	(931)
Brumadinho event	–	–	(5,257)	–	–	–	(5,257)
COVID-19	–	–	(109)	–	–	–	(109)
Others	297	(328)	(928)	(162)	(12)	32	(1,101)
Total	40,018	(16,059)	(6,514)	(443)	(682)	268	16,588

	Year ended December 31, 2019						
	Net operating revenue	Cost of goods sold and services rendered	Sales, administrative and other operating expenses	Research and evaluation	Pre operating and operational stoppage	Dividends received and interest from associates and joint ventures	Adjusted EBITDA
Ferrous minerals							
Iron ore	23,343	(8,778)	(323)	(123)	(750)	29	13,398
Iron ore pellets	5,948	(2,666)	(20)	(16)	(72)	258	3,432
Ferroalloys and manganese	282	(220)	(8)	(2)	(1)	–	51
Other ferrous products and services.....	432	(324)	–	(1)	–	9	116
	30,005	(11,988)	(351)	(142)	(823)	296	16,997
Base metals							
Nickel and other products..	4,257	(2,867)	(75)	(44)	(28)	–	1,243
Copper	1,904	(905)	(5)	(43)	(20)	–	931
	6,161	(3,772)	(80)	(87)	(48)	–	2,174
Coal.....	1,021	(1,638)	1	(30)	–	113	(533)
Brumadinho event	–	–	(7,402)	–	–	–	(7,402)
Others	383	(390)	(506)	(184)	(11)	57	(651)
Total	37,570	(17,788)	(8,338)	(443)	(882)	466	10,585



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

4. Information by business segment and by geographic area (Continued)

	Year ended December 31, 2018						
	Net operating revenue	Cost of goods sold and services rendered	Sales, administrative and other operating expenses	Research and evaluation	Pre operating and operational stoppage	Dividends received and interest from associates and joint ventures	Adjusted EBITDA
Ferrous minerals							
Iron ore	20,354	(9,048)	(76)	(110)	(115)	28	11,033
Iron ore pellets	6,651	(3,393)	(11)	(26)	(19)	154	3,356
Ferroalloys and manganese	454	(290)	(3)	(1)	-	-	160
Other ferrous products and services	474	(313)	(4)	(1)	(1)	7	162
	<u>27,933</u>	<u>(13,044)</u>	<u>(94)</u>	<u>(138)</u>	<u>(135)</u>	<u>189</u>	<u>14,711</u>
Base metals							
Nickel and other products ..	4,610	(3,060)	(47)	(39)	(33)	-	1,431
Copper	2,093	(960)	(4)	(18)	-	-	1,111
	<u>6,703</u>	<u>(4,020)</u>	<u>(51)</u>	<u>(57)</u>	<u>(33)</u>	<u>-</u>	<u>2,542</u>
Coal	1,643	(1,575)	(9)	(21)	-	143	181
Others	296	(263)	(752)	(157)	(21)	56	(841)
Total	<u>36,575</u>	<u>(18,902)</u>	<u>(906)</u>	<u>(373)</u>	<u>(189)</u>	<u>388</u>	<u>16,593</u>
Discontinued operations							
(Fertilizers)	121	(120)	(4)	-	-	-	(3)
Total	<u>36,696</u>	<u>(19,022)</u>	<u>(910)</u>	<u>(373)</u>	<u>(189)</u>	<u>388</u>	<u>16,590</u>

Adjusted EBITDA is reconciled to net income (loss) as follows:

From continuing operations

	Year ended December 31,		
	2020	2019	2018
Net income (loss) attributable to Vale's stockholders	4,881	(1,683)	6,952
Net income (loss) attributable to noncontrolling interests	(350)	(497)	36
Net income (loss)	<u>4,531</u>	<u>(2,180)</u>	<u>6,988</u>
Depreciation, depletion and amortization	3,234	3,726	3,351
Income taxes	438	(595)	(172)
Financial results	4,811	3,413	4,957
Equity results and other results in associates and joint ventures	1,063	681	182
Dividends received and interest from associates and joint ventures(i)	268	466	388
Impairment and disposal of non-current assets	2,243	5,074	899
Adjusted EBITDA	<u>16,588</u>	<u>10,585</u>	<u>16,593</u>

(i) Includes the remuneration of the financial instrument of the Coal segment.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

4. Information by business segment and by geographic area (Continued)

From discontinued operations

	Year ended December 31, 2018
Loss	(92)
Income taxes	(40)
Financial results	5
Impairment of non-current assets	124
Adjusted EBITDA	(3)

b) Assets by segment

	December 31, 2020			December 31, 2019		
	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangibles(i)	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangibles(i)
Ferrous minerals	2,017	1,154	29,436	1,955	1,729	33,528
Base metals	1,231	18	19,549	1,354	14	19,893
Coal	25	—	—	60	—	—
Others	—	859	1,459	2	1,055	1,654
Total	3,273	2,031	50,444	3,371	2,798	55,075

	Year ended December 31,								
	2020			2019			2018		
	Sustaining capital	Capital expenditures(ii) Project execution	Depreciation, depletion and amortization	Sustaining capital	Capital expenditures(ii) Project execution	Depreciation, depletion and amortization	Sustaining capital	Capital expenditures(ii) Project execution	Depreciation, depletion and amortization
Ferrous minerals	2,134	258	1,768	1,685	385	2,063	1,569	823	1,672
Base metals	1,566	239	1,397	1,225	151	1,351	1,189	34	1,351
Coal	203	—	19	240	—	237	132	24	252
Others	5	25	50	10	8	75	6	7	76
Total	3,908	522	3,234	3,160	544	3,726	2,896	888	3,351

- (i) Goodwill is allocated to ferrous minerals and base metals segments in the amount of US\$1,373 and US\$1,926 in December 31, 2020 and US\$1,770 and US\$1,859 in December 31, 2019, respectively.
- (ii) Cash outflows.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

4. Information by business segment and by geographic area (Continued)

c) Assets by geographic area

	December 31, 2020				December 31, 2019			
	Investments in associates and joint ventures	Intangible	Property, plant and equipment	Total	Investments in associates and joint ventures	Intangible	Property, plant and equipment	Total
Brazil.....	1,760	7,341	23,364	32,465	2,498	6,496	29,134	38,128
Canada	—	1,951	11,798	13,749	—	2,000	10,733	12,733
Americas, except Brazil and Canada	234	—	5	239	242	—	—	242
Europe	—	—	894	894	—	2	900	902
Indonesia	—	2	2,729	2,731	—	1	2,761	2,762
Asia, except Indonesia and China	20	—	951	971	39	—	985	1,024
China	17	2	19	38	19	—	10	29
New Caledonia.....	—	—	—	—	—	—	604	604
Oman	—	—	1,388	1,388	—	—	1,449	1,449
Total	2,031	9,296	41,148	52,475	2,798	8,499	46,576	57,873

d) Net operating revenue by geographic area

	Year ended December 31, 2020				
	Ferrous minerals	Base metals	Coal	Others	Total
Americas, except United States and Brazil	334	286	—	—	620
United States of America.....	244	797	—	—	1,041
Germany.....	357	1,309	—	—	1,666
Europe, except Germany	1,214	2,356	101	—	3,671
Middle East, Africa and Oceania.....	1,418	17	68	—	1,503
Japan	1,793	400	20	—	2,213
China	22,202	922	16	—	23,140
Asia, except Japan and China.....	2,068	931	257	—	3,256
Brazil.....	2,448	152	11	297	2,908
Net operating revenue	32,078	7,170	473	297	40,018

	Year ended December 31, 2019				
	Ferrous minerals	Base metals	Coal	Others	Total
Americas, except United States and Brazil	523	835	—	—	1,358
United States of America.....	404	931	—	—	1,335
Germany.....	1,161	522	—	—	1,683
Europe, except Germany	1,514	1,715	282	—	3,511
Middle East, Africa and Oceania.....	2,083	20	75	—	2,178
Japan	2,057	426	120	—	2,603
China	17,572	670	—	—	18,242
Asia, except Japan and China.....	2,032	816	464	—	3,312
Brazil.....	2,659	226	80	383	3,348
Net operating revenue	30,005	6,161	1,021	383	37,570

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

4. Information by business segment and by geographic area (Continued)

	Year ended December 31, 2018				
	Ferrous minerals	Base metals	Coal	Others	Total
Americas, except United States and Brazil	820	658	—	—	1,478
United States of America	388	952	—	13	1,353
Germany	1,130	523	—	—	1,653
Europe, except Germany	2,218	1,800	436	—	4,454
Middle East, Africa and Oceania	2,562	25	151	—	2,738
Japan	2,072	508	163	—	2,743
China	14,381	861	—	—	15,242
Asia, except Japan and China	1,798	1,101	767	—	3,666
Brazil	2,564	275	126	283	3,248
Net operating revenue	27,933	6,703	1,643	296	36,575

Provisionally priced commodities sales—The commodity price risk arises from volatility of iron ore, nickel, copper and coal prices. The Company is mostly exposed to the fluctuations in the iron ore and copper price (note 19). The selling price of these products can be measured reliably at each period, since the price is quoted in an active market.

The sensitivity of the Company's risk on final settlement of provisionally priced accounts receivables are presented below:

	December 31, 2020			
	Thousand metric tons	Provisional price (US\$/tonne)	Change	Effect on Revenue
Iron ore	27,169	150.6	+/-10%	+/-409
Iron ore pellets	418	181.9	+/-10%	+/-8
Copper	89	9,723.4	+/-10%	+/-86

Accounting policy

Revenue is recognized when the control of a good or service transferred to a customer. Since Vale's sales are under different shipping terms, revenue could be recognized when the product is available at the loading port, loaded on the ship, at the port of discharge or at the customer's warehouse.

A relevant proportion of Vale's sales are under Cost and Freight ("CFR") and Cost, Insurance and Freight ("CIF") Incoterms, in which the Company is responsible for providing shipping services after the date that Vale transfers control of the goods to the customers. Shipping services for CFR and CIF contracts are considered as a separate performance obligation in which a proportion of the transaction price is allocated and recognized over time as the shipping services are provided.

Generally, the contract payment terms consider the upfront payments or the use of credit letters. The payment terms do not have a significant financing component. In some cases, the sale price is determined

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

4. Information by business segment and by geographic area (Continued)

on a provisional basis at the date of sale and adjustments to the sale price subsequently occur based on movements in the quoted market or contractual prices up to the date of final pricing.

Revenue is recognized based on the estimated fair value of the total consideration receivable, and the provisionally priced sale mechanism embedded within these sale arrangements has the character of a derivative. Accordingly, the fair value of the final sale price adjustment is re-estimated continuously and changes in fair value are recognized as operational revenue in the income statement.

5. Costs and expenses by nature

a) Cost of goods sold and services rendered

	Year ended December 31,		
	2020	2019	2018
Personnel	1,676	2,009	2,278
Materials and services	3,345	3,873	3,957
Fuel oil and gas	949	1,392	1,538
Maintenance	2,725	2,797	2,807
Royalties	846	802	746
Energy	703	858	906
Ores acquired from third parties	946	608	513
Depreciation, depletion and amortization	2,980	3,399	3,207
Freight	3,439	4,023	4,306
Others	1,430	1,426	1,851
Total	19,039	21,187	22,109
Cost of goods sold	18,457	20,498	21,526
Cost of services rendered	582	689	583
Total	19,039	21,187	22,109

b) Selling and administrative expenses

	Year ended December 31,		
	2020	2019	2018
Selling	88	92	95
Personnel	224	181	212
Services	114	85	92
Depreciation and amortization	49	56	62
Advertisement	17	7	20
Others	62	66	42
Total	554	487	523

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

5. Costs and expenses by nature (Continued)

c) Other operating expenses (income), net

	Year ended December 31,		
	2020	2019	2018
Asset retirement obligations	312	92	5
Provision for litigations(i)	73	291	185
Profit sharing program	115	89	187
COVID-19 expenses	109	—	—
Disposals of materials and inventories	25	47	32
Others(ii)	118	(14)	36
Total	752	505	445

(i) In 2019, includes the change in the expected outcome of probable loss of the lawsuit related to the accident of ship loaders, at the Praia Mole maritime terminal, in Espírito Santo.

(ii) In 2020, includes expenses in the amount of US\$128 related to early termination or amendment of contracts of all converted vessels engaged in cargo transportation. In 2019, includes the reversal of the amount provided for the legal proceedings related to the Rede Ferroviária Federal S.A lawsuit.

6. Financial result

	Year ended December 31,		
	2020	2019	2018
Financial income			
Short-term investments	129	247	177
Others(i)	246	280	246
	375	527	423
Financial expenses			
Loans and borrowings gross interest	(819)	(989)	(1,185)
Capitalized loans and borrowing costs	70	140	194
Participative stockholders' debentures	(1,565)	(1,475)	(550)
Interest on REFIS	(55)	(154)	(197)
Interest on lease liabilities	(70)	(76)	—
Financial guarantees	(468)	(353)	23
Expenses with cash tender offer repurchased	—	(265)	(273)
Others	(376)	(574)	(326)
	(3,283)	(3,746)	(2,314)
Other financial items, net			
Net foreign exchange gains (losses)	(523)	39	(2,247)
Derivative financial instruments (note 19)	(1,210)	244	(266)
Indexation losses, net	(170)	(477)	(553)
	(1,903)	(194)	(3,066)
Total	(4,811)	(3,413)	(4,957)

(i) In 2020, includes amounts related to Eletrobrás' contingent assets in the amount of US\$59, see note 26.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

6. Financial result (Continued)

Accounting policy

Transactions in foreign currencies are translated into the functional currency using the exchange rate prevailing at the transaction date. The foreign exchange gains and losses resulting from the translation at the exchange rates prevailing at the end of the year are recognized in the income statement as “financial income or expense”. The exceptions are transactions related to qualifying net investment hedges or items that are attributable to part of the net investment in a foreign operation, for which gains and losses are recognized in the statement of comprehensive income.

7. Streaming transactions

Cobalt streaming

In June 2018, the Company entered into two different agreements, one with Wheaton Precious Metals Corp (“Wheaton”) and the other with Cobalt 27 Capital Corp. (“Cobalt 27”), to sell a stream equivalent to 75% of the cobalt to be extracted as a by-product from the Voisey’s Bay mine, in Canada. Upon completion of the transaction, the Company received an aggregate upfront payment of US\$690, which the Company has been investing on the Voisey’s Bay underground mine expansion project. The cobalt extraction is expected to start in 2022 and, that is when the prepayment starts to be amortized over the useful life of the mine, along with the depreciation of the Voisey’s Bay underground mine assets.

Vale will also receive additional payments of 20%, on average, of the market reference price for cobalt, for each pound of finished cobalt delivered. The revenue will be recognized based on the units of cobalt extracted in relation to the total proven and probable cobalt reserves negotiated with Wheaton and Cobalt 27.

Gold streaming

In August 2016, the Company amendment the gold transaction entered into to 2013 with Wheaton Precious Metals Corp (“Wheaton”) to include in each contract an additional 25% of the gold extracted as by-product over a lifetime of the Salobo copper mine. Hence, Wheaton holds the rights to 75% of the contained gold in the copper concentrated from the Salobo mine and 70% of the gold extracted as a by-product of the Sudbury nickel mines until 2030.

The transactions were bifurcated into two identifiable components (i) the sale of the mineral rights recognized in the income statement under “Other operating income (expenses), net” and, (ii) the contract liability related to the services for gold extraction on the portion in which Vale operates as an agent for Wheaton gold extraction.



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

7. Streaming transactions (Continued)

Accounting policy

The Company recognizes contract liabilities in the event it receives payments from customers before a sale meets criteria for revenue recognition. Proceeds received under the terms of the streaming transaction are accounted for as “streaming transactions” and included within liabilities.

Contract liability is initially recognized at fair value, net of transaction costs incurred, and is subsequently carried at amortized cost and updated using the effective interest rate method. Contract liability is released in the income statement as the control of the product or service is transferred to the customer.

Critical accounting estimates and judgments

Defining the gain on sale of mineral interest and the contract liabilities portion of the gold transaction requires the use of critical accounting estimates including, but not limited to: (i) allocation of costs between nickel or copper and gold based on relative prices; (ii) expected margin for the independent components (sale of mineral rights and service for gold extraction); and (iii) discount rates used to measure the present value of future inflows and outflows.

8. Income taxes

a) Deferred income tax assets and liabilities

	December 31, 2020	December 31, 2019
Taxes losses carryforward	4,328	4,659
Temporary differences:		
Employee post retirement obligations	744	840
Provision for litigation	356	443
Timing differences arising on assets and liabilities	4,331	3,246
Fair value of financial instruments	1,355	864
Allocated goodwill	(2,623)	(2,640)
Goodwill amortization	(442)	(478)
Others	516	401
	4,237	2,676
Total	8,565	7,335
Assets	10,335	9,217
Liabilities	(1,770)	(1,882)
	8,565	7,335

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

8. Income taxes (Continued)

Changes in deferred tax are as follows:

	Assets	Liabilities	Deferred taxes, net
Balance at December 31, 2018	6,908	1,532	5,376
Utilization of taxes losses carryforward	(443)	—	(443)
Timing differences arising on assets and liabilities	2,113	—	2,113
Fair value of financial instruments	328	—	328
Allocated goodwill	—	(210)	210
Others	(91)	—	(91)
Effect in income statement	1,907	(210)	2,117
Transfers between asset and liabilities	252	252	—
Acquisition of subsidiaries(i)	104	250	(146)
Translation adjustment	(187)	47	(234)
Other comprehensive income	233	11	222
Balance at December 31, 2019	9,217	1,882	7,335
Taxes losses carryforward	374	—	374
Timing differences arising on assets and liabilities	1,690	—	1,690
Fair value of financial instruments	756	—	756
Allocated goodwill	—	(108)	108
Others	32	—	32
Effect in income statement	2,852	(108)	2,960
Transfers between asset and liabilities	38	38	—
Translation adjustment	(1,811)	(37)	(1,774)
Other comprehensive income	39	(5)	44
Balance at December 31, 2020	10,335	1,770	8,565

(i) Refers to the acquisition of New Steel and Ferrous Resources Limited (note 15).

The tax loss carryforward does not expire in the Brazilian jurisdiction and their compensation is limited to 30% of the taxable income for the year. The local profits of subsidiaries abroad are also taxed in Brazil and there is no restriction on their offset against tax losses generated previously by the foreign entity.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

8. Income taxes (Continued)

b) Income tax reconciliation—Income statement

The total amount presented as income taxes in the income statement is reconciled to the statutory rate, as follows:

	Year ended December 31,		
	2020	2019	2018
Income (loss) before income taxes	4,969	(2,775)	6,816
Income taxes at statutory rate—34%	(1,689)	944	(2,317)
Adjustments that affect the basis of taxes:			
Income tax benefit from interest on stockholders' equity	316	601	873
Tax incentives	211	189	576
Equity results	(41)	77	104
Addition (reversal) of tax loss carryforward(i)	769	25	1,510
Unrecognized tax losses of the year	(217)	(1,059)	(458)
Others	213	(182)	(116)
Income taxes	(438)	595	172

(i) Mainly refers to the effect of monetary exchange variation on tax losses carryforward from foreign subsidiaries.

c) Tax incentives

In Brazil, the Company has tax incentives to partially reduce the income tax generated by the operations conducted in the North and Northeast regions that includes iron ore, pellets, copper and nickel. The incentive is calculated based on the taxable income of the incentive activity (tax operating income) and takes into account the allocation of tax operating income into different incentives applicable to different tranches of production during the periods specified for each product, usually 10 years. Most of the Company's incentives are expected to expire up to 2024 and the last recognized tax incentive will expire in 2027. An amount equal to that obtained with the tax saving must be appropriated in retained earnings reserve account in stockholders' equity and cannot be distributed as dividends to stockholders.

In addition to those incentives, part of the income tax due, can be reinvested in the acquisition of new machinery and equipment, subject to subsequent approval by the regulatory agency responsible, Superintendence for the Development of the Amazon ("SUDAM"). The reinvestment subsidy is accounted in retained earnings reserve account, which restricts its distribution as dividends to stockholders. This tax incentive expires in 2023.

The Company is subject to the revision of income tax by local tax authorities in a range up to 10 years depending on jurisdiction where the Company operates.

d) Income taxes—Settlement program ("REFIS")

The balance mainly relates to the settlement program of the claims related to the collection of income tax and social contribution on equity gains of foreign subsidiaries and affiliates from 2003 to 2012. As at December 31, 2020, the balance of US\$2,744 (US\$340 classified as current liabilities and US\$2,404 classified as non-current liabilities) is due in 94 remaining monthly installments, bearing the SELIC interest

Notes to the Financial Statements (Continued)

Expressed in millions of United States dollar, unless otherwise stated

8. Income taxes (Continued)

rate (Special System for Settlement and Custody), which is the Brazilian federal funds rate, while at December 31, 2019, the balance was US\$3,907 (US\$431 classified as current liabilities and US\$3,476 classified as non-current liabilities).

As at December 31, 2020, the SELIC rate was 2.00% per annum (4.50% per annum at December 31, 2019).

e) Uncertain tax positions

The Company has assessed its uncertain tax positions, particularly those related to the deduction of the deduction of social security contributions on the net income ("CSLL") in Brazil and the calculation of the transfer pricing over exportation of ore to its foreign subsidiary and, based on the position of its internal and external legal advisors, has concluded that these uncertain tax positions are likely to be accepted by the tax authority as discussed below:

(e.i) Deduction of CSLL in Brazil:

In 2004, a definitive decision of the Superior Court of Justice ("STJ") granted to the Company the right to deduct the CSLL from the taxable corporate income. In 2006, the Brazilian federal tax authorities commenced a rescission action (*ação rescisória*), seeking the reversal of the 2004 decision. In 2019, the Federal Court of Appeals ("TRF") decided in favor for the rescission action and, based on this decision, although not definitive, the Company has decided not to deduct the CSLL from the taxable income.

In November 2020, the Company received an assessment regarding 2016 and 2017 for the collection of corporate income tax ("IRPJ") in the amount of US\$435 (R\$2,259 million), related to the deduction of CSLL from the fiscal years in which Vale was supported by a definitive favorable court decision (*res judicata*).

Vale believes that the rescission action brought by the Federal Government is not applicable (Precedent 343 issued by Brazilian Supreme Court) and, even if it were, the fiscal years prior to the eventual favorable decision on the rescission action could not be charged to the Company. Any understanding conflicting to that interpretation violates the Brazilian legal framework and the consolidated jurisprudence.

(e.ii) Transfer pricing over the exportation of ores to a foreign subsidiary:

The Company was assessed for the collection corporate income tax (IRPJ) and social contribution on net income (CSLL), for the years of 2015, 2016 and 2017 since the tax agent has disregarded the intermediation cost used in the calculation of the transfer pricing over the exportation of iron ore, copper and manganese to its foreign controlled company.

The Company is challenging these assessments in the administrative level and a decision is pending. The total amount in dispute is US\$695 (R\$3,614 million) (2019: US\$355 (R\$1,431 million)). In addition, there was a reduction of the tax losses from 2015, 2016 and 2017, with the corresponding tax impact of US\$362 (R\$1,882 million), including penalties and interests.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

8. Income taxes (Continued)

The Company consistently applies its method for calculating the transfer pricing and it considers that to be the most appropriate tax treatment regarding the prevailing law. From the 2018 to 2020 fiscal years, the amount involved is US\$1,232 (R\$6,401 million).

Accounting policy

The Brazilian corporate tax law requires the taxation on the income generated from foreign subsidiaries and, therefore, income tax charge is calculated using the tax rate enacted at the end of the reporting period in Brazil. The effects of the income tax calculation in the consolidated financial statements are calculated by applying the differential between the Brazilian income tax rate and the local income tax rate of each jurisdiction where the Company's subsidiaries operate and generate taxable income.

Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation and it establishes provisions, where appropriate, on the basis of amounts expected to be paid to the tax authorities. The benefits of uncertain tax positions are recorded only after determining, based on the position of its internal and external legal advisors, a more-likely-than-not probability that the uncertain tax positions will withstand challenge, if any, from taxing authorities.

Deferred income taxes are recognized based on temporary differences between carrying amount and the tax basis of assets and liabilities as well as tax losses carryforwards. However, deferred tax liabilities are not recognized if they arise from the initial recognition of goodwill. Deferred income tax is also not accounted for if it arises from initial recognition of an asset or liability in a transaction other than a business combination that, at the time of the transaction, affects neither accounting nor taxable profit or loss. Deferred tax assets and liabilities are offset where there is a legally enforceable right to offset current tax assets and liabilities and where the deferred tax balances relate to the same taxation authority.

The deferred tax assets arising from tax losses and temporary differences are not recognized when it is not probable that future taxable profit will be available against which temporary differences and/or tax losses can be utilized.

Current and deferred tax is recognized in profit or loss, except to the extent that it relates to items recognized in other comprehensive income or directly in stockholder's equity. In this case, the tax is also recognized in other comprehensive income or directly in stockholder's equity, respectively.

Critical accounting estimates and judgments

Significant judgements, estimates and assumptions are required to determine the amount of deferred tax assets that are recognized based on the likely timing and future taxable profits. Deferred tax assets arising from tax losses carryforwards and temporary differences are recognized considering assumptions and projected cash flows. Deferred tax assets may be affected by factors including, but not limited to: (i) internal assumptions on the projected taxable income, which are based on production and sales planning, commodity prices, operational costs and planned capital costs; (ii) macroeconomic environment; and (iii) trade and tax scenarios.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

8. Income taxes (Continued)

In addition, the Company applies significant judgement in identifying uncertainties over income tax treatments, which could impact the consolidated financial statements. The Company operates in multiple jurisdictions where uncertainties arise in the application of complex tax regulations. The Company and its subsidiaries are subject to reviews of income tax filings and other tax payments, and disputes can arise with the taxing authorities over the interpretation of the applicable laws and regulations.

9. Basic and diluted earnings (loss) per share

The basic and diluted earnings (loss) per share are presented below:

	Year ended December 31,		
	2020	2019	2018
Net income (loss) attributable to Vale's stockholders:			
Net income (loss) from continuing operations	4,881	(1,683)	6,952
Loss from discontinued operations	—	—	(92)
Net income (loss)	4,881	(1,683)	6,860
Thousands of shares			
Weighted average number of shares outstanding—common shares	5,129,585	5,127,950	5,178,024
Basic and diluted earnings (loss) per share from continuing operations:			
Common share (US\$)	0.95	(0.33)	1.34
Basic and diluted loss per share from discontinued operations:			
Common share (US\$)	—	—	(0.02)
Basic and diluted earnings (loss) per share:			
Common share (US\$)	0.95	(0.33)	1.32

The Company does not have potential outstanding shares or other instruments with dilutive effect on the earnings per share computation.

10. Accounts receivable

	December 31, 2020	December 31, 2019
Accounts receivable	5,043	2,592
Expected credit loss	(50)	(63)
	4,993	2,529
Revenue related to the steel sector—%	87.25%	87.33%

	Year ended December 31,		
	2020	2019	2018
Impairment of accounts receivable recorded in the income statement ..	5	(1)	(7)

In 2020, the Company had a customer of the Ferrous Minerals Segment whose revenue individually represented 10.1% of the Company's total revenue. In 2019, there was no customer that individually represents more than 10% of the Company's accounts receivable or revenues.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

10. Accounts receivable (Continued)

Accounting policy

Accounts receivable is the total amount due from sale of products and services rendered by the Company. Accounts receivable is recognized at fair value and subsequently measured at amortized cost using the effective interest method, except for component of provisionally priced commodities sales that are subsequently measured at fair value through profit or loss.

The Company applies the IFRS 9 simplified approach to measuring expected credit losses which uses a lifetime expected loss allowance for all accounts receivable. The Company has established a provision matrix that is based on historical credit loss experience, adjusted for forward-looking factors specific to the economic environment and by any financial guarantees related to these accounts receivables.

11. Inventories

	<u>December 31, 2020</u>	<u>December 31, 2019</u>
Finished products.....	2,626	2,604
Work in progress	647	767
Consumable inventory	788	903
Total.....	4,061	4,274

	<u>Year ended December 31,</u>		
	<u>2020</u>	<u>2019</u>	<u>2018</u>
Reversal (provision) for net realizable value.....	3	24	(4)

Finished and work in progress products inventories by segments are presented in note 4(b) and the cost of goods sold is presented in note 5(a).

Accounting policy

Inventories are stated at the lower of cost and the net realizable value. The inventory production cost comprises variable and fixed costs, direct and indirect costs of production and are assigned to individual items of inventory on the basis of weighted average costs method. At the end of the reporting period, net realizable value of inventories are assessed and a provision for losses on obsolete or slow-moving inventory may be recognized. The write-downs and reversals are recognized as "Cost of goods sold and services rendered".

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

12. Recoverable taxes

Recoverable taxes are presented net of provisions for losses on tax credits.

	December 31, 2020	December 31, 2019
Value-added tax (net of provision for loss)	433	484
Brazilian federal contributions.....	593	659
Prepaid income taxes.....	561	967
Others	13	16
Total	1,600	2,126
Current	509	922
Non-current	1,091	1,204
Total	1,600	2,126

13. Other financial assets and liabilities

	Current		Non-Current	
	December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Other financial assets				
Restricted cash	—	—	38	151
Derivative financial instruments (note 19)	134	288	66	184
Investments in equity securities.....	—	—	757	726
Related parties—Loans (note 29)	195	319	923	1,600
	329	607	1,784	2,661
Other financial liabilities				
Derivative financial instruments (note 19)	328	94	689	307
Related parties—Loans (note 29)	725	980	943	956
Financial guarantees provided (note 30) ..	—	—	877	525
Liabilities related to the concession grant (note 16b).....	209	—	2,103	—
Advance received	644	330	—	—
	1,906	1,404	4,612	1,788



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures

a) Investment information

	% ownership	% voting capital	Investments in associates and joint ventures		Equity results in the income statement				Dividends received			
			December 31, 2020	December 31, 2019	Year ended December 31,		Year ended December 31,					
					2020	2019	2020	2019	2020	2019		
Associates and joint ventures												
Ferrous minerals												
Baovale Mineração S.A.	50.00	50.00	20	25	1	4	5	—	—	—	—	1
Companhia Coreano-Brasileira de Pelotização.	50.00	50.00	48	88	8	48	69	34	62	34	62	32
Companhia Hispano-Brasileira de Pelotização(i)	50.89	50.89	43	70	11	37	55	27	50	27	50	23
Companhia Italo-Brasileira de Pelotização(i)	50.90	51.00	44	65	10	30	60	23	54	23	54	32
Companhia Nipo-Brasileira de Pelotização(i)	51.00	51.11	121	150	8	84	126	32	92	32	92	67
MRS Logística S.A.	48.16	46.75	398	496	34	50	72	22	29	22	29	27
Samarco Mineração S.A. (note 24)	50.00	50.00	—	—	—	—	—	—	—	—	—	—
VLI S.A.	29.60	29.60	480	812	(22)	1	30	2	9	2	9	7
Zhuhai YPM Pellet Co.	—	—	—	23	—	—	—	—	—	—	—	—
			1,154	1,729	50	254	417	140	296	140	296	189
Base metals												
Korea Nickel Corp.	25.00	25.00	18	14	—	—	1	—	—	—	—	—
			18	14	—	—	1	—	—	—	—	—
Coal												
Henan Longyu Energy Resources Co., Ltd.	—	—	—	—	—	—	(2)	16	—	—	—	—
Nacala Corridor Holding Netherlands B.V.	50.00	50.00	—	—	—	—	—	—	—	—	—	—
			—	—	—	—	(2)	16	—	—	—	—
Others												
Aliança Geração de Energia S.A.(i)	55.00	55.00	367	470	28	31	25	24	28	24	28	25
Aliança Norte Energia Participações S.A.(i)	51.00	51.00	117	160	(8)	4	15	—	—	—	—	—
California Steel Industries, Inc.	50.00	50.00	234	242	(7)	23	(7)	—	29	—	29	31
Companhia Siderúrgica do Pecém	50.00	50.00	—	—	(131)	(69)	(243)	—	—	—	—	—
Mineração Rio do Norte S.A.	40.00	40.00	71	97	(3)	15	2	9	—	9	—	—
Others.	—	—	70	86	(48)	(28)	(5)	—	—	—	—	—
			859	1,055	(169)	(24)	(129)	33	57	33	57	56
Total			2,031	2,798	(119)	228	305	173	353	173	353	245

(i) Although the Company held a majority of the voting capital, the entities are accounted under the equity method due to the stockholders' agreement where relevant decisions are shared with other parties.

The significant associates and joint ventures of the Company are located in Brazil.



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures (Continued)

b) Movements during the year

	2020	2019
Balance at January 1,	2,798	3,225
Additions and Capitalizations(i)	131	76
Disposals(ii)	(250)	—
Translation adjustment	(542)	(111)
Equity results in income statement	(119)	228
Results from sales on equity interest(ii)	106	—
Equity results in statement of comprehensive income	(2)	(4)
Fair value adjustment(iii)	(10)	(163)
Dividends declared	(128)	(326)
Transfer to assets held for sale(iii)	—	(152)
Others	47	25
Balance at December 31,	2,031	2,798

(i) In 2020, refers mainly to Companhia Siderúrgica do Pecém's capital increase.

(ii) In 2020, refers to the exercise of the call option of VLI's share (note 15).

(iii) In 2019, refers to fair value adjustment of the investment in Henan Longyu Energy Resources Co., Ltd., which was reclassified and presented as held for sale (note 15).

The amount of investments by segments are presented in note 4(b).

c) Summarized financial information

The summarized financial information about relevant associates and joint ventures for the Company are as follow. The stand-alone financial statements of those entities may differ from the financial information

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures (Continued)

reported herein, which is prepared considering Vale's accounting policies. The summarized financial information about Samarco is presented in note 24.

	December 31, 2020							
	Aliança Geração de Energia	Aliança Norte Energia	CSI	CSP(i)	Pelletizing(ii)	MRS Logística	Nacala Corridor Holding Netherlands B.V. (i)	VLI S.A.
Current assets	138	—	336	346	300	412	524	614
Non-current assets	711	229	344	2,234	258	1,701	4,349	3,737
Total assets	849	229	680	2,581	558	2,113	4,874	4,351
Current liabilities	48	—	63	737	53	389	573	607
Non-current liabilities	134	—	148	2,623	—	898	4,684	2,123
Total liabilities	182	—	211	3,360	53	1,286	5,257	2,729
Stockholders' equity	668	229	469	(779)	504	827	(383)	1,622
Net revenue	186	—	665	1,176	104	640	611	1,011
Net income (loss)	51	(15)	(14)	(835)	73	70	(87)	(59)

	December 31, 2019							
	Aliança Geração de Energia	Aliança Norte Energia	CSI	CSP(i)	Pelletizing(ii)	MRS Logística	Nacala Corridor Holding Netherlands B.V.(i)	VLI S.A.
Current assets	215	—	481	438	720	490	384	805
Non-current assets	880	314	344	2,960	315	2,196	4,505	4,507
Total assets	1,095	314	825	3,398	1,035	2,686	4,889	5,312
Current liabilities	99	—	186	985	297	415	516	773
Non-current liabilities	142	—	155	2,675	2	1,242	4,671	2,380
Total liabilities	241	—	341	3,660	299	1,657	5,187	3,153
Stockholders' equity	854	314	484	(262)	736	1,029	(298)	2,159
Net revenue	257	—	997	1,393	583	759	782	1,238
Net income (loss)	57	8	46	(412)	392	103	(49)	2

- (i) The joint ventures and its results are accounted for under the equity method, in which the accumulated losses are capped to the Company's interest in the investee's capital based on the applicable law and requirements. That is, after the investment is reduced to zero, the Company does not recognize any further losses nor liabilities associated with the investee.
- (ii) Aggregate entity information: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, Companhia Nipo-Brasileira de Pelotização.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures (Continued)

d) Subsidiaries

The significant consolidated entities in each business segment are as follows:

	Location	Main activity/Business	% Ownership	% Voting capital	% Noncontrolling interest
Direct and indirect subsidiaries					
Companhia Portuária da Baía de Sepetiba	Brazil	Iron ore	100.0%	100.0%	0.0%
Ferrous Resource Limited	Isle of Man	Iron Ore	100.0%	100.0%	0.0%
Mineração Corumbaense Reunida S.A.	Brazil	Iron ore and manganese	100.0%	100.0%	0.0%
Minerações Brasileiras Reunidas S.A. ("MBR")	Brazil	Iron ore	100.0%	100.0%	0.0%
New Steel Global	Netherlands	Iron ore	100.0%	100.0%	0.0%
Salobo Metais S.A.	Brazil	Copper	100.0%	100.0%	0.0%
PT Vale Indonesia	Indonesia	Nickel	44.3%	44.3%	55.7%
Vale Holdings B.V.	Netherlands	Holding and research	100.0%	100.0%	0.0%
Vale Canada Limited	Canada	Nickel	100.0%	100.0%	0.0%
Vale International S.A.	Switzerland	Trading and holding	100.0%	100.0%	0.0%
Vale Malaysia Minerals Sdn. Bhd.	Malaysia	Iron ore	100.0%	100.0%	0.0%
Vale Manganês S.A.	Brazil	Manganese and ferroalloys	100.0%	100.0%	0.0%
Vale Moçambique S.A.	Mozambique	Coal	80.7%	80.7%	19.3%
Vale Nouvelle Caledonie S.A.S.	New Caledonia	Nickel	95.0%	95.0%	5.0%
Vale Newfoundland & Labrador Ltd	Canada	Nickel	100.0%	100.0%	0.0%
Vale Oman Distribution Center LLC	Oman	Iron ore and pelletizing	100.0%	100.0%	0.0%
Vale Oman Pelletizing Company LLC	Oman	Pelletizing	70.0%	70.0%	30.0%
Vale Shipping Holding Pte. Ltd.	Singapore	Iron ore	100.0%	100.0%	0.0%

On April 30, 2020 the incorporation of the wholly owned subsidiary Ferrous Resources do Brasil S.A. was approved at the General Shareholders' Meeting.

e) Noncontrolling interest

Summarized financial information

The summarized financial information, prior to the eliminations of the intercompany balances and transactions, about subsidiaries with material noncontrolling interest are as follow. The stand-alone

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures (Continued)

financial statements of those entities may differ from the financial information reported herein, which is prepared considering Vale's accounting policies.

	December 31, 2020				
	PTVI	VNC	Vale Moçambique S.A.	Others	Total
Current assets	595	2	352	—	
Non-current assets	1,881	—	168	—	
Related parties—Stockholders	61	49	29	—	
Total assets	2,537	51	549	—	
Current liabilities	162	—	341	—	
Non-current liabilities	53	—	98	—	
Related parties—Stockholders	—	281	12,185	—	
Total liabilities	215	281	12,624	—	
Stockholders' equity	2,322	(230)	(12,075)	—	—
Equity attributable to noncontrolling interests	1,292	(12)	(2,330)	127	(923)
Net income (loss)	84	(669)	(1,804)	—	
Net income (loss) attributable to noncontrolling interests	35	(33)	(348)	(3)	(350)
Dividends paid to noncontrolling interests(i)	—	—	—	14	14

(i) Dividends paid to others noncontrolling interests relates to Vale Oman Pelletizing

	December 31, 2019				
	PTVI	VNC	Vale Moçambique S.A.	Others	Total
Current assets	462	169	188		
Non-current assets	1,630	604	199		
Related parties—Stockholders	84	34	29		
Total assets	2,176	807	416		
Current liabilities	140	199	320		
Non-current liabilities	61	236	147		
Related parties—Stockholders	—	344	10,221		
Total liabilities	201	779	10,688		
Stockholders' equity	1,975	28	(10,272)		
Equity attributable to noncontrolling interests	806	1	(1,982)	101	(1,074)
Net income (loss)	67	(2,055)	(3,183)		
Net income (loss) attributable to noncontrolling interests	27	(103)	(613)	192	(497)
Dividends paid to noncontrolling interests(i)	—	—	—	184	184

(i) Dividends paid to noncontrolling interests relates to US\$162 to Minerações Brasileiras Reunidas and US\$21 to Vale Oman Pelletizing.



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures (Continued)

	December 31, 2018					
	MBR	PTVI	VNC	Vale Moçambique S.A.	Others	Total
Net income (loss)	434	58	351	(985)		
Net income (loss) attributable to noncontrolling interests	<u>174</u>	<u>24</u>	<u>18</u>	<u>(190)</u>	<u>10</u>	<u>36</u>
Dividends paid to noncontrolling interests(i)	<u>168</u>	<u>—</u>	<u>—</u>	<u>—</u>	<u>14</u>	<u>182</u>

(i) Dividends paid to others noncontrolling interests relates to Vale Oman Pelletizing

Accounting policy

Consolidation and investments in associates and joint ventures—The financial statements reflect the assets, liabilities and transactions of the Parent Company and its direct and indirect controlled entities (“subsidiaries”). The subsidiaries are consolidated when the Company is exposed or has rights to variable returns from its involvement with the investee and has the ability to direct the significant activities of the investee. Intercompany balances and transactions, which include unrealized profits, are eliminated.

Joint arrangements are all entities over which the Company has shared control with one or more parties. Joint arrangement investments are classified as either joint operations or joint ventures depending on the contractual rights and obligations of each investor. The joint operations are recorded in the financial statements to represent the Company’s contractual rights and obligations.

Interests in joint ventures are accounted for using the equity method, after initially being recognized at cost. The Company investment in joint ventures includes the goodwill identified in the acquisition, net of any impairment loss.

The Company interest in the profits or losses of its joint ventures is recognized in the income statement and participation in the changes in reserves is recognized in the Company’s reserves. When the Company’s interest in the losses of an associate or joint venture is equal to or greater than the carrying amount of the investment, including any other receivables, the Company does not recognize additional losses, unless it has incurred obligations or made payments on behalf of the joint venture.

Unrealized gains on downstream or upstream transactions between the Company and its associates and joint ventures are eliminated proportionately to the Company’s interest.

Investments held by other investors in Vale’s subsidiaries are classified as noncontrolling interests (“NCI”). The Company treats transactions with noncontrolling interests as transactions with equity owners of the Company. For purchases or disposals from noncontrolling interests, the difference between the consideration paid and the proportion acquired of the carrying value of net assets of the subsidiary is directly recorded in stockholders’ equity in “Acquisitions and disposal of noncontrolling interest”.

Translation from the functional currency to the presentation currency—The income statement and statement of financial position of the subsidiaries for which the functional currency is different from the



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

14. Investments in subsidiaries, associates and joint ventures (Continued)

presentation currency are translated into the presentation currency as follows: (i) assets, liabilities and stockholders' equity, except for the components described in item (iii) are translated at the closing rate at the statement of financial position date; (ii) income and expenses are translated at the average exchange rates, except for specific significant transactions that, are translated at the rate at the transaction date and; (iii) capital, capital reserves and treasury stock are translated at the rate at each transaction date. All resulting exchange differences are recognized directly in the comprehensive income as "translation adjustments". When a foreign operation is disposed of or sold, foreign exchanges differences that were recognized in equity are recognized in the income of statement.

Critical accounting estimates and judgments

Judgment is required in some circumstances to determine whether after considering all relevant factors, the Company has either control, joint control or significant influence over an entity. Significant influence includes situations of collective control.

The Company holds the majority of the voting capital in five joint arrangements (Aliança Geração de Energia S.A., Aliança Norte Energia Participações S.A., Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização and Companhia Nipo-Brasileira de Pelotização), but management have concluded that the Company does not have a sufficiently dominant voting interest to have the power to direct the activities of these entities. As a result, these entities are accounted under equity method due to shareholder's agreements where relevant decisions are shared with other parties.

15. Acquisitions and divestitures

a) Business combinations

Ferrous Resources Limited—In August 2019 the Company acquired 100% of the share capital of Ferrous Resources Limited ("Ferrous"), a company that owned iron ore mines nearby some of the Company's operations in Minas Gerais, Brazil for cash consideration of US\$525. Ferrous has been acquired to gain access to additional reserves for the Company.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

15. Acquisitions and divestitures (Continued)

The fair values of identifiable assets acquired and liabilities assumed as a result of the acquisition are as follows:

	August 2019
Acquired assets	706
Cash and cash equivalents	95
Accounts receivable	29
Inventories	10
Intangibles	5
Property, plant and equipment	427
Others	140
Assumed liabilities	(216)
Net identifiable assets acquired	490
Fair value adjustment on PP&E	52
Deferred tax liability	(17)
Total identifiable net assets at fair value	525
<hr style="border: 0.5px solid black;"/>	
	August 2019
Cash consideration transferred	525
(–) Balances acquired	95
Cash and cash equivalents	95
Net cash outflow	430

New Steel—In January 2019, the Company acquired 100% of the share capital of New Steel Global N.V. (“New Steel”) and gained its control for the total cash consideration of US\$496. New Steel is a company that develops processing and beneficiating technologies for iron ore through a completely dry process.

The consideration paid is mainly attributable to the research and development project for processing of iron ore with lower carbon dioxide. The intangible assets are not subject to amortization until the operational phase is reached, which is expected to start on 2022. Instead, they are tested for impairment annually, or more frequently when a trigger for impairment has been identified.

The fair values of identifiable assets acquired and liabilities assumed as a result of the acquisition are as follows:

	January 2019
Acquired assets	18
Intangibles (note 16)	1
Other assets	17
Net identifiable assets acquired	18
Fair value adjustment of intangible research and development asset (note 19)	723
Deferred tax liability	(245)
Total identifiable net assets at fair value	496



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

15. Acquisitions and divestitures (Continued)

b) Other acquisitions and divestitures

Option exercised in VLI shares—In December 2020, BNDES Participações S.A. (“BNDESPar”), fully exercised its option contained in the Call Option Contract for shares issued by VLI S.A. (“VLI”). In this contract, BNDESPar was granted call options on VLI shares held by Vale of up to 8% of VLI’s capital stock.

With the exercise of this option, Vale received US\$241 for an 8% stake in VLI, and now holds 29.6% of VLI’s total shares, resulting in a gain of US\$172, recognized in the income statement as “Equity results and other results in associates and joint ventures” for the year ended December 31, 2020.

Divestment agreement in compliance with PT Vale Indonesia Tbk (“PTVI”) Contract of Work—PTVI, a public company in Indonesia, has an agreement in place with the government of the Republic of Indonesia to operate its mining licenses, expiring in December 2025. According to the agreement, PTVI must meet certain requirements to extend the period of the mining licenses beyond 2025, including the commitment to have Indonesian participants in its shareholding structure.

Following this commitment, in June 2020, the Company signed together with Sumitomo Metal Mining Co., Ltd. (“SMM”), an agreement for the sale of 20% (14.9% from Vale and 5.1% from SMM) of their aggregate stake in PTVI to PT Indonesia Asahan Aluminium (“PT Inalum”), an Indonesia state-owned enterprise. In October 2020, the Company concluded the transaction and received a cash consideration of US\$278. This transaction with non-controlling interests resulted in a loss of US\$179, which was recognized in Stockholders’ Equity for the year ended December 31, 2020.

At the closing of the transaction, Vale and SMM which have a stake of 44.3% and 15%, respectively, totaling a 59.3% interest in PTVI, signed a block voting agreement, in which SMM is required to follow Vale’s vote on relevant operational and financial decisions concerning PTVI. Therefore, the Company continues consolidating PTVI in its financial statements.

Henan Longyu Energy Resources Co., Ltd (“Henan Longyu”)—In December 2019, the Company entered into an agreement to sell its 25% interest in Henan Longyu, a company that operates two coal mines in China, for a total cash consideration of US\$156. Therefore, this investment was classified as held for sale and an impairment loss of US\$163 was recorded as “Equity results and other results in associates and joint ventures” in the income statement for the year ended December 31, 2019.

In 2020, the precedent conditions of the agreement were met, and the Company received the cash consideration in full. Following the conclusion of the transaction, the Company recognized a gain of US\$116 due to the recycling of the cumulative translation adjustments to the income statement, which was recorded as “Equity results and other results in associates and joint ventures” in the income statement for the year ended December 31, 2020.

West III Project—In October 2020, the Company approved the incorporation of a joint venture with Ningbo Zhoushan Port Company Limited (“Ningbo Zhoushan Port”), to build and operate the project to

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

15. Acquisitions and divestitures (Continued)

expand the Shulanghu Port facilities, located in China. The Project secures strategic port capacity in China to further Vale's shipping and distribution costs optimization.

Vale will own 50% of the joint venture and Vale's capital contribution to the project is estimated to range from US\$110 to US\$160. The construction of the project, which is expected to take up to three years, will start after both parties obtain the anti-trust and other regulatory approvals in China.

Heads of Agreement ("HoA") with Mitsui & Co. Ltd. ("Mitsui")—In January 2021 (subsequent event), the Company signed a HoA with Mitsui, both parties to structure Mitsui's exit from Vale Moçambique and Nacala Logistics Corridor ("NLC"). Currently, Mitsui holds a non-controlling interest of 15% in Vale Moçambique and a 50% interest in NLC.

The HoA determines that Vale will acquire Mitsui's stake in the mine and logistics assets for an immaterial consideration and will undertake of the Nacala Corridor Project Finance in full, which is approximately US\$2,500 outstanding balance at December 31, 2020. In case of closing the transaction, Vale will also control NLC and, therefore, consolidate its assets and liabilities. NLC's summarized financial information is presented in note 14c.

In addition, the Company informed the market its divestiture intention in the coal segment and, therefore, the Company will assess whether this segment would meet the criteria to be classified as a discontinued operation in future financial statements.

The parties expect to conclude the transaction in 2021, which is subject to the execution of the definitive agreement and usual precedent conditions.

Boston Electrometallurgical Company ("Boston Metal")—In February 2021 (subsequent event), the Company made an investment of US\$6 in Boston Metal to acquire a minority interest and to promote the development of a technology focused on the reduction of carbon dioxide on the steel production. Boston Metal has a diverse shareholding structure which includes venture capital funds, mining companies and private investors.

MBR—In December 2019, the Company purchased an additional 36.4% interest in Minerações Brasileiras Reunidas S.A. ("MBR") held by its related party, for the total consideration of US\$812. Following the completion of the transaction, the Company holds 98.3% of MBR's share capital. Since this transaction did not result in a change of control for the Company, the impact of US\$343 arising from the purchase of additional shares was recognized in the Company's Stockholders' Equity, as "Acquisitions and disposal of noncontrolling interest". In 2020, the Company purchased the remaining interest in MBR for a total consideration of US\$104, therefore, the Company holds 100% of MBR's share capital as at December 31, 2020.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

15. Acquisitions and divestitures (Continued)

c) Fertilizers (Discontinued operations)

In January 2018, the Company and The Mosaic Company (“Mosaic”) concluded the transaction to sell the fertilizer assets, except for those located in Cubatão, Brazil.

The Company received US\$1,080 in cash and 34.2 million common shares, corresponding to 8.9% of Mosaic’s outstanding common shares after the issuance of these shares totaling US\$899, at closing date of the transaction. The Company recognized a loss of US\$55 in the income statement from discontinued operations.

In May 2018, the Company concluded the transaction entered with Yara International ASA to sell its assets located in Cubatão, Brazil and received US\$255 in cash and a loss of US\$69 was recognized in the income statement from discontinued operations.

The results for the years and the cash flows of discontinued operations are presented as follows:

Income statement

	<u>Year ended December 31, 2018</u>
Discontinued operations	
Net operating revenue	121
Cost of goods sold and services rendered	(120)
Operating expenses	(4)
Impairment of non-current assets	(124)
	<hr/>
Operating loss	(127)
Financial Results, net	(5)
	<hr/>
Loss before income taxes	(132)
Income taxes	40
	<hr/>
Loss from discontinued operations	(92)
Loss attributable to noncontrolling interests	—
	<hr/>
Loss attributable to Vale’s stockholders	(92)
	<hr/> <hr/>

Statement of cash flow

	<u>Year ended December 31, 2018</u>
Discontinued operations	
Net cash used in operating activities	(37)
Net cash used in investing activities	(9)
	<hr/>
Net cash used in discontinued operations	(46)
	<hr/> <hr/>

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

15. Acquisitions and divestitures (Continued)

Accounting policy

Business combination—The acquisition method of accounting is used to account for all business combinations, regardless of whether equity instruments or other assets are acquired. The consideration transferred for the acquisition of a subsidiary comprises (i) fair values of the assets transferred; (ii) liabilities assumed of the acquired business; (iii) equity interests issued to the Company; (iv) fair value of any asset or liability resulting from a contingent consideration arrangement, and (v) fair value of any pre-existing equity interest in the subsidiary.

Identifiable assets acquired, and liabilities and contingent liabilities assumed in a business combination are, with limited exceptions, measured initially at their fair values at the acquisition date. The Company recognizes any non-controlling interest in the acquired entity on an acquisition-by-acquisition basis either at fair value or at the non-controlling interest's proportionate share of the acquired entity's net identifiable assets.

Discontinued operation—The classification as a discontinued operation occurs through disposal, or when the operation meets the criteria to be classified as held for sale if this occurs earlier. A discontinued operation is a component of a Company business comprising cash flows and operations that may be clearly distinct from the rest of the Company and that represents an important separate line of business or geographical area of operations.

The result of discontinued operations is presented in a single amount in the income statement, including the results after income tax of these operations less any impairment loss. Cash flows attributable to operating, investing and financing activities of discontinued operations are disclosed in a separate note.

When an operation is classified as a discontinued operation, the income statements of the prior periods are restated as if the operation had been discontinued since the beginning of the comparative period.

Any noncontrolling interest relating to a group disposal held for sale is presented in the stockholders' equity and is not reclassified in the statement of financial position.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

16. Intangibles

a) Movements during the year

	Goodwill	Concessions	Contract right	Software	Research and development project and patents	Total
Balance at December 31, 2018	3,653	4,061	137	111	–	7,962
Additions	–	439	–	39	–	478
Disposals	–	(17)	–	–	–	(17)
Amortization	–	(239)	(2)	(66)	–	(307)
Impairment (note 18)	–	(112)	–	(11)	–	(123)
Acquisition of subsidiary	–	3	–	1	724	728
Translation adjustment	(24)	(165)	5	2	(40)	(222)
Balance at December 31, 2019	<u>3,629</u>	<u>3,970</u>	<u>140</u>	<u>76</u>	<u>684</u>	<u>8,499</u>
Cost	3,629	5,090	248	888	684	10,539
Accumulated amortization	–	(1,120)	(108)	(812)	–	(2,040)
Balance at December 31, 2019	<u>3,629</u>	<u>3,970</u>	<u>140</u>	<u>76</u>	<u>684</u>	<u>8,499</u>
Additions	–	2,513	–	29	–	2,542
Disposals	–	(7)	(134)	–	–	(141)
Amortization	–	(177)	(1)	(23)	–	(201)
Translation adjustment	(331)	(908)	(5)	(6)	(153)	(1,403)
Balance at December 31, 2020	<u>3,298</u>	<u>5,391</u>	<u>–</u>	<u>76</u>	<u>531</u>	<u>9,296</u>
Cost	3,298	6,393	102	743	531	11,067
Accumulated amortization	–	(1,002)	(102)	(667)	–	(1,771)
Balance at December 31, 2020	<u>3,298</u>	<u>5,391</u>	<u>–</u>	<u>76</u>	<u>531</u>	<u>9,296</u>

b) Early extension of railway concessions—In December 2020, the Company agreed terms with the Brazilian Federal Government to extend its concessions to operate the Estrada de Ferro Carajás (“EFC”) and Estrada de Ferro Vitória a Minas (“EFVM”) railways by 30 years, from 2027 to 2057.

Upon the signing, the Company recognized an intangible asset related to its right of use of EFC and EFVM and, at the same time, in exchange for the early renewal of its contracts, a liability in the amount of US\$2,312 (R\$12,016 million) (note 13). The total obligation is comprised by the following commitments:

- Grants payments for the concessions, payable in quarterly installments, in the total amount of US\$542 (R\$2,818 million). This commitment is measured based on the net present value of the thirty-year projected cash flows, discounted at 11.04%.
- The construction of 383 km section of the Midwest Integration Railway (“FICO”), between the municipalities of Mara Rosa, in Goiás, and Água Boa, in Mato Grosso. The construction is planned to start in 2021 and its execution is expected to take 6 years. As at December 31, 2020, its estimated cost of construction, discounted to the present value at 2.59%, is US\$1,306 (R\$6,789 million).
- An infrastructure program, envisaging over 450 separate projects designed to improve safety and reduce trespass where the railways pass through urban areas. The program will benefit 25 and 33 municipalities intercepted by EFC and EFVM, respectively. As at December 31, 2020, its estimated cost of construction, discounted to the present value at 3.08%, is US\$264 (R\$1,372 million).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

16. Intangibles (Continued)

- Acquisition and delivery of rails and sleepers, which the Federal Government will use for the construction of section II of the West-East Integration Railway (“FIOL”), which will connect the municipalities of Caetité and Barreiras, in Bahia, and other miscellaneous commitments. As at December 31, 2020, these commitments, discounted to the present value at 2.67%, are estimated at approximately US\$200 (R\$1,037 million).

The concession contract renewal requires the review and physical inspection of the railway assets by the National Land Transport Agency (“ANTT”), which may impact the amount of liabilities assumed by the Company. Additionally, the ANTT may require, at their discretion, further investments on the concession network, whose conditions and limitations will be established in an addendum. In both circumstances, discussions on the contracts’ economic and financial rebalancing will be required. Furthermore, there is a provision for the Company to complete a minimum percentage of certain investments by 2027.

Additionally, as a condition for signing the contracts, the Company paid for a guarantee insurance in the amount of US\$197 (R\$1,026 million) during the year ended on December 31, 2020. These insurance contracts guarantee cover indemnifications, up to the amount established in the insurance policy, in the event of possible losses resulting from the Company not being in compliance with its assumed contractual obligations in relation to the concession contracts. The contracts also provide for the payment of additional insurance policies in the amount of approximately US\$192 (R\$1,000 million), based on certain contractual milestones.

c) Goodwill—Includes the goodwill arose from the acquisition of iron ore and nickel businesses and the goodwill from the incorporation of Valepar into Vale in 2017. This goodwill was recognized on the acquisition of Vale controlling interest by Valepar, based on the expected future returns on the ferrous segment. The Company has not recognized the deferred taxes over the goodwill, since there are no differences between the tax basis and accounting basis. The Company assesses annually the recoverable amount of the goodwill.

d) Research and development project and patents—Refers to in-process research and development projects and patents identified in the business combination of New Steel Global N.V. (note 15). The intangible assets of research and development are not subject to amortization until the operational phase is reached.

Accounting policy

Intangibles are carried at the acquisition cost, net of accumulated amortization and impairment charges.

The estimated useful lives are as follows:

	<u>Useful life</u>
Railways concessions	3 to 50 years
Usufruct	22 to 31 years
Software	5 years

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

17. Property, plant and equipment

a) Movements during the year

	Building and land	Facilities	Equipment	Mineral properties	Railway equipment	Right of use assets	Others	Constructions in progress	Total
Balance at December 31, 2018 ...	11,587	11,236	6,407	8,499	3,796	—	3,473	3,387	48,385
Effects of IFRS 16 adoption	—	—	—	—	—	1,801	—	—	1,801
Additions(i)	—	—	—	—	—	152	—	4,297	4,449
Disposals	(109)	(75)	(70)	(164)	(155)	(7)	(26)	(25)	(631)
Assets retirement obligation	—	—	—	429	—	—	—	—	429
Depreciation, depletion and amortization	(514)	(666)	(866)	(603)	(293)	(183)	(378)	—	(3,503)
Impairment (note 18)	(577)	(1,113)	(708)	(600)	(336)	(55)	(456)	(353)	(4,198)
Acquisition of subsidiary(ii)	77	41	46	276	—	2	—	46	488
Translation adjustment	(197)	(275)	(102)	88	(122)	(18)	(34)	16	(644)
Transfers	435	456	979	336	351	—	433	(2,990)	—
Balance at December 31, 2019 ...	10,702	9,604	5,686	8,261	3,241	1,692	3,012	4,378	46,576
Cost	18,970	17,170	11,756	17,826	4,701	1,875	6,820	4,378	83,496
Accumulated depreciation	(8,268)	(7,566)	(6,070)	(9,565)	(1,460)	(183)	(3,808)	—	(36,920)
Balance at December 31, 2019 ...	10,702	9,604	5,686	8,261	3,241	1,692	3,012	4,378	46,576
Additions(i)	—	—	—	—	—	125	—	4,170	4,295
Disposals	(14)	(92)	(8)	(13)	(5)	—	(8)	(88)	(228)
Assets retirement obligation	—	—	—	568	—	—	—	—	568
Depreciation, depletion and amortization	(439)	(469)	(730)	(459)	(186)	(173)	(290)	—	(2,746)
Impairment (note 18)	(130)	(162)	(22)	(81)	—	—	(79)	(168)	(642)
Transfer to assets held for sale ...	(66)	(80)	(3)	(58)	—	—	(1)	(96)	(304)
Translation adjustment	(1,664)	(1,756)	(644)	(523)	(759)	(81)	(392)	(552)	(6,371)
Transfers	202	546	654	359	232	—	253	(2,246)	—
Balance at December 31, 2020 ...	8,591	7,591	4,933	8,054	2,523	1,563	2,495	5,398	41,148
Cost	15,135	11,690	10,680	17,072	3,853	1,966	5,893	5,398	71,687
Accumulated depreciation	(6,544)	(4,099)	(5,747)	(9,018)	(1,330)	(403)	(3,398)	—	(30,539)
Balance at December 31, 2020 ...	8,591	7,591	4,933	8,054	2,523	1,563	2,495	5,398	41,148

(i) Includes capitalized borrowing costs.

(ii) Refers mainly to the acquisition of Ferrous (note 15).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

17. Property, plant and equipment (Continued)

b) Right-of-use assets (Leases)

	December 31, 2019	Additions and contract modifications	Depreciation	Translation adjustment	December 31, 2020
Ports.....	734	50	(40)	(26)	718
Vessels	582	—	(47)	(1)	534
Pellets plants	161	39	(41)	(28)	131
Properties.....	133	32	(29)	(24)	112
Energy plants	64	—	(7)	(1)	56
Mining equipment and locomotives	18	4	(9)	(1)	12
Total.....	1,692	125	(173)	(81)	1,563

Lease liabilities are presented in note 22.

Accounting policy

Property, plant and equipment are recorded at the cost of acquisition or construction, net of accumulated depreciation and impairment charges.

Mineral properties developed internally are determined by (i) direct and indirect costs attributed to build the mining facilities, (ii) financial charges incurred during the construction period, (iii) depreciation of other fixed assets used during construction, (iv) estimated decommissioning and site restoration expenses, and (v) other capitalized expenditures during the development phase (phase when the project demonstrates its economic benefit to the Company, and the Company has ability and intention to complete the project).

The depletion of mineral properties is determined based on the ratio between production and total proven and probable mineral reserves.

Property, plant and equipment, other than mineral properties are depreciated using the straight-line method based on the estimated useful lives, from the date on which the assets become available for their intended use and are capitalized, except for land which is not depreciated.

The estimated useful lives are as follows:

	Useful life
Buildings	3 to 50 years
Facilities	3 to 50 years
Equipment	3 to 40 years
Others:	
Locomotives	12 to 25 years
Wagon	30 to 44 years
Railway equipment	5 to 33 years
Ships	20 years
Others	2 to 50 years

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

17. Property, plant and equipment (Continued)

The residual values and useful lives of assets are reviewed at the end of each reporting period and adjusted if necessary.

Expenditures and stripping costs

(i) Exploration and evaluation expenditures—Expenditures on mining research are accounted for as operating expenses until the effective proof of economic feasibility and commercial viability of a given field can be demonstrated. From then on, the expenditures incurred are capitalized as mineral properties.

(ii) Expenditures on feasibility studies, new technologies and others research—The Company also conducts feasibility studies for many businesses which it operates including researching new technologies to optimize the mining process. After these costs are proven to generate future benefits to the Company, the expenditures incurred are capitalized.

(iii) Maintenance costs—Significant industrial maintenance costs, including spare parts, assembly services, and others, are recorded in property, plant and equipment and depreciated through the next programmed maintenance overhaul.

(iv) Stripping Costs—The cost associated with the removal of overburden and other waste materials (“stripping costs”) incurred during the development of mines, before production takes place, are capitalized as part of the depreciable cost of the mineral properties. These costs are subsequently amortized over the useful life of the mine.

Post-production stripping costs are included in the cost of inventory, except when a new project is developed to permit access to a significant ore deposit. In such cases, the cost is capitalized as a non-current asset and is amortized during the extraction of the ore deposits, over the useful life of the ore deposits.

Leases—The Company recognizes a right-of-use asset and a lease liability at the lease commencement date. The right-of-use asset is initially measured at cost, which comprises the initial amount of the lease liability adjusted for any lease payments made at or before the commencement date. The right-of-use asset is subsequently depreciated using the straight-line method from the commencement date to the earlier of the end of the lease term or the end of the useful life of the right-of-use asset.

The Company does not recognize right-of-use assets and liabilities for leases with less than 12 months of lease term and/or leases of low-value assets. The payments associated to these leases are recognized as an expense on a straight-line basis over the lease term.

The lease liability is initially measured at the present value of the lease payments, discounted using the interest rate implicit in the lease or, if that rate cannot be readily determined, the Company’s incremental borrowing rate. Lease payments included in the measurement of the lease liability comprise: (i) fixed payments, including in-substance fixed payments; (ii) variable lease payments that depend on an index or a rate; and (iii) the exercise price under a purchase option or renewal option that are under the Company’s control and is reasonably certain to be exercised.

The lease liability is measured at amortized cost using the effective interest method. It is remeasured when there is a change in future lease payments arising from a change in an index or rate. When the lease liability is remeasured, a corresponding adjustment is made to the carrying amount of the right-of-use asset or is recorded in profit or loss if the carrying amount of the right-of-use asset has been reduced to zero. Lease liabilities are presented in note 22.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

17. Property, plant and equipment (Continued)

Critical accounting estimates and judgments

Mineral reserves—The estimates of proven and probable reserves are regularly evaluated and updated. These reserves are determined using generally accepted geological estimates. The calculation of reserves requires the Company to make assumptions about expected future conditions that are uncertain, including future ore prices, exchange rates, inflation rates, mining technology, availability of permits and production costs. Changes in assumptions could have a significant impact on the proven and probable reserves of the Company.

The estimated volume of mineral reserves is used as basis for the calculation of depletion of the mineral properties, and also for the estimated useful life which is a major factor to quantify the provision for asset retirement obligation, environmental recovery of mines and impairment of long lived asset. Any changes to the estimates of the volume of mine reserves and the useful lives of assets may have a significant impact on the depreciation, depletion and amortization charges and assessments of impairment.

18. Impairment and onerous contracts

The impairment losses recognized in the year are presented below:

	Income statement		
	Impairment		
Segments by class of assets	2020	2019	2018
Base metals—nickel	882	2,511	–
Coal	935	1,691	–
Other assets	201	119	184
Impairment of non-current assets	2,018	4,321	184
Onerous contracts	–	240	393
Disposals of non-current assets	225	513	322
Impairment and disposals of non-current assets	2,243	5,074	899

a) Impairment of assets

During 2020, some of the Company's operations were temporarily halted due to the COVID-19 pandemic. These operations have already been resumed and, therefore, the main long-term assumptions applied in the preparation of their discounted cash flow models, such as commodity prices and production levels, remained unchanged and did not result in the impairment loss for these assets.

The Company tested for impairment the cash generating units ("CGU") for which a triggering event was identified and for goodwill. The recoverable amount of each CGU under the Company's impairment test was assessed using the fair value less costs of disposal model ("FVLCD"), through discounted cash flow techniques, which is classified as "level 3" in the fair value hierarchy, taking into consideration offers and purchase agreements, if applicable.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

18. Impairment and onerous contracts (Continued)

The cash flows were discounted by using a post-tax discount rate expressed in real terms, which represents an estimate of the rate that a market participant would apply having regard to the time value of money and the asset's specific risk. The Company used its weighted average cost of capital ("WACC") as a starting point for determining the discount rates, with appropriate adjustments for the risk profile of the countries in which the individual CGU operate.

Base Metals

Vale Nouvelle-Calédonie S.A.S. ("VNC"), Nickel—Since 2019, the New Caledonian operation has experienced challenging issues, mainly in relation to production and processing of refined nickel, associated with the challenges imposed by the remote location of this asset. The Company started studies of alternatives for VNC, taking into account the operational and commercial options to improve VNC's short-term cash flows. Based on the revision of the business plan in 2019, the Company reduced the expected production levels of its refined nickel product for remaining useful life of the mine, resulting in an impairment loss of US\$2,511 recorded as at December 31, 2019.

In 2020, the Company started looking for a potential buyer and started studying the other options available to exit the operation, including placing VNC in care and maintenance, in preparation for a possible closing of the operation. Due to the negotiations that took place during the year, VNC's assets and liabilities were classified as "held for sale" and measured at fair value resulting in the recognition of an impairment loss in the amount of US\$382 recognized in the income statement as "Impairment and disposal of non-current assets" for the year ended December 31, 2020. With the recognition of this additional impairment, the carrying value of the CGU was reduced to zero as at December 31, 2020.

In December 2020, the Company signed a binding put option agreement for its interest in VNC to a consortium constituted in a new company called "Prony Resources", led by the current management and employees of VNC and supported by the Caledonian and French authorities with Trafigura as a non-controlling shareholder. Closing is expected for the first quarter of 2021, subject to consultation with the VNC workers council and other conditions, including approvals by the Caledonian and French state authorities.

The terms of the proposal take into account the financing needs to continue VNC operations, including the commitment to invest in the conversion of the tailings deposition from wet to dry-stacking ("Project Lucy"), which will cost approximately US\$500. Therefore, the Company recognized a loss in that amount due to the potential sale agreement, presented in the income statement as "Impairment and disposal of non-current assets" for the year ended December 31, 2020. Thus, the total loss related to VNC recorded in 2020 is US\$882.

Goodwill, Nickel—Out of Vale's total goodwill (note 16), US\$1,926 is allocated to the Base Metals segment. Although the Company recognized an impairment loss in the New Caledonia CGU, the impairment test of goodwill demonstrates that there were no identified losses related to the goodwill allocated to the nickel business, based on cash flows projected until 2048 and discounted at rates ranging between 4.5% and 5.1% (2019: rates ranging between 5% and 6%).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

18. Impairment and onerous contracts (Continued)

Coal

Moatize mine, Mozambique—The Company has coal operations in Mozambique, through Vale Moçambique S.A. (“Vale Moçambique”), where metallurgical and thermal coal operations are in ramp-up. Vale Moçambique is a company controlled by Vale, and Mitsui & Co. Ltd. (“Mitsui”) holds a non-controlling interest of 15%. Coal products are transported from the Moatize mine to the maritime terminal by the Corredor Logístico de Nacala (“CLN”), a joint venture between Vale and Mitsui, which holds the railways and port concessions located in Mozambique and Malawi.

In 2019, the Company recognized an impairment loss in the amount of US\$1,691, corresponding to the total assets of the coal CGU, mainly due to technical difficulties in the project and operation of the assets related to this CGU. In addition, the Company lowered its long-term price assumption for both metallurgical and thermal coal and, carried out a detailed review of the mining plan, leading to a significant reduction on the estimated marketable coal reserves. In addition, the Company tested for impairment the assets acquired during the year and recognized a loss of US\$137 in the income statement for the year ended December 31, 2020.

Due to the challenges identified, the Company decided to implement a new strategy to reach the ramp-up of the coal business, including the revamp of the two processing plants and the adaptation to the new flowsheet.

However, in addition to the slowdown in the operational activities, the COVID-19 pandemic has caused travel and equipment transportation restrictions and so, the Company has revisited the plans for the Mozambique coal processing plant stoppage. The halting of the processing plants’ operations that was previously expected to start in the second quarter of 2020, was postponed to late 2020 and completion is scheduled for the first quarter of 2021.

Therefore, the delay in the execution of the projects planned to speed up the ramp-up, associated with the developments on the detailed technical studies of the projects that are necessary to reach out the total capacity of the plants, resulted in the push back of the investment plan for the Moatize processing plants. As a consequence, the projected production volumes to reach the plants’ maximum installed capacity were also postponed.

Loans receivable, Nacala BV—The Company has loans receivable from Nacala (note 29), which have been impacted by the change in the production curve of the Moatize mine, following the reduction in the expected volume of coal to be transported in CLN, which has impacted CLN’s projected cash flows. Therefore, the Company carried out an impairment test for the loan receivable, resulting in a loss of US\$798, based on discounted cash flows at the average rate of 8.2%. As at December 31, 2020, the carrying amount of the receivable is US\$1,118, after the impairment charge.

The assumption subject to the most estimation uncertainty for the FVLCD calculation is the volume of coal transported. To illustrate this sensitivity, the carrying value would be fully impaired by a reduction of

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

18. Impairment and onerous contracts (Continued)

approximately 5 million tons per year (out of the total capacity of 22 million tons per year), considering the other constant assumptions, if all other inputs remained constant.

Ferrous Minerals

Goodwill, Iron ore and pellets—The Company did not identify changes in circumstances or indicatives that could result in a reduction to the recoverable value of the CGU of Iron ore and Pellets. Although, the Company tested for impairment the goodwill, based on cash flows projected until 2050 and discounted at 5.6% (2019: 6.3%), and there were no losses identified. Out of Vale's total goodwill (Note 16), US\$1,373 is allocated to the Ferrous Minerals segment.

Simões Filho, Ferroalloys of Manganese—In September 2020, the Company decided to shut down the Simões Filho operation, a plant located in the Brazilian State of Bahia, that was part of Vale Manganês S.A. ("Vale Manganês") business and produced manganese ferroalloys. The Company continues to operate the remaining Vale Manganês plants and producing manganese ore.

The Company tested this CGU for impairment, resulting in the full impairment of inventories, other assets related to the Simões Filho plant, and additional provisions required for the closure of the site. As a result, the Company recognized an impairment loss of US\$76 as "Impairment and disposals of non-current assets", and the carrying amount for this CGU was US\$75 at December 31, 2020.

Other assets

In 2019, the Company reviewed the business plan of biological assets controlled by Biopalma, a company that cultivates palm oil plantation, which is the raw material for palm oil. This revision resulted in a reduction in Biopalma's expected operational capacity. The Company has also reviewed its long-term price assumptions based on the market conditions at that time. Thus, the Company tested the CGU for impairment and an impairment loss of US\$119 was recognized in the income statement for the year ended December 31, 2019.

In September 2020, the Company signed an agreement with Brasil Bio Fuels S.A. to sell its entire interest in Biopalma for an immaterial consideration. As a result of this agreement, the Company recognized a loss of US\$125, which was recognized in the income statement as "Impairment and disposals of non-current assets" for the year ended December 31, 2020, reducing the carrying value of this CGU to zero. Biopalma's divestment was completed in November 2020.

b) Onerous contract

In 2019, the Company reviewed its expectation of iron ore production and sales volumes of the Midwest system. Following the revised plan for the upcoming years, the Company has recognized an additional provision of US\$240 in relation to the costs of certain long-term contracts, with minimum guaranteed volume for fluvial transportation and port structure. In 2020, there were no changes in the expectation

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

18. Impairment and onerous contracts (Continued)

related to the ore production and sales volumes of the Midwest system and, therefore, no impairment charge has been recognized in the income statement for the year ended December 31, 2020.

c) Disposals of assets

Refers to non-viable projects and operating assets written off through sale or obsolescence. Additionally, includes assets write-off of the Córrego do Feijão mine and those related to the other upstream dams in Brazil, as described in note 23.

Accounting policy

Impairment of non-financial assets—Non-financial assets are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount might not be recoverable. An impairment loss is recognized for the amount by which the asset's carrying value exceeds its recoverable amount. The recoverable amount is the higher of an asset's fair value less costs of disposal ("FVLCD") and value in use ("VIU").

FVLCD is generally determined as the present value of the estimated future cash flows expected to arise from the continued use of the asset from a market participant's perspective, including any expansion prospects. VIU model is determined as the present value of the estimated future cash flows expected to arise from the continued use of the asset in its present form. Value in use is determined by applying assumptions specific to the Company's continued use and cannot take into account future development. These assumptions are different to those used in calculating fair value and consequently the VIU calculation is likely to give a different result to a FVLCD calculation.

Assets that have an indefinite useful life and are not subject to amortization, such as goodwill, are tested annually for impairment.

For the purposes of assessing impairment, assets are grouped at the lowest levels for which there are separately identifiable cash flows (CGU). Goodwill is allocated to Cash Generating Units or Cash Generating Units groups that are expected to benefit from the business combinations in which the goodwill arose and are identified in accordance with the operating segment.

Non-current assets (excluding goodwill) in which the Company recognized impairment in the past are reviewed whenever events or changes in circumstances indicate that the impairment may no longer be applicable. In such cases, an impairment reversal will be recognized.

Onerous Contracts—For certain long-term contracts, a provision is recognized when the present value of the unavoidable cost to meet the Company's obligation exceeds the economic benefits that could be received from those contracts.

Notes to the Financial Statements (Continued)

Expressed in millions of United States dollar, unless otherwise stated

18. Impairment and onerous contracts (Continued)

Critical accounting estimates and judgments

Significant judgements, estimates and assumptions are required to determine whether an impairment trigger has occurred and to prepare the Company's cash flows. Management uses the budgets approved as a starting point and key assumptions are, but not limited to: (i) mineral reserves and mineral resources measured by internal experts; (ii) costs and investments based on the best estimate of projects as supported by past performance; (iii) sale prices consistent with projections available in reports published by industry considering the market price when appropriate; (iv) the useful life of each cash-generating unit (ratio between production and mineral reserves); and (v) discount rates that reflect specific risks relating to the relevant assets in each cash-generating unit.

These assumptions are susceptible to risks and uncertainties and may change the Company's projection and, therefore, may affect the recoverable value of assets.

19. Financial and capital risk management

The Company is exposed to several financial and capital risk factors that may impact the its performance and equity position. The evaluation of the exposure to financial and capital risks is performed periodically to support the decision making process regarding the risk management strategy.

The Company's policy aims at establishing a capital structure that will ensure the continuity of our business in the long term. Within this perspective, the Company has been able to deliver value to stockholders through dividend payments and capital gain, and at the same time maintain a debt profile suitable for its activities, with an amortization well distributed over the years, thus avoiding a concentration in one specific period.

The Board of Directors establishes and supervises the management of financial risks with the support of a Financial Committee. The Financial Committee ensures that Company's financial activities are governed by appropriate policies and procedures and that financial risks are identified, measured and managed in accordance with the Company's policies and objectives.

The Company has developed its strategy through an integrated view of the risks to which it is exposed, considering not only the risk generated by the variables traded in the financial market (market risk) and the liquidity risk, but also the risk arising from obligations assumed by third parties to the Company (credit risk), among others.

The Company uses derivative financial instruments to protect its exposure to these market risks arising from operating, financing and investment activities. The portfolios composed of these financial instruments are monitored on a monthly basis, allowing the monitoring of financial results and their impact on cash flow. Currently, the Company applies hedge accounting to its net investment in foreign operation and nickel and palladium revenue programs.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

The Company does not have any derivatives increasing financial leverage beyond the nominal amount of its contracts. The Company contracts derivatives solely to mitigate market risks.

Risks	Origin of the exhibition	Management
Market Risk—Exchange Rate	Contracts for the sale of ore and financial instruments that are not denominated in US\$	Swap and forward operations
Market risk—Interest rate	Loans and financing indexed to LIBOR	Swap operations
Market risk—Product and input prices....	Volatility of commodity and input prices	Option contracts
Credit Risk	Receivables, derivative transactions, guarantees, advances to suppliers and financial investments	Portfolio diversification and policies for monitoring counterparty solvency and liquidity indicators
Liquidity risk	Contractual or assumed obligations	Availability of revolving credit lines

a) Method and techniques of valuation of derivatives

The risk of the derivatives portfolio is measured using the delta-Normal parametric approach and considers that the future distribution of the risk factors and its correlations tends to present the same statistic properties verified in the historical data. The value at risk estimate considers a 95% confidence level for a one-business daytime horizon.

The derivative financial instruments were evaluated using the curves and market prices that impact each instrument on the calculation dates. For the pricing of options the Company generally uses the Black & Scholes model. In this model, the fair value of the derivative is obtained basically as a function of the volatility and price of the underlying asset, the exercise price of the option, the risk-free interest rate and the term to maturity of the option. In the case of options where the result is a function of the average price of the underlying asset in a certain period of the option's life, called Asian, the Company uses the Turnbull & Wakeman model. In this model, in addition to the factors that influence the option price in the Black & Scholes model, the average price formation period is considered.

In the case of swaps, both the present value of the active and the passive tip are estimated by discounting their cash flows by the interest rates in the corresponding currencies. The fair value is obtained by the difference between the present value of the active tip and the passive tip of the swap in the reference currency. In the case of swaps linked to Brazilian long-term interest rate ("TJLP"), the fair value calculation considers the constant TJLP, i.e., projections of future cash flows in reais are made considering the last TJLP disclosed.

Forward and future contracts are priced using the future curves of the respective underlying assets. These curves are usually obtained from the exchanges where these assets are traded, such as the London Metals Exchange ("LME"), the Commodities Exchange ("COMEX") or other market price providers. When there is no price for the desired maturity, the Company uses interpolations between the available maturities.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

a.i) Libor discontinuation

In July 2017, the UK Financial Conduct Authority (“FCA”), which regulates the London Interbank Offered Rate (“LIBOR”), announced the effective discontinuation of that rate from the end of 2021, as banks will no longer be required to contribute rate quotations. The Company is currently evaluating the potential impact of the eventual replacement of the LIBOR interest rate.

a.ii) Effects of derivatives on the balance sheet

	Assets			
	December 31, 2020		December 31, 2019	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	–	–	13	–
IPCA swap	7	38	82	117
Eurobonds swap	–	3	–	–
Pre-dollar swap	–	9	21	8
Forward transactions	–	–	1	–
	<u>7</u>	<u>50</u>	<u>117</u>	<u>125</u>
Commodities price risk				
Base metals products	30	–	151	9
Gasoil, Brent and freight	97	–	20	–
	<u>127</u>	<u>–</u>	<u>171</u>	<u>9</u>
Others	–	16	–	50
	<u>–</u>	<u>16</u>	<u>–</u>	<u>50</u>
Total	<u>134</u>	<u>66</u>	<u>288</u>	<u>184</u>
	Liabilities			
	December 31, 2020		December 31, 2019	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	111	525	48	80
IPCA swap	72	100	13	37
Eurobonds swap	4	–	6	29
Pre-dollar swap	62	58	8	37
Libor swap	1	6	–	–
Forward transactions	1	–	–	–
	<u>251</u>	<u>689</u>	<u>75</u>	<u>183</u>
Commodities price risk				
Base metals products	46	–	4	4
Gasoil, Brent and freight	13	–	8	–
	<u>59</u>	<u>–</u>	<u>12</u>	<u>4</u>
Others	18	–	7	120
	<u>18</u>	<u>–</u>	<u>7</u>	<u>120</u>
Total	<u>328</u>	<u>689</u>	<u>94</u>	<u>307</u>

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

a.iii) Net exposure

	December 31, 2020	December 31, 2019
Foreign exchange and interest rate risk		
CDI & TJLP vs. US\$ fixed and floating rate swap	(636)	(115)
IPCA swap	(127)	149
Eurobonds swap	(1)	(35)
Pre-dollar swap	(111)	(16)
Libor swap	(7)	-
Forward transactions	(1)	1
	(883)	(16)
Commodities price risk		
Base metals products	(16)	152
Gasoil, Brent and freight	84	12
	68	164
Others	(2)	(77)
	(2)	(77)
Total	(817)	71

a.iv) Effects of derivatives on the income statement

	Gain (loss) recognized in the income statement		
	Year ended December 31,		
	2020	2019	2018
Foreign exchange and interest rate risk			
CDI & TJLP vs. US\$ fixed and floating rate swap	(746)	(39)	(206)
IPCA swap	(262)	118	(23)
Eurobonds swap	28	(39)	(27)
Pre-dollar swap	(160)	2	(23)
Libor swap	(7)	-	-
	(1,147)	42	(279)
Commodities price risk			
Base metals products	10	58	(25)
Gasoil, Brent and freight	(134)	42	6
	(124)	100	(19)
Others	61	102	32
	61	102	32
Total	(1,210)	244	(266)

Notes to the Financial Statements (Continued)
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19. Financial and capital risk management (Continued)

a.v) Effects of derivatives on the cash flows

	Financial settlement inflows (outflows)		
	Year ended December 31,		
	2020	2019	2018
Foreign exchange and interest rate risk			
CDI & TJLP vs. US\$ fixed and floating rate swap	(141)	(381)	(135)
IPCA swap	-	(28)	7
Eurobonds swap	(6)	(5)	(3)
Pre-dollar swap.....	(49)	8	10
	<u>(196)</u>	<u>(406)</u>	<u>(121)</u>
Commodities price risk			
Base metals products	8	48	8
Gasoil, Brent and freight	(206)	2	49
	<u>(198)</u>	<u>50</u>	<u>57</u>
Others	68	21	(3)
Derivatives designated as cash flow hedge accounting			
Nickel	292	11	-
	<u>292</u>	<u>11</u>	<u>-</u>
Total	<u><u>(34)</u></u>	<u><u>(324)</u></u>	<u><u>(67)</u></u>

a.vi) Hedge accounting

	Gain (loss) recognized in the other comprehensive income		
	Year ended December 31,		
	2020	2019	2018
Net investments hedge	(2,786)	(392)	(543)
Cash flow hedge (Nickel and Palladium)	(104)	150	-

Net investment hedge—The Company uses hedge accounting for the foreign exchange risk arising from Vale S.A.'s net investments in Vale International S.A. and Vale Holding BV. With the hedge program, the Company's debt with third parties denominated in dollars and euros serves as a hedge instrument for investments in these subsidiaries. As of December 31, 2020, the amount of debt designated as a hedge instrument for these investments is US\$2,168 and EUR750 million. As a result of the hedge program, the impact of the exchange rate variation on the debt denominated in dollars and euros is now partially recorded in other comprehensive results, under "accumulated translation adjustments".

Cash Flow Hedge (Nickel)—In order to reduce the cash flow volatility due to nickel price fluctuations, the Company implemented the Nickel Revenue Hedge Program in 2019. In this program, hedging operations were executed, through option contracts, to protect a portion of the projected volume of sales at

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

floating, highly probable realization prices, guaranteeing prices above the average unit cost of nickel production for the protected volumes.

In April 2020, the option contracts were liquidated in order to increase the Company's cash position as a result of COVID-19 in order to increase the Company's liquidity, temporarily discontinuing the Nickel Revenue Hedge program. The amount that was accumulated in the cash flow hedge reserve up to the settlement date of these option contracts is being recycled to income as the sale of nickel is recognized in the income statement.

In October 2020, the Company executed new hedge operations, continuing the Nickel Revenue Hedge program. The contracts are traded on the London Metal Exchange or over-the-counter market and the hedged item's P&L is offset by the hedged item's P&L due to Nickel price variation.

Flow	Notional (ton)		Bought / Sold	Average strike (US\$/ ton)	Fair value		Financial settlement Inflows (Outflows) December 31, 2020	Value at Risk December 31, 2020	Fair value by year 2021
	December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2019			
Nickel Revenue Hedging Program(i)									
Call options	58,620	75,984	S	17,664	(46)	(12)	–	10	(46)
Put options	58,620	75,984	B	15,000	28	162	292	6	28
Total					(18)	150	292	16	(18)

(i) With the hedge structure, the company ensures prices between US\$15,000/t and US\$17,664/t for the program's sales volume.

Cash flow hedge (Palladium)—To reduce the volatility of its future cash flows arising from changes in palladium prices, the Company implemented a Palladium Revenue Hedging Program. Under this program, hedge operations were executed using forwards and option contracts to protect a portion of the highly probable forecast sales at floating prices. A hedge accounting treatment is given to this program. The derivative transactions under the program are negotiated over-the-counter and the financial settlement inflows/outflows are offset by the protected items' losses/gains due to palladium price changes.

Flow	Notional (t oz)		Bought / Sold	Average strike (US\$/t oz)	Fair value		Financial settlement Inflows (Outflows) December 31, 2020	Value at Risk December 31, 2020	Fair value by year 2021
	December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2019			
Palladium Revenue Hedging Program									
Palladium Forwards	–	–	S	–	–	–	3	–	–
Call Options	7,200	–	S	2,347	(1)	–	–	–	(1)
Put Options	7,200	–	B	2,050	–	–	–	–	–
Total					(1)	–	–	–	(1)

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

b) Market risk—Foreign exchange and interest rates

The Company's cash flow is exposed to the volatility of several currencies against the U.S. dollar. While most of our product prices are indexed to U.S. dollars, most of our costs, disbursements and investments are indexed to currencies other than the U.S. dollar, principally the Brazilian real and the Canadian dollar.

The Company implements hedge transactions to protect its cash flow against the market risks that arises from its debt obligations—mainly currency volatility. The hedges cover most of the debt denominated in Brazilian real and euros. The Company uses swap and forward transactions to convert debt linked to Brazilian real and Euros into U.S. dollar, with volumes, flows and settlement dates similar to those of the debt instruments—or sometimes lower, subject to market liquidity conditions.

Hedging instruments with shorter settlement dates are renegotiated through time so that their final maturity matches—or becomes closer—to the debts' final maturity. At each settlement date, the results of the swap and forward transactions partially offset the impact of the foreign exchange rate in the Company's obligations, contributing to stabilize the cash disbursements in U.S. dollar.

(b.i) Protection programs for the R\$ and EUR denominated debt instruments and other liabilities

To reduce cash flow volatility, swap and forward transactions were implemented to convert into US\$ the cash flows from certain liabilities denominated in R\$ with interest rates linked mainly to Brazilian Interbank Interest rate ("CDI"), TJLP and consumer price index ("IPCA"). In those swaps, the Company pays fixed or floating rates in US\$ and receives payments in R\$ linked to the interest rates of the protected liabilities. Swap transactions were implemented to convert into US\$ the cash flows from certain debt instruments issued in Euros by the Company, where receives fixed rates in EUR and pays fixed rates in US\$.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

The swap and forward transactions were negotiated over-the-counter and the protected items are the cash flows from debt instruments and other liabilities linked to R\$ and EUR.

Flow	Notional		Index	Average rate	Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year		
	December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2021	2022
CDI vs. US\$ fixed rate swap					(473)	(38)	(129)	42	(60)	(96)	(317)
Receivable	R\$ 9,445	R\$ 2,115	CDI	100.09%							
Payable	US\$ 2,213	US\$ 558	Fix	2.09%							
TJLP vs. US\$ fixed rate swap					(163)	(77)	(44)	9	(50)	(42)	(71)
Receivable	R\$ 1,651	R\$ 2,111	TJLP +	1.14%							
Payable	US\$ 460	US\$ 601	Fix	3.05%							
R\$ fixed rate vs. US\$ fixed rate swap					(111)	(18)	(48)	11	(63)	(51)	3
Receivable	R\$ 2,512	R\$ 2,173	Fix	5.43%							
Payable	US\$ 621	US\$ 604	Fix	0.31%							
IPCA vs. US\$ fixed rate swap					(173)	46	(12)	13	(73)	(8)	(92)
Receivable	R\$ 2,363	R\$ 2,826	IPCA +	5.10%							
Payable	US\$ 622	US\$ 759	Fix	4.02%							
IPCA vs. CDI swap					45	104	44	1	7	38	-
Receivable	R\$ 694	R\$ 1,634	IPCA +	6.63%							
Payable	R\$ 550	R\$ 1,350	CDI	98.76%							
EUR fixed rate vs. US\$ fixed rate swap					(1)	(35)	(6)	5	(4)	(3)	6
Receivable	€ 500	€ 500	Fix	3.75%							
Payable	US\$ 613	US\$ 613	Fix	4.29%							
Forward	R\$ 916	R\$ 121	B	5.96	(1)	-	-	3	(1)	-	-

b.ii) Protection program for Libor floating interest rate US\$ denominated debt

The Company has also exposure to interest rates risks over loans and financings. The US Dollar floating rate debt in the portfolio consists mainly of loans including export pre-payments, commercial banks and multilateral organizations loans. In general, such debt instruments are indexed to the LIBOR in US dollar.

To reduce the cash flow volatility, swap transactions were implemented to convert Libor floating interest rate cash flows from certain debt instruments issued by the Company into fixed interest rate. In those swaps, the Company receives floating rates and pays fixed rates in US\$.

Flow	Notional		Index	Average rate	Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year		
	December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2021	2022
Libor vs. US\$ fixed rate swap					(7)	-	-	1	(1)	(1)	(4)
Receivable	US\$ 950	-	Libor	0.13%							
Payable	US\$ 950	-	Fix	0.48%							

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

c) Market risk—Product prices and input costs

The Company is also exposed to market risks associated with the price volatility of commodities and inputs, especially freight and fuel costs. In line with its risk management policy, risk mitigation strategies involving commodities are used to reduce cash flow volatility. These mitigation strategies incorporate derivative instruments, predominantly forward, futures and options.

c.i) Protection program for product prices and input costs

Flow	Notional		Bought / Sold	Average strike (US\$/bbl)	Fair value		Financial settlement Inflows (Outflows) December 31, 2020	Value at Risk December 31, 2020	Fair value by year 2021+
	December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2019			
Brent crude oil (bbl)									
Call options	13,746,945	7,048,500	B	55	92	11	–	11	92
Put options	13,746,945	7,048,500	S	28	(12)	(3)	(68)	1	(12)
Gasoil (bbl)									
Call options	–	7,710,750	C	–	–	7	–	–	–
Put options	–	7,710,750	V	–	–	(3)	(137)	–	–
Forward Freight Agreement (days)									
Freight forwards (days) ...	1,625	1,050	C	11,893	4	–	(2)	1	4

Brent Crude Oil and Gasoil options—In order to reduce the impact of fluctuations in fuel oil prices on the hiring and availability of maritime freight and, consequently, to reduce the Company's cash flow volatility, hedging operations were carried out through options contracts on Brent Crude Oil and Gasoil (10ppm) for different portions of the exposure. The derivative transactions were negotiated over-the-counter and the protected item is part of the costs linked to the price of fuel oil used on ships. The financial settlement inflows/outflows are offset by the protected items' losses/gains.

Freight derivative—To reduce the impact of maritime freight price volatility on the Company's cash flow, freight hedging transactions were implemented, through Forward Freight Agreements (FFAs). The protected item is part of the costs linked to maritime freight spot prices. The financial settlement inflows/outflows of the FFAs are offset by the protected items' losses/gains due to freight price changes. The FFAs are contracts traded over the counter and can be cleared through a Clearing House, in this case subject to margin requirements.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

d) Embedded derivatives in contracts

Flow	Notional		Bought / Sold	Average strike	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value
	December 31, 2020	December 31, 2019			December 31, 2020	December 31, 2019			
Warrants da Wheaton									
Precious Metals									
Corp. (quantity of warrants)									
Call options	–	10,000,000	B	–	–	26	25	–	–
Stock options associated with convertible debentures (quantity)									
Conversion options	–	140,239	S	8,346	–	(51)	235	–	–
Option related to a Special Purpose Entity "SPE" (quantity)									
Call option	137,751,623	137,751,623	B	2.92	18	24	–	2	18
Embedded derivatives in contracts for the sale of part of its shareholding (quantity)									
Put option	1,105,070,863	1,105,070,863	S	4.23	(19)	(69)	–	4	(19)
Embedded Derivative in natural gas purchase agreement (volume/month)									
Call options	746,667	746,667	S	233	–	(1)	–	–	–
Embedded in raw material purchase contract (ton)									
Nickel forwards	1,979	1,497	S	15,831	2	2	–	1	2
Copper forwards	976	1,009	S	7,121	–	–	–	–	–

Wheaton Precious Metals Corp. warrants—The Company owned warrants issued by Wheaton Precious Metals Corp. (WPM), a Canadian company with stocks negotiated on the Toronto Stock Exchange and the New York Stock Exchange. Such warrants have payoff similar to that of an American call option and were received as part of the payment regarding the sale of part of gold payable flows produced as a sub product from Salobo copper mine and some nickel mines in Sudbury. In February 2020, the Company sold all of its warrants of Wheaton (equivalent to 10,000,000 common shares) for US\$2.50 per warrant, totaling US\$25.

Call options associated to debentures convertible into shares—In this contract, BNDESPar was granted call options on VLI S.A. ("VLI") shares held by Vale of up to 8% of VLI's capital stock. On December 9, 2020, the

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

Company was notified by BNDESPar of the full exercise of the call option for shares issued by VLI. With the exercise of this option, Vale received US\$241 for an 8% stake in VLI (note 14).

Option related to a Special Purpose Entity "SPE"—The Company acquired in January 2019 a call option related to shares of certain special purpose entities, which are part of a wind farm located in Bahia, Brazil. This option was acquired in the context of the Company's signing of electric power purchase and sale agreements with an SPE, supplied by this wind farm.

Options to purchase shares of associates—In 2014, the Company sold part of its stake in an associate to an investment fund, of which sales contract establishes, under certain conditions, a minimum return guarantee on the investment whose maturity was extended to December 2021. This is considered an embedded derivative, with payoff equivalent to a put option.

Options on natural gas purchase—The Company has also a natural gas purchase agreement in which there's a clause that defines that a premium can be charged if the Company's pellet sales prices trade above a pre-defined level. This clause is considered an embedded derivative.

Nickel and copper raw materials—The Company has some nickel concentrate and raw materials purchase agreements in which there are provisions based on nickel and copper future prices behavior. These provisions are considered as embedded derivatives.

e) Sensitivity analysis of derivative financial instruments

The following tables present the potential value of the instruments given hypothetical stress scenarios for the main market risk factors that impact the derivatives positions. The scenarios were defined as follows:

- *Probable*: the probable scenario was defined as the fair value of the derivative instruments as at December 31, 2020
- *Scenario I*: fair value estimated considering a 25% deterioration in the associated risk variables
- *Scenario II*: fair value estimated considering a 50% deterioration in the associated risk variables



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

Instrument	Instrument's main risk events	Probable	Scenario I	Scenario II
CDI vs. US\$ fixed rate swap	R\$ depreciation	(473)	(1,048)	(1,623)
	US\$ interest rate inside Brazil decrease	(473)	(494)	(517)
	Brazilian interest rate increase	(473)	(496)	(522)
Protected item: R\$ denominated liabilities	R\$ depreciation	n.a.	-	-
TJLP vs. US\$ fixed rate swap	R\$ depreciation	(163)	(285)	(408)
	US\$ interest rate inside Brazil decrease	(163)	(165)	(168)
	Brazilian interest rate increase	(163)	(173)	(182)
	TJLP interest rate decrease	(163)	(172)	(181)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
R\$ fixed rate vs. US\$ fixed rate swap	R\$ depreciation	(111)	(264)	(418)
	US\$ interest rate inside Brazil decrease	(111)	(113)	(115)
	Brazilian interest rate increase	(111)	(120)	(129)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
IPCA vs. US\$ fixed rate swap	R\$ depreciation	(173)	(343)	(512)
	US\$ interest rate inside Brazil decrease	(173)	(178)	(183)
	Brazilian interest rate increase	(173)	(189)	(204)
	IPCA index decrease	(173)	(184)	(195)
	Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-
IPCA vs. CDI swap	Brazilian interest rate increase	45	43	41
	IPCA index decrease	45	43	40
Protected item: R\$ denominated debt linked to IPCA	IPCA index decrease	n.a.	(43)	(40)
EUR fixed rate vs. US\$ fixed rate swap	EUR depreciation	(1)	(173)	(346)
	Euribor increase	(1)	(2)	(3)
	US\$ Libor decrease	(1)	(2)	(2)
	Protected item: EUR denominated debt	EUR depreciation	n.a.	173
US\$ floating rate vs. US\$ fixed rate swap	US\$ Libor decrease	(7)	(10)	(13)
Protected item: Libor US\$ indexed debt	US\$ Libor decrease	n.a.	10	13
NDF BRL/USD	R\$ depreciation	(1)	(39)	(77)
	US\$ interest rate inside Brazil decrease	(1)	(2)	(3)
	Brazilian interest rate increase	(1)	(7)	(13)
Protected item: R\$ denominated liabilities	R\$ depreciation	n.a.	-	-
Fuel oil protection				
Options	Price input decrease	80	25	(28)
Protected item: Part of costs linked to fuel oil prices	Price input decrease	n.a.	(25)	28
Forward Freight Agreement				
Forwards	Freight price decrease	4	(2)	(7)
Protected item: Part of costs linked to maritime freight prices	Freight price decrease	n.a.	2	7
Nickel sales fixed price protection				
Forwards	Nickel price decrease	(19)	(19)	(19)
Protected item: Part of nickel revenues with fixed prices	Nickel price decrease	n.a.	19	19



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

Instrument	Instrument's main risk events	Probable	Scenario I	Scenario II
Palladium Revenue Hedging Program				
Options	Palladium price increase	(1)	(5)	(9)
Protected item: Part of palladium future revenues	Palladium price increase	n.a.	5	9
Option—SPCs	SPCs stock value decrease	18	10	2
Instrument	Main risks	Probable	Scenario I	Scenario II
Embedded derivatives—Raw material purchase (nickel)	Nickel price increase	2	(5)	(13)
Embedded derivatives—Raw material purchase (copper)	Copper price increase	–	(1)	(3)
Embedded derivatives—Gas purchase	Pellet price increase	–	–	(1)
Embedded derivatives—Guaranteed minimum return	Stock value decrease	(19)	(84)	(270)

f) Credit risk management

The Company is exposed to credit risk arises from trade receivables, derivative transactions, guarantees, down payment for suppliers and cash investments. Our credit risk management process provides a framework for assessing and managing counterparties' credit risk and for maintaining our risk at an acceptable level.

For the commercial credit exposure, which arises from sales to final customers, the risk management area, in accordance with the current delegation level, approves or requests the approval of credit risk limits for each counterparty.

Vale attributes an internal credit risk rating for each counterparty using its own quantitative methodology for credit risk analysis, which is based on market prices, external credit ratings and financial information of the counterparty, as well as qualitative information regarding the counterparty's strategic position and history of commercial relations.

Based on the counterparty's credit risk, risk mitigation strategies may be used to manage the Company's credit risk. The main credit risk mitigation strategies include non-recourse sale of receivables, insurance instruments, letters of credit, corporate and bank guarantees, mortgages, among others.

f.i) Accounts receivable

Vale has a diversified accounts receivable portfolio from a geographical standpoint, with Asia, Europe and Brazil the regions with more significant exposures. According to each region, different guarantees can be used to enhance the credit quality of the receivables. In 2019 and 2018, the expected credit loss on the Company's accounts receivable portfolio is immaterial (see note 10).



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

f.ii) Financial instruments, except for accounts receivable

To manage the credit exposure arising from cash investments and derivative instruments, credit limits are approved to each counterparty with whom the Company has credit exposure. Furthermore, the Company controls the portfolio diversification and monitor different indicators of solvency and liquidity of the different counterparties that were approved for trading. The carrying amount of the financial assets that represent the exposure to credit risk is presented below:

	December 31, 2020	December 31, 2019
Cash and cash equivalents	13,487	7,350
Short-term investments.....	771	826
Restricted cash	38	151
Judicial deposits (note 26)	1,268	3,133
Derivative financial instruments (note 19)	200	472
Investments in equity securities.....	757	726
Related parties—Loans (note 29)	1,118	1,919
Total	17,639	14,577

f.iii) Financial counterparties' ratings

The transactions of derivative instruments, cash and cash equivalents as well as short-term investments are held with financial institutions whose exposure limits are periodically reviewed and approved by the delegated authority. The financial institutions credit risk is performed through a methodology that considers, among other information, ratings provided by international rating agencies.

The table below presents the ratings published by Moody's regarding the main financial institutions that we hire derivative instruments, cash and cash equivalents transactions.

	December 31, 2020		December 31, 2019	
	Cash and cash equivalents and investment	Derivatives	Cash and cash equivalents and investment	Derivatives
Aa1	2,210	36	31	-
Aa2	363	15	1	11
Aa3	1,681	41	202	46
A1	2,812	21	1,468	-
A2	4	20	2,740	138
A3	5	36	109	105
Baa1	4	-	5	-
Baa2	1	-	47	-
Baa3	-	-	1	117
Ba1	2,986	-	-	-
Ba2	4,189	6	835	-
Ba3	-	-	2,735	-
Others	3	25	2	55
	14,258	200	8,176	472



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

g) Liquidity risk management

The liquidity risk arises from the possibility that Vale might not perform its obligations on due dates, as well as face difficulties to meet its cash requirements due to market liquidity constraints.

The revolving credit facilities available today were provided by a syndicate of several global commercial banks. To mitigate liquidity risk, the Company has two revolving credit facilities, which will mature in 2022 and 2024, in the available amount of US\$5,000 to assist the short term liquidity management and to enable more efficiency in cash management, being consistent with the strategic focus on cost of capital reduction. As at December 31, 2020 these lines are undrawn.

Accounting policy

The Company uses financial instruments to hedge its exposure to certain market risks arising from operational, financing and investing activities. Derivatives are included within financial assets or liabilities at fair value through profit or loss unless they are designated as effective hedging instruments (hedge accounting).

At the beginning of the hedge operations, the Company documents the type of hedge, the relation between the hedging instrument and hedged items, its risk management objective and strategy for undertaking hedge operations. The Company also documents, both at hedge inception and on an ongoing basis that the hedge is expected to continue to be highly effective. The Company has elected to adopt the new general hedge accounting model in IFRS 9 and designates certain derivatives as either:

Cash flow hedge—The effective portion of changes in the fair value of derivatives that are designated and qualify as cash flow hedges is recognized in equity within “Unrealized fair value gain (losses)”. The gain or loss relating to the ineffective portion is recognized immediately in the income statement. When a hedging instrument expires or is sold, or when a hedge no longer meets the criteria for hedge accounting, any cumulative gain or loss existing in equity at that time remains in equity and is recognized in profit or loss when the transaction is recognized in the income statement.

Net investment hedge—Hedges of net investments in foreign operations are accounted for similarly to cash flow hedges. Any gain or loss on the hedging instrument relating to the effective portion of the hedge is recognized in equity within “Cumulative translation adjustments”. The gain or loss relating to the ineffective portion is recognized immediately in the income statement. Gains and losses accumulated in equity are included in the statement of income when the foreign operation is partially or fully disposed of or sold.

Derivatives at fair value through profit or loss—Certain derivative instruments do not qualify for hedge accounting. Changes in the fair value of any of these derivative instruments are recognized immediately in the income statement.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

19. Financial and capital risk management (Continued)

Critical accounting estimates and judgments

The fair values of financial instruments that are not traded in active markets are determined using valuation techniques. Vale uses its own judgment to choose between the various methods. Assumptions are based on the market conditions, at the end of the year. An analysis of the impact if actual results are different from management's estimates is present under "Sensitivity analysis of derivative financial instruments".

20. Financial assets and liabilities

The Company classifies its financial instruments in accordance with the purpose for which they were acquired, and determines the classification and initial recognition according to the following categories:

	December 31, 2020				December 31, 2019			
	Amortized cost	At fair value through OCI	At fair value through profit or loss	Total	Amortized cost	At fair value through OCI	At fair value through profit or loss	Total
Financial assets								
Current								
Cash and cash equivalents (note 22)	13,487	-	-	13,487	7,350	-	-	7,350
Short-term investments (note 22)	-	-	771	771	-	-	826	826
Derivative financial instruments (note 19)	-	-	134	134	-	-	288	288
Accounts receivable (note 10)	4,499	-	494	4,993	2,452	-	77	2,529
Related parties (note 29)	195	-	-	195	319	-	-	319
	18,181	-	1,399	19,580	10,121	-	1,191	11,312
Non-current								
Judicial deposits (note 26)	1,268	-	-	1,268	3,133	-	-	3,133
Restricted cash	38	-	-	38	151	-	-	151
Derivative financial instruments (note 19)	-	-	66	66	-	-	184	184
Investments in equity securities	-	757	-	757	-	726	-	726
Related parties (note 29)	923	-	-	923	1,600	-	-	1,600
	2,229	757	66	3,052	4,884	726	184	5,794
Total of financial assets	20,410	757	1,465	22,632	15,005	726	1,375	17,106

Notes to the Financial Statements (Continued)
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20. Financial assets and liabilities (Continued)

	December 31, 2020				December 31, 2019			
	Amortized cost	At fair value through OCI	At fair value through profit or loss	Total	Amortized cost	At fair value through OCI	At fair value through profit or loss	Total
Financial liabilities								
Current								
Suppliers and contractors	3,367	-	-	3,367	4,107	-	-	4,107
Derivative financial instruments (note 19)	-	-	328	328	-	-	94	94
Loans, borrowings and leases (note 22)	1,136	-	-	1,136	1,439	-	-	1,439
Dividends payable	1,220	-	-	1,220	1,560	-	-	1,560
Liabilities related to the concession grant	209	-	-	209	-	-	-	-
Related parties (note 29)	725	-	-	725	980	-	-	980
Other financial liabilities	644	-	-	644	330	-	-	330
	<u>7,301</u>	<u>-</u>	<u>328</u>	<u>7,629</u>	<u>8,416</u>	<u>-</u>	<u>94</u>	<u>8,510</u>
Non-current								
Derivative financial instruments (note 19)	-	-	689	689	-	-	307	307
Loans, borrowings and leases (note 22)	13,891	-	-	13,891	13,408	-	-	13,408
Related parties (note 29)	943	-	-	943	956	-	-	956
Participative stockholders' debentures (note 21)	-	-	3,413	3,413	-	-	2,584	2,584
Liabilities related to the concession grant	2,103	-	-	2,103	-	-	-	-
Financial guarantees	-	-	877	877	-	-	525	525
	<u>16,937</u>	<u>-</u>	<u>4,979</u>	<u>21,916</u>	<u>14,364</u>	<u>-</u>	<u>3,416</u>	<u>17,780</u>
Total of financial liabilities	<u><u>24,238</u></u>	<u><u>-</u></u>	<u><u>5,307</u></u>	<u><u>29,545</u></u>	<u><u>22,780</u></u>	<u><u>-</u></u>	<u><u>3,510</u></u>	<u><u>26,290</u></u>

Notes to the Financial Statements (Continued)
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20. Financial assets and liabilities (Continued)

b) Hierarchy of fair value

	December 31, 2020				December 31, 2019			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Financial assets								
Short-term investments	771	–	–	771	826	–	–	826
Derivative financial instruments	–	182	18	200	–	448	24	472
Accounts receivable	–	494	–	494	–	77	–	77
Investments in equity securities	757	–	–	757	726	–	–	726
Total	1,528	676	18	2,222	1,552	525	24	2,101
Financial liabilities								
Derivative financial instruments	–	998	19	1,017	–	281	120	401
Participative stockholders' debentures	–	3,413	–	3,413	–	2,584	–	2,584
Financial guarantees	–	877	–	877	–	525	–	525
Total	–	5,288	19	5,307	–	3,390	120	3,510

There were no transfers between levels 1, 2 and 3 of the fair value hierarchy during the years presented.

b.i) Changes in Level 3 assets and liabilities during the year

	Derivative financial instruments	
	Financial assets	Financial liabilities
Balance at December 31, 2019	24	120
Gain and losses recognized in income statement	–	(79)
Translation adjustments	(6)	(22)
Balance at December 31, 2020	18	19

c) Fair value of loans and financing

Loans and financing are recorded at their contractual values. To determine the market values of these financial instruments traded in public markets, the closing market quotations on the balance sheet dates were used. The Company considers that for the other financial liabilities measured at amortized cost, their

Notes to the Financial Statements (Continued)
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20. Financial assets and liabilities (Continued)

book values are close to their fair values and therefore information on their fair values is not being presented.

	December 31, 2020		December 31, 2019	
	Carrying amount	Fair value	Carrying amount	Fair value
Quoted in the secondary market:				
Bonds	7,448	10,025	5,948	7,484
Eurobonds	920	985	843	916
Debentures	496	496	995	995
Debt contracts in Brazil in:				
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	860	857	1,332	1,379
R\$, with fixed interest	34	35	88	88
Basket of currencies and bonds in US\$ indexed to LIBOR.....	56	56	101	100
Debt contracts in the international market in:				
US\$, with variable and fixed interest	3,225	3,278	3,194	3,280
EUR, with variable interest	-	-	224	211
Other currencies, with fixed interest	120	134	120	131
Total	13,159	15,866	12,845	14,584

Accounting policy

Classification and measurement—The Company classifies financial instruments based on its business model for managing the assets and the contractual cash flow characteristics of those assets. The business model test determines the classification based on the business purpose for holding the asset and whether the contractual cash flows represent only payments of principal and interest.

Financial instruments are measured at fair value through profit or loss (“FVTPL”) unless certain conditions are met that permit measurement at fair value through other comprehensive income (“FVOCI”) or amortized cost. Gains and losses recorded in other comprehensive income for debt instruments are recognized in profit or loss only on disposal.

Investments in equity instruments are measured at FVTPL unless they are eligible to be measured at FVOCI, whose gains and losses are never recycled to profit or loss.

All financial liabilities are initially measured at fair value, net of transaction costs incurred and are subsequently carried at amortized cost and updated using the effective interest rate method. Excepts for Participative stockholders’ debentures and Derivative financial instruments that are measured at fair value through profit or loss.

Fair value hierarchy—The Company classifies financial instruments within the fair value hierarchy as:

Level 1: The fair value of financial instruments traded in active markets (e.g. derivatives and publicly traded shares) is based on quoted market prices at the end of the financial statements period.

Notes to the Financial Statements (Continued)
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20. Financial assets and liabilities (Continued)

Level 2: The fair value of financial instruments that are not traded in an active market (e.g. over the counter derivatives) is determined using valuation techniques that maximize the use of observable market data. If all significant data required for the fair value of an instrument are observable, the instrument is included in level 2.

Level 3: If one or more of the significant data are not based on observable market data, the instrument is included in level 3. The fair value of derivatives classified as level 3 is estimated using discounted cash flows and option valuation models with unobservable inputs of discount rates, stock prices and commodity prices.

21. Participative stockholders' debentures

At the time of its privatization in 1997, the Company issued a total of 388,559,056 debentures to then-existing stockholders, including the Brazilian Government. The debentures' terms were set to ensure that pre-privatization stockholders would participate in potential future benefits that might be obtained from exploration of mineral resources. This obligation will cease when all the relevant mineral resources are exhausted, sold or otherwise disposed of by the Company.

Holders of participative stockholders' debentures have the right to receive semi-annual payments equal to an agreed percentage of revenues less value-added tax, transport fee and insurance expenses related to the trading of the products, derived from these mineral resources. The Company made available for withdrawal as remuneration the amount of US\$183 (R\$1 billion) and US\$194 (R\$776 million), for the year ended December 31, 2020 and 2019, respectively, as disclosed on the "Shareholders' debentures report" made available on the Company's website.

Accounting policy

The participative stockholders' debentures are measured at fair value through profit or loss based on the market approach. To calculate the fair value of the liabilities, the Company uses the weighted average price of the secondary market trades in the last month of the quarter.

Notes to the Financial Statements (Continued)
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22. Loans, borrowings, leases, cash and cash equivalents and short-term investments

a) Net debt

The Company evaluates the net debt with the objective of ensuring the continuity of its business in the long term.

	<u>December 31, 2020</u>	<u>December 31, 2019</u>
Debt contracts in the international markets	11,890	10,494
Debt contracts in Brazil	1,470	2,562
Total of loans and borrowings	13,360	13,056
(–) Cash and cash equivalents.....	13,487	7,350
(–) Short-term investments.....	771	826
Net debt (cash)	(898)	4,880
Leasing	1,667	1,791

b) Cash and cash equivalents

Cash and cash equivalents include cash, immediately redeemable deposits and short-term investments with an insignificant risk of change in value. They are readily convertible to cash, being US\$2,849 (US\$2,822 in 2019) denominated in R\$, indexed to the CDI), US\$10,195 (US\$4,361 in 2019) denominated in US\$ and US\$443 (US\$167 in 2019) denominated in other currencies.

c) Short-term investments

At December 31, 2020, the balance of US\$771 is substantially comprised of investments in an exclusive investment fund immediately liquid, whose portfolio is composed of committed transactions and Financial Treasury Bills (“LFTs”), which are floating-rate securities issued by the Brazilian government. At December 31, 2019, the balance of US\$826 is mainly comprised of investments directly in LFTs.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

22. Loans, borrowings, leases, cash and cash equivalents and short-term investments (Continued)

d) Loans, borrowings and leases

i) Total debt

	Average interest rate(i)	Current liabilities		Non-current liabilities	
		December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Quoted in the secondary market:					
Bonds	6.01%	–	–	7,448	5,948
Eurobonds	4.29%	–	–	920	843
Debentures	10.48%	107	374	389	621
Debt contracts in Brazil in:					
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	9.29%	320	276	540	1,056
R\$, with fixed interest	2.86%	20	43	14	45
Basket of currencies and bonds in US\$ indexed to LIBOR	2.31%	45	44	11	56
Debt contracts in the international market in:					
US\$, with variable and fixed interest	2.24%	182	260	3,044	2,934
EUR, with variable interest	–	–	–	–	225
Other currencies, with fixed interest	3.17%	12	14	107	106
Accrued charges		201	203	–	8
Total		887	1,214	12,473	11,842

- (i) In order to determine the average interest rate for debt contracts with floating rates, the Company used the rate applicable at December 31, 2020.
- (ii) R\$ denominated debt that bears interest at IPCA, IGP, CDI, TR or TJLP, plus spread. For a total of US\$1,296 the Company entered into derivative transactions to mitigate the exposure to the cash flow variations of the floating rate debt denominated in R\$, resulting in an average cost of 2.99% per year in US\$.
- (iii) Eurobonds, for which the Company entered into derivatives to mitigate the exposure to the cash flow variations of the debt denominated in EUR, resulting in an average cost of 4.29% per year in US\$.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

22. Loans, borrowings, leases, cash and cash equivalents and short-term investments (Continued)

Future flows of debt payments, principal and interest

	<u>Principal</u>	<u>Estimated future interest payments(i)</u>
2021	685	637
2022	1,230	610
2023	1,229	581
2024	2,024	527
Between 2025 and 2029	2,175	2,108
2030 onwards	5,816	2,450
Total	<u>13,159</u>	<u>6,913</u>

(i) Based on interest rate curves and foreign exchange rates applicable as at December 31, 2020 and considering that the payments of principal will be made on their contracted payments dates. The amount includes the estimated interest not yet accrued and the interest already recognized in the financial statements.

Credit and financing lines

As a precautionary measure in order to increase the Company's cash position due to the uncertainties resulting from the COVID-19 pandemic, Vale drew down its revolving credit lines in March 2020. These credit lines were fully paid in September 2020. As at December 31, 2020, the total amount available under credit lines is US\$5,000, of which US\$2,000 maturing in June 2022 and US\$3,000 maturing in December 2024.

Funding

In July 2020, the Company issued through Vale Overseas Limited guaranteed notes due July 2030 totaling US\$1,500. The notes bear 3.750% coupon per year, payable semi-annually, and were sold at a price of 99.176% of the principal amount. In August 2020, the Company contracted US\$300 with The Export-Import Bank of China ("CEXIM").

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

22. Loans, borrowings, leases, cash and cash equivalents and short-term investments (Continued)

Reconciliation of debt to cash flows arising from financing activities

	Quoted in the secondary market	Debt contracts in Brazil	Debt contracts on the international market	Total
December 31, 2019	7,954	1,535	3,567	13,056
Additions	1,500	–	5,300	6,800
Repayments	(243)	(294)	(5,527)	(6,064)
Interest paid	(556)	(60)	(139)	(755)
Cash flow from financing activities	701	(354)	(366)	(19)
Effect of exchange rate	(140)	(271)	(3)	(414)
Interest accretion	531	49	157	737
Non-cash changes	391	(222)	154	323
December 31, 2020	9,046	959	3,355	13,360

ii) Lease liabilities

	December 31, 2019	Additions and contract modifications	Payments(i)	Interest(ii)	Translation adjustment	December 31, 2020
Ports	750	50	(71)	30	(16)	743
Vessels	580	–	(72)	25	–	533
Pellets plants	175	39	(36)	4	(45)	137
Properties	152	32	(17)	7	(32)	142
Energy plants	71	–	(2)	1	(8)	62
Mining equipment and locomotives	63	4	(21)	3	1	50
Total	1,791	125	(219)	70	(100)	1,667

- (i) The total amount of the variable lease payments not included in the measurement of lease liabilities, which have been recognized straight to the income statement, for the year ended December 31, 2020 and 2019 was US\$63 and US\$560, respectively.
- (ii) The interest accretion recognized in the income statement is disclosed in note 6.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

22. Loans, borrowings, leases, cash and cash equivalents and short-term investments (Continued)

Discount rates

	<u>Discount rate</u>
Ports	3% to 6%
Vessels	3% to 6%
Pellets plants	3% to 6%
Properties	3% to 7%
Energy plants	4% to 5%
Mining equipment and locomotives	3% to 6%

Annual minimum payments

	<u>2021</u>	<u>2022</u>	<u>2023</u>	<u>2024</u>	<u>2025 onwards</u>	<u>Total</u>
Ports	68	62	61	60	801	1,052
Vessels	65	63	62	60	404	654
Pellets plants	36	31	10	10	85	172
Properties	47	27	23	21	39	157
Energy plants	7	7	6	6	59	85
Mining equipment and locomotives	18	16	10	8	16	68
Total	<u><u>241</u></u>	<u><u>206</u></u>	<u><u>172</u></u>	<u><u>165</u></u>	<u><u>1,404</u></u>	<u><u>2,188</u></u>

The amounts in the table above presents the undiscounted lease obligation by maturity date. The lease liability recognized in the balance sheet is measured at the present value of such obligations.

e) Guarantees

As at December 31, 2020 and 2019, loans and borrowings are secured by property, plant and equipment in the amount of US\$176 and US\$220, respectively. The securities issued through Vale's wholly-owned finance subsidiary Vale Overseas Limited are fully and unconditionally guaranteed by Vale.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

22. Loans, borrowings, leases, cash and cash equivalents and short-term investments (Continued)

Accounting policy

Loans and borrowings are initially measured at fair value, net of transaction costs incurred and are subsequently carried at amortized cost and updated using the effective interest rate method. Any difference between the proceeds (net of transaction costs) and the redemption value is recognized in the Income statement over the period of the loan, using the effective interest rate method. The fees paid in obtaining the loan are recognized as transaction costs. The Company contracts derivatives to protect its exposure to changes in debt cash flows, changing the average cost of debts that have hedge derivatives contracted.

Loans and borrowing costs are capitalized as part of property, plants and equipment if those costs are directly related to a qualified asset. The capitalization occurs until the qualified asset is ready for its intended use. The average capitalization rate is 9%. Borrowing costs that are not capitalized are recognized in the income statement in the period in which they are incurred.

Some of the Company's debt agreements with lenders contain financial covenants. The primary financial covenants in those agreements require maintaining certain ratios, such as debt to EBITDA and interest coverage. The Company has not identified any instances of noncompliance as at December 31, 2020 and 2019.

The accounting policy applied to lease liabilities is disclosed in note 17.

23. Brumadinho dam failure

On January 25, 2019, a tailings dam ("Dam I") failed at the Córrego do Feijão mine, in the city of Brumadinho, state of Minas Gerais. The failure released a flow of tailings debris, destroying some of Vale's facilities, affecting local communities and disturbing the environment. The tailings released have caused an impact of around 315 km in extension, reaching the nearby Paraopeba River. The dam failure in Brumadinho ("event") resulted in 270 fatalities or presumed fatalities.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

As a result of the dam failure, the Company has been recognizing provisions to meet its assumed obligations, including de-characterization of the dams, individual indemnification to those affected by the event, remediation of the affected areas and compensation to the society, as shown below:

	December 31, 2019	Impact on the income statement	Present value adjustment	Disbursements(i)	Translation adjustment	December 31, 2020
Global Settlement for Brumadinho.....	1,916	3,872	(5)	(1,325)	(469)	3,989
Provision for individual indemnification and other commitments	1,067	258	10	(504)	(245)	586
De-characterization of dams .	2,489	617	36	(293)	(560)	2,289
Incurred expenses(ii)	-	510	-	(510)	-	-
	<u>5,472</u>	<u>5,257</u>	<u>41</u>	<u>(2,632)</u>	<u>(1,274)</u>	<u>6,864</u>

- (i) Disbursements include the release of judicial deposits in the amount of US\$1,313 (R\$6,900 million), of which US\$274 (R\$1,500 million) was released in the second quarter of 2020 and US\$1,039 (R\$5,400 million) will be released as provided in the Global Settlement. In 2019, the Company disbursed US\$1,720 (R\$6,885 million) in relation to the Brumadinho event. Of the total amount disbursed by the Company in 2019 and 2020, US\$1,701 (R\$7,777 million) is part of the total economic value of the Global Settlement.
- (ii) The Company has incurred expenses, which have been recognized straight to the income statement, in relation to communication services, accommodation and humanitarian assistance, equipment, legal services, water, food aid, taxes, among others. In 2019, the Company incurred expenses in the amount of US\$730.

a) Global Settlement for Brumadinho

On February 4, 2021 (subsequent event), the Company entered into a Judicial Settlement for Integral Reparation (“Global Settlement”), which was under negotiations since 2019, with the State of Minas Gerais, the Public Defender of the State of Minas Gerais and the Federal and the State of Minas Gerais Public Prosecutors Offices, to repair the environmental and social damage resulting from the Dam I rupture.

With the Global Settlement, the requests contained in public civil actions regarding the socio-environmental and socioeconomic damages caused by the dam rupture were substantially resolved. In addition, relevant aspects related to the scope and execution of the Company’s obligations were defined. Therefore, as the negotiations have started before the reporting date, the Company recognized a loss of US\$3,872 (R\$19,924 million) in the income statement for the year ended December 31, 2020.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

Based on the present value of the projected cash outflows discounted at 5.93%, the provision is detailed as follows:

	December 31, 2020	December 31, 2019
Payment obligations(i)	2,343	—
Provision for socio-economic reparation and others	860	729
Provision for social and environmental reparation	786	1,187
	3,989	1,916
	December 31, 2020	December 31, 2019
Current liabilities	1,561	783
Non-current liabilities	2,428	1,133
Liabilities	3,989	1,916

(i) As established in the Global Settlement, US\$1,039 (R\$5,400 million) in judicial deposits made by Vale in public civil actions due to the Dam I rupture will be released to the State of Minas Gerais to use in water security projects and to develop projects that will be proposed by the affected communities. Therefore, the provision already considers that these judicial deposits settled part of the obligations at December 31, 2020.

(a.i) Cash settlement obligation

The cash settlement obligation relates to the socio-economic reparation and socio-environmental compensation projects that will be carried out or managed directly by the State of Minas Gerais and Institutions of Justice, mainly aiming to develop the urban mobility program and strengthening public service programs, as well as other projects that will be proposed by the affected population. In addition, resources will be used in a program of income transfer to those affected by the event, which will be carried out by Institutions of Justice. Of the total amount, US\$848 (R\$4,400 million) relates to the income transfer program that will be fully paid in 2021. The remaining amount of US\$1,495 (R\$7,772 million) is the present value of the semiannual fixed payments obligation, which will last 5 years on average.

(a.ii) Provision for socio-economic reparation and others

The Global Settlement includes remediation projects for Brumadinho and other affected municipalities of the Paraopeba Basin. The socioeconomic reparation actions aims to strengthen the productive activities of the affected region, through measures for greater economic diversification of the municipality of Brumadinho, reducing its historical dependence on mining, and, for the rest of the Basin, finding ways to support the transformation of the economy of the impacted municipalities. These projects will be carried out directly by the Company for an average period of 3 years.

The estimated amounts for the project execution, although set in the agreement, may vary since the implementation of those projects are Vale's responsibility and changes against the original budget may result in changes in provision in future reporting periods.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

(a.iii) Provision for social and environmental reparation

The Global Settlement establishes the rule for the development of the environmental reparation plan, and projects for the compensation of environmental damage already known. These measures aim to repair the damage caused, restore the ecosystems disruption, restore local infrastructure, repair social and economic losses, recover affected areas and repair the loss of memory and cultural heritage caused by the dam rupture. It also includes several actions to clean up the affected areas and improvements to the water catchment system along the Paraopeba River and other water collection points near the affected area. These measures and compensation projects will be carried out directly by the Company for an average period of 5 years.

The estimated amount to carry out the environmental recovery actions is part of the Global Settlement. However, it has no cap due to the Company's legal obligation to fully repair the environmental damage caused by the dam rupture. Therefore, this provision may change in the future depending on several factors that are not under the control of the Company.

b) Provision for individual indemnification and other commitments

In addition to the Global Settlement, the Company has been working to ensure geotechnical safety of the remaining structures at the Córrego do Feijão mine, in Brumadinho, and the removal and proper disposal of the tailings of Dam I. As at December 31, 2020, the provision recorded is US\$267 (2019: US\$113).

For the individual indemnification, Vale and the Public Defendants of the State of Minas Gerais formalized an agreement on April 5, 2019, under which those affected by the Brumadinho's Dam failure may join an individual or family group out-of-court settlement agreements for the indemnification of material, economic and moral damages. This agreement establishes the basis for a wide range of indemnification payments, which were defined according to the best practices and case law of Brazilian Courts, following rules and principles of the United Nations ("UN"). As at December 31, 2020, the provision recorded is US\$179 (2019: US\$569).

In addition, the Company was notified of the imposition of administrative fines by the Brazilian Institute of the Environment and Renewable Natural Resources ("IBAMA"), in the amount of US\$48 (R\$250 million). In July 2020, the Company signed an agreement with IBAMA, of which US\$29 (R\$150 million) will be used in environmental projects in 7 parks in the state of Minas Gerais, covering an area of approximately 794 thousand hectares, and US\$19 (R\$100 million) will be used in basic sanitation programs in the state of Minas Gerais.

c) De-characterization of other dams in Brazil

Following the Brumadinho Dam rupture, the Company has decided to speed up the plan to "de-characterize" its tailings dams built under the upstream method (same method as Brumadinho's dam), certain "centerline structures" and dikes, located in Brazil. Therefore, the Company has a total provision to comply with these assumed obligations in the amount of US\$2,289 at December 31, 2020 (US\$2,489 as at December 31, 2019).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

In 2020, as a consequence of the periodic review of the estimates for the de-characterization of the dam structures, built under the upstream raising method, which are already reserved, the Company recognized US\$369 in addition to the recorded provision, mainly due to the evolution of engineering projects and changes in the planned containments. The Company also identified other structures that met the criteria to be de-characterized as well, resulting in a further provision of US\$248, recognized in the income statement for the year ended December 31, 2020.

As described in “Critical accounting estimates and judgments”, changes in engineering methods and solutions, the volume of tailings to be removed, among other relevant assumptions, may result in a significant change in the provision.

(c.i) Operation stoppages

The Company has suspended some operations due to judicial decisions or technical analysis performed by Vale on its upstream dam structures. The Company has been recording losses in relation to the operational stoppage and idle capacity of the ferrous mineral segment in the amounts of US\$634 and US\$983 for the year ended December 31, 2020 and 2019, respectively. The Company is working on legal and technical measures to resume all operations at full capacity.

(c.ii) Assets write-off

Following the event and the decision to speed up the de-characterization of the upstream dams, the Company recognized a loss of US\$235 as “Impairment and disposal of non-current assets” for the year ended December 31, 2019 in relation to the assets written-off of the Córrego do Feijão mine and those related to the other upstream dams in Brazil. In 2020, the Company did not write-off any asset related to the Brumadinho event.

d) Contingencies and other legal matters

(d.i) Public civil actions brought by the State of Minas Gerais and state public prosecutors for damages resulting from the rupture of Dam I

The Company is party to public civil actions brought by the State of Minas Gerais and state prosecutors claiming economic and environmental damages resulting from the dam rupture and seeking a broad range of injunctions ordering Vale to take specific remediation and reparation actions. These legal proceedings were initially brought before various state courts in Minas Gerais but have been consolidated before the 6th Public Treasury Court in the city of Belo Horizonte and then transferred to the 2nd Public Treasury Court in the city of Belo Horizonte.

With the Global Settlement, the requests contained in public civil actions regarding the socio-environmental and socioeconomic damages caused by the dam rupture were substantially resolved (of the 207 requests, 204 were extinguished). Indemnifications for individual damages are not covered by the Global Settlement, but the parties ratified the agreement with the Public Defendants of the State of Minas Gerais. Thus, the Company expects to keep signing individual agreements.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

(d.ii) Requests for fines or forfeit of assets

On August 26, 2020, the Public Prosecutor's Office of Minas Gerais ("MPMG") and other plaintiffs of the Public Civil Actions presented a request for ruling condemning Vale to indemnify alleged economic losses of the State of Minas Gerais and collective moral damages, both claims already considered in said Public Civil Actions filed against Vale in January 2019 as a result of the Brumadinho dam rupture. In that submission, the plaintiffs also requested the immediate freezing of US\$5.1 billion (R\$26.7 billion) from the Company as a guarantee for the reimbursement of the alleged economic losses, which was dismissed by the judge of the 2nd Lower Court of Public Treasury of Belo Horizonte on October 6, 2020. This claim was extinguished with the Global Settlement.

In other proceeding, in May 2020, the MPMG requested the imposition of fines or forfeit of assets, rights and amounts of the Company, allegedly based on Article 5, item V of Brazilian Law 12.846/2013. According to the MPMG, Vale would have, through its employee's actions, hindered the inspection activities of public agencies in the complex. Vale was not required to present any guarantees based on a judicial decision. The Company believes that the likelihood of loss is remote.

In October 2020, the Company was informed that the Brazilian Office of the Comptroller General ("CGU") initiated an administrative proceeding based on the same allegations made by the MPMG. As this is a discretionary procedure from the CGU, the Company estimates its likelihood of a loss during the administrative phase as possible, but it reaffirms its assessment of loss as remote in the annulment lawsuit to be instituted against any decision by CGU, if necessary.

(d.iii) U.S. Securities putative class action suit

Vale is defending itself in a putative class action brought before a Federal Court in New York and filed by holders of securities—American Depositary Receipts ("ADRs")—issued by Vale. The Lead Plaintiff alleges that we made false and misleading statements or omitted to make disclosures concerning the risks of the operations of Dam I in the Corrego de Feijão mine and the adequacy of the related programs and procedures.

Following the decision of the Court, in May 2020, that denied the Motion to Dismiss presented by the Company, the Discovery phase has started and is expected to be concluded by June 2021.

Based on the evaluation of the Company's legal counsel and given the very preliminary stage, the expectation of loss of this process is classified as possible. However, considering the initial stage of this putative class action, it is not possible at this time to reliably estimate the amount of a potential loss.

(d.iv) Arbitration proceedings in Brazil filed by shareholders and a class association

In Brazil, Vale is a defendant in (i) one arbitration filed by 166 minority shareholders, (ii) one arbitration filed by a class association allegedly representing all Vale's minority shareholders, and (iii) one arbitration filed by foreign investment funds.

In the three proceedings, the Claimants argue Vale would be aware of the risks associated with the dam, and failed to disclose it to the shareholders, which would be required under the Brazilian applicable laws

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

and the rules of *Comissão de Valores Mobiliários* (Securities and Exchange Commission of Brazil). Based on such argument, they claim compensation for losses caused by the decrease of the value of the shares.

Based on the evaluation of the Company's legal counsel and given the very preliminary stage, the expectation of loss of these proceedings is classified as possible.

Specifically, in the proceeding filed by foreign funds, the Claimants estimated the amount of the alleged losses at approximately US\$346 (R\$1,800 million). However, the Company disagree with the estimated losses alleged by the foreign funds and believes that the likelihood of loss is remote based on the current status of the proceeding.

(d.v) Cooperation with the CVM and the Securities and Exchange Commission ("SEC")

The Company is cooperating with the CVM and the SEC by providing documents and other information related to the Dam I rupture in connection with ongoing investigations by both agencies. These investigations relate to Vale's disclosure of relevant information to shareholders, investors and the market in general, especially regarding the conditions and management of Vale's dams. The CVM and SEC investigations may result in the application of fines and administrative penalties either through negotiated resolutions or court proceedings.

e) Insurance and financial guarantees

(e.i) Insurance

The Company is negotiating with insurers the payment of indemnification under its operational risk and civil liability. However, these negotiations are still at a preliminary stage, therefore any payment of insurance proceeds will depend on the coverage definitions under these policies and assessment of the amount of loss. Due to uncertainties, no indemnification to the Company was recognized in these financial statements.

(e.ii) Financial guarantees

For the Brumadinho event, the Company has financial guarantees in the amount of US\$1,124 in December 31, 2020 (US\$1,396 in December 31, 2019), which were presented in court and used to release the respective judicial deposit. The expenses related to these financial guarantees in the amounts of US\$7 and US\$9 were recorded as financial expense in the Company's income statement for the year ended December 31, 2020 and 2019, respectively. With the Global Settlement, these guarantees will be released.

Critical accounting estimates and judgments

The provision for social, economic and environmental reparation may be affected by factors including, but not limited to: (i) changes in the current estimated market price of the direct and indirect cost related to products and services, (ii) changes in timing for cash outflows, (iii) changes in the technology considered in measuring the provision, (iv) number of individuals entitled to the indemnification payments, (v) resolution of existing and potential legal claims, (vi) demographic assumptions, (vii) actuarial assumptions, and (viii) updates in the discount rate.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

23. Brumadinho dam failure (Continued)

The main critical assumptions and estimates applied in the De-Characterization provision considers, among others: (i) volume of the waste to be removed based on historical data available and interpretation of the enacted laws and regulations; (ii) location availability for the tailings disposal; (iii) engineering methods and solution; and (iv) updates in the discount rate.

Therefore, future expenditures may differ from the amounts currently provided because the realized assumptions and various other factors are not always under the Company's control. These changes to key assumptions could result in a material impact to the amount of the provision in future reporting periods. At each reporting period, the Company will reassess the key assumptions used in the preparation of the projected cash flows and will adjust the provision, if required.

24. Liabilities related to associates and joint ventures

In November 2015, the Fundão tailings dam owned by Samarco Mineração S.A. (Samarco) failed, releasing tailings downstream, flooding certain communities and causing impacts on communities and the environment along the Doce river. The rupture resulted in 19 fatalities and caused property and environmental damage to the affected areas. Samarco is a joint venture equally owned by Vale S.A. and BHP Billiton Brasil Ltda. ("BHPB").

In June 2016, Samarco, Vale and BHPB created the Fundação Renova, a not-for-profit private foundation, to develop and implement (i) social and economic remediation and compensation programs and (ii) environmental remediation and compensation programs in the region affected by the dam rupture.

The creation of Fundação Renova was provided for under the agreement for settlement and conduct adjustment (the "Framework Agreement") signed in March 2016 by Vale, BHPB, Samarco, the Brazilian federal government, the two Brazilian states affected by the rupture (Minas Gerais and Espírito Santo) and other governmental authorities.

In June 2018, Samarco, Vale and BHPB entered into a comprehensive agreement with the offices of the federal and state (Minas Gerais and Espírito Santo) prosecutors, public defenders and attorney general, among other parties, improving the governance mechanism of Fundação Renova and establishing, among other things, a process for potential revisions to the remediation programs provided under the Framework Agreement based on the findings of experts hired by Samarco to advise the MPF (Federal Prosecutor's Office) over a two-year period (the "June 2018 Agreement").

Under the Framework Agreement, the June 2018 Agreement and Renova's by-laws, Fundação Renova must be funded by Samarco, but to the extent that Samarco is unable to fund, Vale and BHPB must ratably bear the funding requirements Under the Framework Agreement. As Samarco is currently unable to resume its activities, we and BHPB have been funding the Fundação Renova and also providing funds directly to Samarco, to preserve its operations and to support Samarco's funding obligations.

Samarco has been gradually resuming its operations since December 2020.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

24. Liabilities related to associates and joint ventures (Continued)

Renova Foundation

During 2020, the Renova Foundation updated the premises used in the preparation of the estimate of the costs necessary for the execution of the 42 repair and compensation programs. This periodic review resulted in an additional provision of US\$1,069, which corresponds to the Company's proportional responsibility with Renova Foundation.

Germano Dam

In addition to the Fundão tailings dam, Samarco owns the Germano dam, which was also built under the upstream method and has been inactive since the Fundão dam rupture. Due to the new safety requirements set by ANM, Samarco prepared a project for the de-characterization of this dam, resulting in a provision for the de-characterization of the Germano tailings dam, which was recognized by the Company in 2019. During 2020, the Company recorded an additional provision of US\$26, equivalent to 50% of the estimated costs to carry out the project for the de-characterization of this structure.

Movements during the year

	<u>2020</u>	<u>2019</u>
Balance at January 1,	1,700	1,121
Provision	1,095	758
Disbursements	(394)	(315)
Present value valuation	64	200
Translation adjustment	(391)	(64)
Balance at December 31,	<u>2,074</u>	<u>1,700</u>

	<u>December 31, 2020</u>	<u>December 31, 2019</u>
Current liabilities	876	516
Non-current liabilities	1,198	1,184
Liabilities	<u>2,074</u>	<u>1,700</u>

Samarco's working capital

In addition to the provision, Vale S.A. made available in the year ended December 31, 2020 and 2019, the amount of US\$166 and US\$102, respectively, which was fully used to fund Samarco's working capital. This amount was recognized in Vale's income statement as an expense in "Equity results and other results in associates and joint ventures".

During 2021, Vale S.A. may provide a short-term credit facility up to US\$85 to support the Samarco's cash needs, without any binding obligation to Samarco. The availability of funds by the shareholders—

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

24. Liabilities related to associates and joint ventures (Continued)

Vale S.A. and BHP—is subject to the fulfillment of certain conditions, being deliberated by the shareholders, in the same bases and concomitantly, if required.

Summarized financial information

The summarized financial information of Samarco are as follows. The stand-alone financial statements of these entity may differ from the financial information reported herein, which is prepared considering Vale’s accounting policies.

	December 31, 2020	December 31, 2019
Current assets	87	34
Non-current assets	4,582	3,940
Total assets	4,669	3,974
Current liabilities	8,370	6,990
Non-current liabilities	6,385	5,527
Total liabilities	14,755	12,517
Negative reserves	(10,086)	(8,543)
Loss for the year ended	(1,160)	(4,125)

Contingencies related to Samarco accident

These proceedings include public civil actions brought by Brazilian authorities and multiple proceedings involving claims for significant amounts of damages and remediation measures. The Company expects the Framework Agreements to represent the settlement of the public civil action brought by the MPF and other related proceedings. There are also putative securities class actions in the United States against Vale and some of its current and former officers and a criminal proceeding in Brazil. The main updates regarding the lawsuits in the year were as follows:

(i) Public Civil Action filed by the Federal Government and others and public civil action filed by the Federal Public Ministry (“MPF”)

The Framework Agreement established a possible renegotiation of Renova Foundation’s reparation programs upon the completion of studies carried by specialist engaged by the Public Prosecutor’s Office in this process. The studies of the aforementioned specialists have not yet been concluded and, therefore, these negotiations have not started. In October 2020, MPF required the continuance of its public civil action of US\$27.5 billion (R\$155 billion) due to a deadlock in the hiring of Technical Assistants. The request will still be analyzed by the Judge of the 12th Federal Court after a statement by Samarco and its shareholders Vale and BHP. Depending on the conclusion of those experts and the decision to be issued in this regard, the Company may recognize additional provisions to comply with the requirements set the Framework Agreement.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

24. Liabilities related to associates and joint ventures (Continued)

(ii) Class Action in the United States

In March 2017, the holders of securities issued by Samarco Mineração S.A. filed a potential collective action in the New York Federal Court against Samarco, Vale, BHP Billiton Limited, BHP Billiton PLC and BHP Brasil Ltda. based on U.S. Federal Securities laws, which was dismissed without prejudice, in June 2019. In December 2019 the plaintiffs filed a Notice of Appeal to the NY Court of Appeals.

In January 2021, it was held a hearing before the Second Circuit of the New York State Court of Appeals. A ruling on the case is now expected to be issued, with no term for it to occur. Based on the assessment of the Company's legal consultants, Vale has good arguments to oppose the appeal. Therefore, the expectation of loss of this case is classified as possible. However, considering the phase of the potential class action, it is not possible at this time to reliably estimate the amount of an eventual loss.

(iii) Class action filed by holders of American Depositary Receipts

Vale and some of its executives have been named as defendants in class actions relating to securities before the New York Federal Court, filed by investors holding American Depositary Receipts ("ADRs") issued by the Company, based on the U.S. Federal Securities laws. In June 2020, the case was closed as a result of the agreement reached by the parties, whereby the defendants agreed to pay the amount of US\$25, which was accepted by the Court. This amount was recognized in income as "Equity in earnings of affiliates and joint ventures.

(iv) Criminal proceeding

In September 2019, the federal court of Ponte Nova dismissed all criminal charges against Vale representatives relating to the first group of charges, which concerns the results of the Fundão dam failure, remaining only the legal entity in the passive pole. The second group of charges against Vale S.A. and one of the Company's employees, which concerns the accusation of alleged crimes committed against the Environmental Public Administration, remained unchanged. In March 2020, the judge scheduled a number of hearings to collect defense witnesses' testimonies and intent letters were issued for the same purpose, but due to the new coronavirus pandemic, all hearings in the country which were previously scheduled to take place in April have been cancelled by an express determination from the National Justice Council. In July 2020, the Federal Court of the 1st Region denied an appeal presented by Vale and rejected the claim to recognize the state of limitation to keep the company within the criminal process. In October 2020, the criminal action was scanned and transferred to electronic processing. Additionally, the scheduling of hearings for the deposition of defense witnesses began in some cities, which received the letter precatory from Ponte Nova. The Company cannot estimate when a final decision on the case will be issued.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

24. Liabilities related to associates and joint ventures (Continued)

Insurance

Since the Fundão dam rupture, the Company has been negotiating with insurers the indemnification payments based on its general liability policies. During 2020 and 2019, the Company received payments in the amount of US\$17 and US\$109, respectively, and recognized a gain in the income statement as “Equity results and other results in associates and joint ventures”.

Critical accounting estimates and judgments

Under Brazilian legislation and the terms of the joint venture agreement, the Company does not have an obligation to provide funding to Samarco. Accordingly, the Company’s investment in Samarco was fully impaired and no provision was recognized in relation to the Samarco’s negative equity.

The provision related to Renova Foundation requires the use of assumptions that may be mainly affected by: (i) changes in scope of work required under the Framework Agreement as a result of further technical analysis and the ongoing negotiations with the Federal Prosecution Office, (ii) resolution of uncertainty in respect of the resumption of Samarco’s operations; (iii) updates of the discount rate; and (iv) resolution of existing and potential legal claims.

Moreover, the main critical assumptions and estimates applied in the Germano dam provision considers, among others: (i) volume of the waste to be removed based on historical data available and interpretation of the enacted laws and regulations; (ii) location availability for the tailings disposal; and (iii) acceptance by the authorities of the proposed engineering methods and solution.

As a result, future expenditures may differ from the amounts currently provided and changes to key assumptions could result in a material impact to the amount of the provision in future reporting periods. At each reporting period, the Company reassess the key assumptions used by Samarco in the preparation of the projected cash flows and adjust the provision, if required.

25. Provisions

	Current liabilities		Non-current liabilities	
	December 31, 2020	December 31, 2019	December 31, 2020	December 31, 2019
Payroll, related charges and other remunerations	877	790	–	–
Onerous contracts (note 18)	58	57	838	866
Environmental obligations	102	146	200	243
Provision related to VNC sale	500	–	–	–
Asset retirement obligations	99	158	4,121	3,802
Provisions for litigation (note 26)	87	–	1,004	1,462
Employee postretirement obligations (note 27)	103	79	2,271	2,120
Provisions	1,826	1,230	8,434	8,493

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

25. Provisions (Continued)

Asset retirement obligations

Provision is made for expected costs for the closure of the mines and deactivation of the related mining assets. Changes in the provision for asset retirement obligations and long-term interest rates (per annum, used to discount these obligations to present value and to update the provisions) are as follows:

	<u>December 31, 2020</u>	<u>December 31, 2019</u>
Balance at beginning of the year	3,960	3,115
Present value valuation	27	37
Settlements	(45)	(47)
Revisions on cash flows estimates(i)	509	812
Translation adjustment	(231)	43
Balance at end of the year	4,220	3,960
Current	99	158
Non-current	4,121	3,802
	<u>4,220</u>	<u>3,960</u>
Long-term interest rates (per annum)		
Brazil	3.54%	3.36%
Canada	0.00%	0.40%
Mozambique	5.67%	5.20%
Other regions	0.0% - 4.73%	0.60% - 4.78%

(i) In 2019, includes changes in discount rates and updating plans for mine closure, that also considers new legal requirements related to the decommissioning.

As at December 31, 2020, the Company has issued letters of credit and surety bonds for US\$651 in connection with the Asset retirement obligations for its Base Metals operations.

Accounting policy

When the provision is recognized, the corresponding cost is capitalized as part of property, plant and equipment and it is depreciated over the useful life of the related mining asset, resulting in an expense recognized in the income statement.

The long-term liability is discounted at presented value using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability and the unwinds are recorded in the income statement and is reduced by payments for mine closure and decommissioning of mining assets. The accrued amounts of these obligations are not deducted from the potential costs covered by insurance or indemnities.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

25. Provisions (Continued)

Critical accounting estimates and judgments

Judgment is required to determine key assumptions used on the asset retirement obligation measurement such as, interest rate, cost of closure, useful life of the mining asset considering the current conditions of closure and the projected date of depletion of each mine. Any changes in these assumptions may significant impact the recorded provision. Therefore, the estimated costs for closure of the mining assets is deemed to be a critical accounting estimate and annually reviewed.

26. Litigations

The Company is defendant in numerous legal actions in the ordinary course of business, including civil, tax, environmental and labor proceedings.

The Company makes use of estimates to recognize the amounts and the probability of outflow of resources, based on reports and technical assessments and on management's assessment. Provisions are recognized for probable losses of which a reliable estimate can be made.

Arbitral, legal and administrative decisions against the Company, new jurisprudence and changes of existing evidence can result in changes regarding the probability of outflow of resources and on the estimated amounts, according to the assessment of the legal basis.

a) Provision for legal proceedings

The Company has considered all information available to assess the likelihood of an outflow of resources and in the preparation on the estimate of the costs that may be required to settle the obligations.

Tax litigations—Mainly refers to the lawsuit filed in 2011 by Valepar (merged by Vale) seeking the right to exclude the amount of dividends received in the form of interest on stockholders' equity ("JCP") from the PIS and COFINS tax base. The amount reserved for this proceeding as at December 31, 2020 is US\$423 (2019: US\$536). This proceeding is guaranteed by a judicial deposit in the amount of US\$487 recorded at December 31, 2020 (2019: US\$616).

Civil litigations—Refers to lawsuits for: (i) indemnities for losses, payments and contractual fines due to contractual imbalance or non-compliance that are alleged by suppliers, and (ii) land claims referring to real estate Vale's operational activities.

Labor litigations—Refers to lawsuits for individual claims by in-house employees and service providers, primarily involving demands for additional compensation for overtime work, moral damages or health and safety conditions.



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

26. Litigations (Continued)

Environmental litigations—Refers mainly to proceedings for environmental damages and issues related to environmental licensing.

	Tax litigation	Civil litigation	Labor litigation	Environmental litigation	Total of litigation provision
Balance at December 31, 2018	729	166	459	3	1,357
Additions and reversals, net	10	168	106	7	291
Payments	(33)	(58)	(110)	–	(201)
Indexation and interest	9	42	18	1	70
Translation adjustment	(19)	(18)	(18)	–	(55)
Balance at December 31, 2019	696	300	455	11	1,462
Additions and reversals, net	29	26	16	2	73
Payments	(23)	(30)	(59)	–	(112)
Indexation and interest	(85)	30	26	1	(28)
Translation adjustment	(132)	(66)	(103)	(3)	(304)
Balance at December 31, 2020	485	260	335	11	1,091
Current liabilities	8	15	64	–	87
Non-current liabilities	477	246	271	11	1,004
	485	260	335	11	1,091

(i) Includes amounts regarding to social security claims that were classified as labor claims.

b) Contingent liabilities

	December 31, 2020	December 31, 2019
Tax litigations	6,911	8,040
Civil litigations	1,348	1,518
Labor litigations	563	773
Environmental litigations	907	1,094
Total	9,729	11,425

The main contingent liabilities, updated by applicable interest rates, for which the likelihood of loss is not considered remote are discussed as follows:

(b.i) CFEM-related proceedings:

The Company is engaged in numerous administrative and judicial proceedings related to the mining royalty known as CFEM. These proceedings arise out of a large number of assessments by the Brazilian National Mining Agency (“*Agência Nacional de Mineração—ANM*”, former “*DNPM*”), which main discussions involve the deduction of insurance and transportation costs indicated in the corresponding invoice payment of royalties on pellet sales and CFEM charges on the revenues provided by our subsidiaries abroad. The Company estimates the possible losses resulting from these proceedings to be US\$2,065 (R\$10,730 million) as at December 31, 2020 (US\$1,914 (R\$7,715 million) as at December 31, 2019).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

26. Litigations (Continued)

(b.ii) Assessments and legal proceedings related to PIS/COFINS:

The Company has received several tax assessments from the Brazilian federal tax authority contending that Vale incorrectly claimed PIS and COFINS tax credits. The tax authorities claim that (i) some credits deducted from the Company's payments of PIS and COFINS were not deductible; and (ii) the Company has not submitted adequate evidence of certain other credits. The Company is contesting these assessments related to the credits taken from 2002 onwards. The Company estimates the possible losses resulting from these proceedings to be US\$1,078 (R\$5,602 million) as at December 31, 2020 (US\$1,350 (R\$5,442 million) as at December 31, 2019). The Company may receive other tax assessments in the future.

(b.iii) Value added tax on services and circulation of goods ("ICMS") tax assessments and legal proceedings:

The Company is engaged in several administrative and court proceedings relating to additional charges of ICMS by the tax authorities of different Brazilian states. In each of these proceedings, the tax authorities claim that (i) certain credits that have been deducted from Vale's payments of ICMS were not deductible; (ii) the Company failed to comply with certain accessory obligations; (iii) the Company is required to pay the ICMS on electricity purchases (iv) the Company is required to pay ICMS in connection with goods that we bring into the State of Para and (v) increase in ICMS on own transportation. The Company estimates the possible losses resulting from these proceedings to be US\$648 (R\$3,369 million) as at December 31, 2020 (US\$758 (R\$3,057 million) as at December 31, 2019).

(b.iv) Tax assessment notices on alleged non-deductibility of goodwill amortization:

The Company is a party in administrative proceedings relating tax assessment notices for collection of IRPJ and CSLL, including fine and interest, related to the periods between 2013 and 2016. These tax assessments are based on the alleged non-deductibility of goodwill amortization expenses recorded by Vale in the acquisition of CAEMI (merged by Vale). The disallowance of goodwill amortization expenses resulted in a reduction in the balance of tax losses recorded by the Company and in the collection of IRPJ and CSLL. The Company is discussing the charges at the administrative level and the potential loss is classified as possible in the amount of US\$300 (R\$1,558 million) as at December 31, 2020 (US\$358 (R\$1,445 million) as at December 31, 2019).

(b.v) Tax on Services ("ISS"):

The Company is party in a number of administrative and judicial proceedings related to the collection of ISS in several Brazilian municipalities. The tax authorities main allegations for those proceedings are: (i) the tax basis used for computing the tax payable was incorrect; (ii) failure to pay ISS related to third parties asset management services; and (iii) the incidence of ISS over own goods port handling services ("self-service"). As at December 31, 2020, the total amount of the possible loss is US\$504 (R\$2,621 million) (US\$597 (R\$2,405 million) as at December 31, 2019).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

26. Litigations (Continued)

(b.vi) Penalties on the undue deduction of tax credits:

Vale has received several assessments from the Brazilian federal tax authority (“RFB”) imposing penalties resulting from the rejection by the tax authority of certain offsetting of federal debits. In these cases, the tax authority alleged that we offset taxes with improper tax credits, and issued assessments imposing fines in the amount of 50% of the amount that was unduly deducted. There is a leading case in Federal Supreme Court discussing the legal grounds for this charge, whose decision will affect all taxpayers who argue this thesis. At December 31, 2020, the total amount of fines imposed, which likelihood of loss is classified as possible, was US\$297 (R\$1,542 million) (US\$381 (R\$1,535 million) as at December 31, 2019).

(b.vii) Assessments regarding the disallowance of JCP:

In addition to the tax contingent liabilities presented in the table above, on February 23, 2021 (subsequent event), Vale was assessed for collection of IRPJ, CSLL and penalties in the amount of US\$659 (R\$3,423 million) regarding the disallowance of the JCP expenses deducted from the 2017 taxable income. There was also a reduction in tax losses, with the corresponding tax impact of US\$134 (R\$698 million), including penalties and interest. The Company will file an administrative appeal and, based on its assessment of the tax treatment, it believes that the likelihood of loss is possible.

(b.viii) Public civil actions seeking for the suspension of the Company’s environmental licenses:

The Company is engaged on public civil actions brought by associations representing the Kayapó and Xikrin indigenous communities, in the state of Pará, which seek to suspend the Company’s environmental licenses for Onça Puma (nickel), Salobo (copper) and S11D (iron ore). Those associations claim, among other things, that during the environmental licensing process, the Company did not perform appropriate studies on the impacts from those operations over the surrounding indigenous communities, which were ordinarily processed and approved by the competent licensing bodies and they benefit from the legal presumption of legitimacy. The Company estimates the likelihood of loss on those proceedings as possible, however, the amount of a possible loss resulting from a possible Interruption of these operations or compensatory measures to prevent the suspension of their environmental licenses cannot be reliably estimated.

c) Judicial deposits

	December 31, 2020	December 31, 2019
Tax litigations	988	1,278
Civil litigations	85	86
Labor litigations	177	246
Environmental litigations	18	41
Brumadinho event (note 23)	-	1,482
Total	1,268	3,133

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

26. Litigations (Continued)

d) Guarantees contracted for legal proceedings

In addition to the above-mentioned tax, civil, labor and environmental judicial deposits, the Company contracted US\$2.2 billion (R\$11.3 billion) in guarantees for its lawsuits, as an alternative to judicial deposits.

e) Contingent Assets

(e.i) Compulsory Loan

In 2015, the Company requested for the enforcement of the judicial decision related to a favorable unappealable decision which partially recognized its right to refund the differences of monetary adjustments and interests due over to the third convertible bonds issued by Eletrobrás shares in the period within 1987 to 1993. In November 2019, the Company requested for the payment recognized by Eletrobrás as due and such requirement was granted by the court. In August 2020, the Company received US\$55 (R\$301 million) and the remaining amount is still under evaluation and, therefore, the contingent asset was not recognized in the Company's financial statements.

(e.ii) ICMS included in PIS and COFINS computation tax base

Vale has been discussing the issue regarding the exclusion of ICMS in PIS and COFINS tax basis in two judicial proceedings. In one of the proceedings, the Company has obtained a definitive favorable decision (res judicata) in relation to taxable events from March 2012 onwards, therefore the Company recognized a gain of US\$60 (R\$313 million) in the income statement for the year ended December 31, 2020, which was calculated based on the ICMS collected during the period in which Vale was supported by a definitive favorable decision. Since there is a leading case in the Supreme Court discussing this subject, the Company may recognize an additional gain of US\$14 (R\$72 million) (historical amount), if prevails the thesis that the ICMS credit should be the amount stated in the invoices.

The other lawsuit, estimated at an amount of US\$66 (R\$343 million) (historical amount) and related to taxable events from December 2001 to February 2012, has a favorable decision, but a final decision has not been issued. Therefore, the Company did not recognize this contingent asset as at December 31, 2020.

(e.iii) Arbitration related to Simandou

In 2010, the Company acquired a 51% interest in BSG Resources Limited G ("BSGR"), which held concession rights and permits for iron ore exploration in the Republic of Guinea. In 2014, the Republic of Guinea revoked these concessions based on evidence that BSGR had obtained them through bribery of Guinean government officials. The Republic of Guinea did not make any finding of any involvement or responsibility on the Company's part.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

26. Litigations (Continued)

The arbitral tribunal in London ruled in the Company's favor and ordered BSGR to pay to the Company the amount of approximately US\$2 billion (with interest and costs). BSGR went into administration in March 2018, and the Company has commenced legal proceedings against BSGR before courts in London, England and in the United States District Court for the Southern District of New York to enforce the arbitral award against BSGR.

The Company intends to pursue the enforcement of the award and collection of the amounts due by all legally available means, but since there can be no assurance as to the timing and amount of any collections, the asset was not recognized in its financial statements.

(e.iv) Tax Litigation in Canada

Vale Canada Limited ("VCL") and the Canadian tax agency, affiliated with the Canadian Department of Justice, have signed an agreement on a tax dispute related to the tax treatment of receipts and expenses incurred by the VCL in merger and acquisition transactions that occurred in 2006. In 2019, the Company recognized an asset in the amount of US\$162 (CAD221 million), which corresponded to the amount due from the income tax refund, including estimated interest. In 2020, the Company recognized an additional amount of US\$15 (CAD21 million) related to interest. The total amount has been paid in full to the company.

Accounting policy

A provision is recognized when it is considered probable that an outflow of resources will be required to settle the obligation and can be reliably estimated. The liability is accounted against an expense in the income statement. This obligation is updated based on the developments of the judicial process or interest accretion and can be reversed if the expectation of loss is not considered probable due to changes in circumstances or when the obligation is settled.

Critical accounting estimates and judgments

Litigations are contingent by nature, that is, it will be resolved when one or more future event occurs or fails to occur. Typically, the occurrence or not of such events is outside of the Company's control. Legal uncertainties involve the application of significant estimates and judgments by management regarding the potential outcomes of future events.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits

a) Employee postretirements obligations

In Brazil, the management of the pension plans is the responsibility of Fundação Vale do Rio Doce de Seguridade Social (“Valia”) a nonprofit entity with administrative and financial autonomy. The Brazilian plans are as follows:

Benefit plan Vale Mais (“Vale Mais”) and benefit plan Valiaprev (“Valiaprev”)—Certain Company’s employees are participants of Vale Mais and Valiaprev plans with components of defined benefits (specific coverage for death, pensions and disability allowances) and components of defined contributions (for programmable benefits). The defined benefits plan is subject to actuarial evaluations. The defined contribution plan represents a fixed amount held on behalf of the participants. Both Vale Mais and Valiaprev were overfunded as at December 31, 2020 and 2019.

Defined benefit plan (“Plano BD”)—The Plano BD has been closed to new entrants since the year 2000, when the Vale Mais plan was implemented. It is a plan that has defined benefit characteristics, covering almost exclusively retirees and their beneficiaries. It was overfunded as of December 31, 2020 and 2019 and the contributions made by the Company are not material.

“Abono complementação” benefit plan—The Company sponsors a specific group of former employees entitled to receive additional benefits from Valia regular payments plus post-retirement benefits that covers medical, dental and pharmaceutical assistance. The contributions made by the Company finished in 2014. The “*abono complementação*” benefit was overfunded as at December 31, 2020 and 2019.

Other benefits—The Company sponsors medical plans for employees that meet specific criteria and for employees who use the “*abono complementação*” benefit. Although those benefits are not specific retirement plans, actuarial calculations are used to calculate future commitments. As those benefits are related to health care plans they have the nature of underfunded benefits, and are presented as underfunded plans as at December 31, 2020 and 2019.

The Foreign plans are managed in accordance with their region. They are divided between plans in Canada, United States of America, United Kingdom, Indonesia, New Caledonia, Japan and Taiwan. Pension plans in Canada are composed of a defined benefit and defined contribution component. Currently the defined benefit plans do not allow new entrants. The foreign defined benefit plans are underfunded as at December 31, 2020 and 2019.

Employers’ disclosure about pensions and other post-retirement benefits on the status of the defined benefit elements of all plans is provided as follows.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

i. Change in benefit obligation

	Overfunded pension plans	Underfunded pension plans	Other benefits
Benefit obligation as at December 31, 2018	3,577	3,929	1,280
Service costs	6	55	10
Interest costs	305	153	59
Benefits paid	(433)	(249)	(62)
Effect of changes in the actuarial assumptions	718	373	176
Translation adjustment	(167)	160	42
Benefit obligation as at December 31, 2019	4,006	4,421	1,505
Service costs	7	53	18
Interest costs	222	134	64
Benefits paid	(368)	(248)	(53)
Effect of changes in the actuarial assumptions	118	271	243
Translation adjustment	(880)	1	(44)
Benefit obligation as at December 31, 2020	3,105	4,632	1,733

ii. Evolution of assets fair value

	Overfunded pension plans	Underfunded pension plans	Other benefits
Fair value of plan assets as at December 31, 2018 ..	4,737	3,273	-
Interest income	416	123	-
Employer contributions	27	56	62
Benefits paid	(433)	(247)	(62)
Return on plan assets (excluding interest income) ..	757	382	-
Translation adjustment	(200)	139	-
Fair value of plan assets as at December 31, 2019 ..	5,304	3,726	-
Interest income	298	109	-
Employer contributions	(39)	54	53
Participant contributions	-	-	-
Benefits paid	(368)	(248)	(53)
Return on plan assets (excluding interest income) ..	(114)	305	-
Translation adjustment	(1,112)	46	-
Fair value of plan assets as at December 31, 2020 ..	3,969	3,992	-

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

iii. Reconciliation of assets and liabilities recognized in the statement of financial position

	Plans in Brazil					
	December 31, 2020			December 31, 2019		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	1,298	-	-	1,220	-	-
Interest income	74	-	-	110	-	-
Changes on asset ceiling	(278)	-	-	59	-	-
Translation adjustment	1,172	-	-	(91)	-	-
Balance at end of the year	<u>2,266</u>	<u>-</u>	<u>-</u>	<u>1,298</u>	<u>-</u>	<u>-</u>
Amount recognized in the statement of financial position						
Present value of actuarial liabilities ...	(3,105)	(317)	(465)	(4,006)	(412)	(303)
Fair value of assets	3,969	109	-	5,304	163	-
Effect of the asset ceiling	(864)	-	-	(1,298)	-	-
Liabilities	<u>-</u>	<u>(208)</u>	<u>(465)</u>	<u>-</u>	<u>(249)</u>	<u>(303)</u>
Current liabilities	-	(32)	(49)	-	(7)	(20)
Non-current liabilities	-	(176)	(416)	-	(242)	(283)
Liabilities	<u>-</u>	<u>(208)</u>	<u>(465)</u>	<u>-</u>	<u>(249)</u>	<u>(303)</u>
	Foreign plan					
	December 31, 2020			December 31, 2019		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Amount recognized in the statement of financial position						
Present value of actuarial liabilities ...	-	(4,315)	(1,268)	-	(4,009)	(1,202)
Fair value of assets	-	3,883	-	-	3,563	-
Liabilities	<u>-</u>	<u>(432)</u>	<u>(1,268)</u>	<u>-</u>	<u>(446)</u>	<u>(1,202)</u>
Current liabilities	-	(7)	(47)	-	(6)	(46)
Non-current liabilities	-	(425)	(1,221)	-	(440)	(1,156)
Liabilities	<u>-</u>	<u>(432)</u>	<u>(1,268)</u>	<u>-</u>	<u>(446)</u>	<u>(1,202)</u>

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

	December 31, 2020			December 31, 2019			Total
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits	
	Balance at beginning of the year	1,298	-	-	1,220	-	-
Interest income	74	-	-	110	-	-	-
Changes on asset ceiling	(278)	-	-	59	-	-	-
Translation adjustment	1,172	-	-	(91)	-	-	-
Balance at end of the year	2,266	-	-	1,298	-	-	-
Amount recognized in the statement of financial position							
Present value of actuarial liabilities ...	(3,105)	(4,632)	(1,733)	(4,006)	(4,421)	(1,504)	(1,504)
Fair value of assets	3,969	3,991	-	5,304	3,726	-	-
Effect of the asset ceiling	(864)	-	-	(1,298)	-	-	-
Liabilities	-	(641)	(1,733)	-	(695)	(1,504)	(1,504)
Current liabilities	-	(47)	(96)	-	(13)	(76)	(76)
Non-current liabilities	-	(594)	(1,637)	-	(682)	(1,428)	(1,428)
Liabilities	-	(641)	(1,733)	-	(695)	(1,504)	(1,504)

iv. Costs recognized in the income statement

	Year ended December 31,								
	2020			2019			2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Service cost	7	52	18	7	55	10	5	101	36
Interest on expense on liabilities...	222	134	64	317	153	57	282	158	59
Interest income on plan assets	(297)	(107)	-	(432)	(123)	-	(406)	(127)	-
Interest expense on effect of (asset ceiling)/ onerous liability ..	74	-	-	114	-	-	124	-	-
Total of cost, net	6	79	82	6	85	67	5	132	95

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

v. Costs recognized in the statement of comprehensive income

	Year ended December 31,								
	2020			2019			2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year ..	(173)	(459)	(238)	(166)	(468)	(128)	(163)	(496)	(189)
Effect of changes actuarial assumptions	(118)	(271)	(243)	(718)	(373)	(176)	(679)	172	32
Return on plan assets (excluding interest income).....	(114)	305	-	757	385	-	479	(144)	-
Change of asset ceiling	278	-	-	(60)	-	-	172	-	-
Others.....	-	9	11	-	-	-	(1)	-	(1)
	<u>46</u>	<u>43</u>	<u>(232)</u>	<u>(21)</u>	<u>12</u>	<u>(176)</u>	<u>(29)</u>	<u>28</u>	<u>31</u>
Deferred income tax	(15)	(12)	82	7	(5)	63	10	(7)	(8)
Others comprehensive income	31	31	(150)	(14)	7	(113)	(19)	21	23
Translation adjustments.....	41	28	25	7	2	3	23	11	10
Transfers/ disposal /others	-	-	-	-	-	-	(7)	(4)	28
Accumulated other comprehensive income.....	(101)	(400)	(363)	(173)	(459)	(238)	(166)	(468)	(128)

vi. Risks related to plans

The Administrators of the plans have committed to strategic planning to strengthen internal controls and risk management. This commitment is achieved by conducting audits and assessments of internal controls, which aim to mitigate operational market and credit risks. Risks are presented as follow:

Legal—lawsuits: issuing periodic reports to internal audit and directors contemplating the analysis of lawyers about the possibility of loss (remote, probable or possible), aiming to support the administrative decision regarding provisions. Analysis and ongoing monitoring of developments in the legal scenario and its dissemination within the institution in order to subsidize the administrative plans, considering the impact of regulatory changes.

Actuarial—the annual actuarial valuation of the benefit plans comprises the assessment of costs, revenues and adequacy of plan funding. It also considers the monitoring of biometric, economic and financial assumptions (asset volatility, changes in interest rates, inflation, life expectancy, salaries and other).

Market—profitability projections are performed for the various plans and profiles of investments for 10 years in the management study of assets and liabilities. These projections include the risks of investments in various market segments. Furthermore, the risks for short-term market of the plans are monitored monthly through metrics of VaR (Value at Risk) and stress testing. For exclusive investment funds of Valia, the market risk is measured daily by the custodian asset bank.

Credit—assessment of the credit quality of issuers by hiring expert consultants to evaluate financial institutions and internal assessment of payment ability of non-financial companies. For assets of

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

non-financial companies, the assessment is conducted a monitoring of the company until the maturity of the security.

vii. Actuarial and economic assumptions and sensitivity analysis

All calculations involve future actuarial projections about some parameters, such as: salaries, interest, inflation, the trend of social security in Brazil ("INSS") benefits, mortality and disability.

The economic and actuarial assumptions adopted have been formulated considering the long-term period for maturity and should therefore be analyzed accordingly. In the short term they may not be realized.

The following assumptions were adopted in the assessment:

	Brazil					
	December 31, 2020			December 31, 2019		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Discount rate to determine benefit obligation	6.62% - 7.18%	6.50%	6.16% - 7.17%	6.99% - 7.32%	7.10%	6.99% - 7.39%
Nominal average rate to determine expense/ income	6.62% - 7.18%	6.50%	N/A	6.99% - 7.32%	7.10%	N/A
Nominal average rate of salary increase	3.80%	6.00%	N/A	5.88%	6.00%	N/A
Nominal average rate of benefit increase	3.80%	6.00%	N/A	3.80%	6.00%	N/A
Immediate health care cost trend rate	N/A	N/A	6.35% - 6.91%	N/A	N/A	6.91%
Ultimate health care cost trend rate	N/A	N/A	6.35% - 6.91%	N/A	N/A	6.91%
Nominal average rate of price inflation	3.31% - 3.80%	3.50%	3.25% - 3.80%	3.80%	4.00%	3.80%

	Foreign			
	December 31, 2020		December 31, 2019	
	Underfunded pension plans	Other benefits	Underfunded pension plans	Other benefits
Discount rate to determine benefit obligation	2.43%	2.62%	2.96%	3.04%
Nominal average rate to determine expense/ income	3.04%	3.04%	3.57%	3.66%
Nominal average rate of salary increase	3.21%	N/A	3.17%	N/A
Nominal average rate of benefit increase	3.00%	N/A	3.00%	N/A
Immediate health care cost trend rate	N/A	5.35%	N/A	5.58%
Ultimate health care cost trend rate	N/A	4.56%	N/A	4.55%
Nominal average rate of price inflation	2.08%	N/A	2.10%	N/A

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

For the sensitivity analysis, the Company applies the effect of 1.0% in nominal discount rate to the present value of the Company's actuarial liability. The effects of this analysis on the Company's actuarial liability and assumptions adopted are as follows:

	December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits
Nominal discount rate—1% increase			
Effect on actuarial liability balance	2,838	4,064	1,509
Assumptions made	7.62%	4.20%	4.64%
Nominal discount rate—1% reduction			
Effect on actuarial liability balance	3,424	5,295	2,016
Assumptions made	5.62%	2.20%	2.64%

viii. Assets of pension plans

Brazilian plan assets as at December 31, 2020 and 2019 includes respectively (i) investments in a portfolio of Vale's stock and other instruments in the amount of US\$20 and US\$27, which are presented as "Investments funds—Equity" and (ii) Brazilian Federal Government securities in the amount of US\$3,612 and US\$4,523, which are presented as "Debt securities governments" and "Investments funds—Fixed"

Foreign plan assets as at December 31, 2020 and 2019 includes Canadian Government securities in the amount of US\$688 and US\$633, respectively.

ix. Overfunded pension plans

Assets by category are as follows:

	December 31, 2020				December 31, 2019			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Debt securities—Corporate	-	42	-	42	-	48	-	48
Debt securities—Government	1,840	-	-	1,840	2,716	-	-	2,716
Investments funds—Fixed Income	2,242	-	-	2,242	2,668	-	-	2,668
Investments funds—Equity	396	-	-	396	556	-	-	556
International investments	32	-	-	32	28	-	-	28
Structured investments—Private Equity funds	-	-	126	126	-	-	157	157
Structured investments—Real estate funds	124	-	5	129	160	-	17	177
Real estate	-	-	255	255	-	-	323	323
Loans to participants	-	-	105	105	-	-	141	141
Total	4,633	42	491	5,166	6,128	48	638	6,814
Funds not related to risk plans(i)				(1,197)				(1,510)
Fair value of plan assets at end of year				3,969				5,304

(i) Financial investments not related to coverage of overfunded pension plans. Funds are related to the Company's unconsolidated entities and former employees.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

Measurement of overfunded plan assets at fair value with no observable market variables (level 3) are as follows:

	December 31, 2020				
	Private equity funds	Real estate funds	Real estate	Loans to participants	Total
Balance as at December 31, 2018	159	15	339	160	673
Return on plan assets	8	–	8	19	35
Assets purchases	1	2	4	46	53
Assets sold during the year	(4)	–	(13)	(79)	(96)
Translation adjustment	(7)	–	(15)	(5)	(27)
Balance as at December 31, 2019	157	17	323	141	638
Return on plan assets	18	(8)	9	19	38
Assets purchases	1	1	10	117	129
Assets sold during the year	(15)	–	(14)	(141)	(170)
Translation adjustment	(35)	(4)	(72)	(32)	(143)
Balance as at December 31, 2020	126	5	255	104	491

x. Underfunded pension plans

Assets by category are as follows:

	December 31, 2020				December 31, 2019			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Cash and cash equivalents	–	102	–	102	–	56	–	56
Equity securities	1,565	–	–	1,565	1,409	2	–	1,411
Debt securities—Corporate	–	519	–	519	–	507	–	507
Debt securities—Government	132	690	–	822	156	634	–	790
Investments funds—Fixed Income	36	158	–	194	49	339	–	388
Investments funds—Equity	1	350	–	351	2	135	–	137
Structured investments—Private Equity funds	–	–	250	250	–	–	212	212
Real estate	–	–	5	5	–	–	55	55
Loans to participants	–	–	2	2	–	–	3	3
Others	–	–	179	179	2	–	165	167
Total	1,735	1,819	437	3,991	1,618	1,673	435	3,726

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

Measurement of underfunded plan assets at fair value with no observable market variables (level 3) are as follows:

	Private equity funds	Real estate	Loans to participants	Others	Total
Balance as at December 31, 2018	213	51	3	165	432
Return on plan assets	11	4	–	5	20
Assets purchases	18	–	–	–	18
Assets sold during the year	(32)	–	(1)	(4)	(37)
Translation adjustment	2	–	1	(1)	2
Balance as at December 31, 2019	212	55	3	165	435
Return on plan assets	1	(1)	–	–	–
Assets purchases	20	–	–	–	20
Assets sold during the year	(33)	–	–	–	(33)
Translation adjustment	50	(49)	(1)	15	15
Balance as at December 31, 2020	250	5	2	180	437

xi. Disbursement of future cash flow

Vale expects to disburse US\$57 in 2021 in relation to pension plans and other benefits.

xii. Expected benefit payments

The expected benefit payments, which reflect future services, are as follows:

	December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits
2021	215	239	17
2022	220	237	18
2023	224	238	19
2024	227	239	20
2025	230	238	21
2026 and thereafter	1,177	1,175	119

b) Profit sharing program (“PLR”)

The Company recorded as cost of goods sold and services rendered and other operating expenses related to the profit sharing program US\$353, US\$289 and US\$503 for the years ended on December 31, 2020, 2019 and 2018, respectively.

c) Long-term compensation plan

For the long-term awarding of eligible executives, the Company compensation plans includes Matching Program and Performance Share Unit Program—PSU, with three to four years-vesting cycles, respectively, with the aim of encouraging employee’s retention and stimulating their performance.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

For the Matching program, the participants can acquire Vale's common shares in the market without any benefits being provided by Vale. If the shares acquired are held for a period of three years and the participants keep it employment relationship with Vale, the participant is entitled to receive from Vale an award in shares, equivalent to the number of shares originally acquired by the executive. It should be noted that, although a specific custodian of the shares is defined by Vale, the share initially purchased by the executives have no restriction and can be sold at any time. However, if it's done before the end of the three-year-vesting period, they lose the entitlement of receiving the related award paid by Vale.

For PSU program, the eligible executives have the opportunity to receive during a four year-vesting cycle, an award equivalent to the market value of a determined number of common shares and conditioned to Vale's performance factor measured based on indicators of total return to the shareholders ("TSR") and Environmental, Social, and Governance ("ESG"). It is comprised by 80% of TSR metrics and 20% of ESG indicators.

This award is paid in cash and can occur in cumulative installments of 20% (at the end of 2nd year), 30% (at the end of 3rd year) and 50% (at the end of 4th year), conditioned to the performance factor of each year.

Liabilities of the plans are measured at fair value at every reporting period, based on market rates. Compensation costs incurred are recognized by the defined vesting period of three or four years. For the years ended December 31, 2020, 2019 and 2018 the Company recognized in the income statement the amounts of US\$71, US\$39 and US\$95, respectively, related to long-term compensation plan.

Accounting policy

Employee benefits

i. Current benefits—wages, vacations and related taxes

Payments of benefits such as wages or accrued vacation, as well the related social security taxes over those benefits are recognized monthly in income, on an accruals basis.

ii. Current benefits—profit sharing program

The Company has the Annual Incentive Program (AIP) based on Team and business unit's contribution and Company-wide performance through operational cash generation. The Company makes an accrual based on evaluation periodic of goals achieved and Company result, using the accrual basis and recognition of present obligation arising from past events in the estimated outflow of resources in the future. The accrual is recorded as cost of goods sold and services rendered or operating expenses in accordance with the activity of each employee.

iii. Non-current benefits—long-term incentive programs

The Company has established a procedure for awarding certain eligible executives (Matching and Virtual Shares Programs) with the goal of encouraging employee retention and optimum performance. Plan liabilities are measured at each reporting date, at their fair values, based on market prices. Obligations are

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

27. Employee benefits (Continued)

measured at each reporting date, at fair values based on market prices. The compensation costs incurred are recognized in income during the vesting period as defined.

iv. Non-current benefits—pension costs and other post-retirement benefits

The Company has several retirement plans for its employees.

For defined contribution plans, the Company's obligations are limited to a monthly contribution linked to a pre-defined percentage of the remuneration of employees enrolled into these plans.

For defined benefit plans, actuarial calculations are periodically obtained for liabilities determined in accordance with the Projected Unit Credit Method in order to estimate the Company's obligation. The liability recognized in the statement of financial position represents the present value of the defined benefit obligation as at that date, less the fair value of plan assets. The Company recognized in the income statement the costs of services, the interest expense of the obligations and the interest income of the plan assets. The rereasurement of gains and losses, return on plan assets (excluding the amount of interest on return of assets, which is recognized in income for the year) and changes in the effect of the ceiling of the active and onerous liabilities are recognized in comprehensive income for the year.

For overfunded plans, the Company does not recognize any assets or benefits in the statement of financial position or income statement until such time as the use of the surplus is clearly defined. For underfunded plans, the Company recognizes actuarial liabilities and results arising from the actuarial valuation.

Critical accounting estimates and judgments

Post-retirement benefits for employees—The amounts recognized depend on several factors that are determined based on actuarial calculations using various assumptions in order to determine costs and liabilities. One of these assumptions is selection and use of the discount rate. Any changes to these assumptions will affect the amount recognized.

At the end of each year the Company and external actuaries review the assumptions that will be used for the following year. These assumptions are used in determining the fair values of assets and liabilities, costs and expenses and the future values of estimated cash outflows, which are recorded in the plan obligations.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

28. Stockholders' equity

a) Share capital

As at December 31, 2020, the share capital was US\$61,614 corresponding to 5,284,474,782 shares issued and fully paid without par value. The Board of Directors may, regardless of changes to by-laws, issue new common shares (up to the total authorized shares), including the capitalization of profits and reserves to the extent authorized.

	December 31, 2020		
	Common shares	Golden shares	Total
Stockholders			
Shareholders with more than 5% of total capital	1,940,863,859	-	1,940,863,859
Litela	519,733,209	-	519,733,209
Capital World Investors	298,099,389	-	298,099,389
Bradespar	293,907,266	-	293,907,266
Mitsui&co	286,347,055	-	286,347,055
Blackrock, Inc	272,614,219	-	272,614,219
Capital Research Global Investors	270,162,721	-	270,162,721
Non-Brazilian investors	1,887,304,559	-	1,887,304,559
Brazilian investors	1,301,742,524	-	1,301,742,524
Golden shares	-	12	12
Total outstanding (without shares in treasury)	5,129,910,942	12	5,129,910,954
Shares in treasury	154,563,828	-	154,563,828
Total capital	5,284,474,770	12	5,284,474,782

The Company used 1,628,485 from its treasury shares (2019:2,024,059) for the share-based payment program of its executives (Matching program), in the amount of US\$14 (2019:US\$22) recognized as "Treasury shares utilized in the year" in the Statement of Changes in Equity for the year ended December 31, 2020.

The Company holds shares in treasury for future sale, cancellation or for the Matching program. These shares are recorded in a specific account as a reduction of stockholders' equity at their acquisition value and carried at cost. These programs are approved by the Board of Directors with a determined terms and numbers of shares.

b) Company's remuneration policy

On July 29, 2020, the Board of Directors approved the resumption of the stockholders' remuneration policy, which was suspended as a result of the Brumadinho dam failure. This policy set a semi-annual payment that is calculated by applying 30% of Adjusted EBITDA less sustaining capital expenditures, subject to availability of profit reserves as required by the Brazilian corporate law.

In addition, the Board of Directors approved the payment of dividends in the amount of US\$3,350 (R\$18,637 million) on September 30, 2020. Of that amount, US\$2,191 (R\$12,350 million), equivalent to R\$2.407510720 per share, is the remuneration for the first half of 2020, in connection with the Company's remuneration policy. This amount was paid from the Company's profit reserves as presented below in "Profit Reserves".

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

28. Stockholders' equity (Continued)

The remaining amount of US\$1,159 (R\$6,287 million) relates to the interest on stockholder's equity declared in December 2019, corresponding to the gross amount of US\$1,324 (R\$7,253 million), equivalent to R\$1.414364369 per share. The income tax in amount of US\$165 was paid in 2019.

c) Profit distribution

	2020
Net income of the year	4,881
Appropriation to legal reserve	(251)
Appropriation to tax incentive reserve	(2)
Net income after appropriations to legal reserve and tax incentive reserve	4,628
Minimum mandatory remuneration	1,152
Additional Stockholders' remuneration(i)	2,820
Appropriation to investments reserve	656

(i) Interim dividends calculated based on the September 30, 2020 balance sheet.

(c.i) Stockholder's remuneration

On February 25, 2021 (subsequent event), based on the Company's dividends policy, the Board of Directors approved the stockholder's remuneration in the amount of US\$3,972 (R\$21,866 million), equivalent to R\$4.262386983 per share, to be paid on March 15, 2021, of which US\$779 (R\$4,288 million) will be in the form of interest on stockholders' equity and US\$3,193 (R\$17,578 million) in the form of dividends.

Of the total amount, US\$1,152 (R\$6,342 million) represents the minimum mandatory remuneration for 2020 year end, based on the Company's by-laws, which determines 25% of net income, after appropriations to legal reserve and tax incentive reserve, as the minimum remuneration to stockholders. This amount is recorded as a liability under "Dividends payable" as at December 31, 2020. The remaining amount of US\$2,820 (R\$15,524 million) was approved as an additional remuneration to the Company's stockholders and is presented in Equity as "additional remuneration reserve" as at December 31, 2020.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

28. Stockholders' equity (Continued)

(c.ii) Profit reserves

	Legal reserve	Tax incentive reserve	Investments reserve	Additional remuneration reserve	Total of profit reserves
Balance as at December 31, 2018	1,722	882	8,364	–	10,968
Allocation of loss	–	–	(1,683)	–	(1,683)
Dividends and interest on capital of Vale's stockholders	–	–	(1,767)	–	(1,767)
Translation adjustment	(66)	(34)	(328)	–	(428)
Balance as at December 31, 2019	1,656	848	4,586	–	7,090
Allocation of income	251	2	656	2,820	3,729
Dividends and interest on capital of Vale's stockholders	–	–	(2,329)	–	(2,329)
Translation adjustment	(365)	(191)	(1,059)	167	(1,448)
Balance as at December 31, 2020	1,542	659	1,854	2,987	7,042

Legal reserve—Is a legal requirement for Brazilian public companies to retain 5% of the annual net income up to 20% of the capital. The reserve can only be used to compensate losses or to increase capital.

Tax incentive reserve—Results from the option to designate a portion of the income tax for investments in projects approved by the Brazilian Government as well as tax incentives.

Investment reserve—Aims to ensure the maintenance and development of the main activities that comprise the Company's operations and to retain budgeted capital for investments. Based on the Company's by-laws, this reserve is capped to 50% of the annual distributable net income, up to the amount of the share capital. The remaining balance over than 50% of the annual distributable net income can be retained based on the capital investments budget submitted for approval in the Stockholder's Meeting, pursuant to article 196 of the Law 6,404.

Additional remuneration reserve—Results from the remuneration proposed by Management that exceeds the mandatory minimum remuneration of 25% of the adjusted net income.

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

28. Stockholders' equity (Continued)

d) Others reserves

	Retirement benefit obligations	Fair value adjustment to investment in equity securities	Results on conversion of shares	Net ownership changes in subsidiaries	Total of other reserves
Balance as at December 31, 2018.....	(755)	60	(490)	(970)	(2,155)
Other comprehensive income.....	(126)	(184)	–	–	(310)
Translation adjustment.....	12	–	–	–	12
Acquisitions and disposal of noncontrolling interest.....	–	–	–	343	343
Balance as at December 31, 2019.....	(869)	(124)	(490)	(627)	(2,110)
Other comprehensive income.....	(88)	101	–	–	13
Translation adjustment.....	92	162	–	–	254
Acquisitions and disposal of noncontrolling interest.....	–	–	–	(213)	(213)
Balance as at December 31, 2020.....	(865)	139	(490)	(840)	(2,056)

e) Shareholders Agreement

At the General Extraordinary Stockholders' Meeting, held on June 27, 2017, stockholders approved the corporate restructuring of the Company proposed by Valepar S.A. (former controlling stockholder). The corporate restructuring was based on (i) conversion of Company class "A" preferred shares into common shares; (ii) amendment of Vale's by-laws, to adjust to Novo Mercado rules; and (iii) the merger of Valepar S.A. into Vale.

On the date of the merger of Valepar into Vale, August 14, 2017, the former Controlling Shareholders of Valepar executed a new shareholders' agreement ("Vale Agreement") that binds only 20% of the totality of Vale's common shares issued by Vale, with no provision for renewal, in order to provide stability to the Company and adjust its corporate governance structure during the transition period to become a dispersed capital company. The Vale Agreement expired on November 10, 2020, therefore, the votes, belonging to the shareholders who signed the Vale Agreement are no longer bound by an agreement.

Accounting policy

Share capital and treasury shares—Incremental costs directly attributable to the issue of new shares or options are recognized in stockholders' equity as a deduction from the amount raised, net of taxes.

Stockholder's remuneration—The stockholder's remuneration is paid on dividends and interest on capital. This remuneration is recognized as a liability in the financial statements of the Company based on bylaws. Any amount above the minimum mandatory remuneration approved by the by-laws shall only be recognized in current liabilities on the date that is approved by stockholders.



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

28. Stockholders' equity (Continued)

The Company is permitted to distribute interest attributable to stockholders' equity. The calculation is based on the stockholders' equity amounts as stated in the statutory accounting records and the interest rate applied may not exceed the Brazilian Government Long-term Interest Rate ("TJLP") determined by the Central Bank of Brazil. Also, such interest may not exceed 50% of the net income for the year or 50% of retained earnings plus profit reserves as determined by Brazilian corporate law.

The benefit to the Company, as opposed to making a dividend payment, is a reduction in the income tax burden because this interest charge is tax deductible in Brazil. Income tax of 15% is withheld on behalf of the stockholders relative to the interest distribution. Under Brazilian law, interest attributed to stockholders' equity is considered as part of the annual minimum mandatory dividend. This notional interest distribution is treated for accounting purposes as a deduction from stockholders' equity in a manner similar to a dividend and the tax deductibility recorded in the income statement.

29. Related parties

The Company's related parties are subsidiaries, joint ventures, associates, stockholders and its related entities and key management personnel of the Company. Transactions between the parent company and its subsidiaries are eliminated on consolidation and are not disclosed in this note.

Related party transactions were made by the Company on terms equivalent to those that prevail in arm's-length transactions, with respect to price and market conditions that are no less favorable to the Company than those arranged with third parties.

Purchases, accounts receivable and other assets, and accounts payable and other liabilities relate largely to amounts charged by joint ventures and associates related to the pelletizing plants operational lease and railway transportation services.

a) Transactions with related parties

	Year ended December 31, 2020			
	Joint Ventures	Associates	Major stockholders	Total
Net operating revenue	372	240	185	797
Cost and operating expenses	(951)	(25)	-	(976)
Financial result	27	2	(49)	(20)

	Year ended December 31, 2019			
	Joint Ventures	Associates	Major stockholders	Total
Net operating revenue	374	294	204	872
Cost and operating expenses	(1,749)	(32)	-	(1,781)
Financial result	49	(1)	(29)	19



Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

29. Related parties (Continued)

	Year ended December 31, 2018			
	Joint Ventures	Associates	Major stockholders	Total
Net operating revenue	352	309	207	868
Cost and operating expenses	(2,269)	(39)	-	(2,308)
Financial result	115	-	(115)	-

Net operating revenue relates to sale of iron ore to the steelmakers and right to use capacity on railroads. Cost and operating expenses mostly relates to the variable lease payments of the pelletizing plants and the logistics costs for using the Nacala Logistic Corridor.

b) Outstanding balances with related parties

	December 31, 2020				December 31, 2019			
	Joint Ventures	Associates	Major stockholders(iii)	Total	Joint Ventures	Associates	Major stockholders(iii)	Total
Assets								
Cash and cash equivalents ..	-	-	2,082	2,082	-	-	1,384	1,384
Accounts receivable	109	45	2	156	91	22	5	118
Dividends receivable.....	19	-	-	19	83	6	-	89
Loans(i)	1,118	-	-	1,118	1,919	-	-	1,919
Derivatives financial instruments	-	-	2	2	-	-	42	42
Other assets	68	2	-	70	65	-	-	65
Liabilities								
Supplier and contractors	121	10	35	166	302	28	37	367
Loans(ii)	-	1,433	944	2,377	-	1,367	1,688	3,055
Derivatives financial instruments	-	-	242	242	-	-	64	64
Other liabilities	235	-	-	235	569	-	-	569

- (i) Refers to the loan with Nacala BV., which carries interest at the average rate of 8.2% p.a. and maturity at 2034. In 2020, the Company recognized an impairment of this receivable in the amount of US\$798 (note 18).
- (ii) Mainly relates to Vale Moçambique's loan payable to an entity controlled by one of its non-controlling shareholders, which carries interest at 5.83% p.a. and maturity at 2034.
- (iii) Refers to regular financial instruments with large financial institutions of which the stockholders were part of the controlling "shareholders' agreement", which has expired on November 10, 2020 (note 28(e)).

Notes to the Financial Statements (Continued)
Expressed in millions of United States dollar, unless otherwise stated

29. Related parties (Continued)

c) The key management personnel remuneration

	Year ended December 31,		
	2020	2019	2018
Short-term benefits			
Wages	9	8	8
Direct and indirect benefits	16	11	11
Profit sharing program ("PLR").....	8	1	10
	33	20	29
Long-term benefits			
Shares based	–	–	3
Severance	7	4	20
	40	24	52

The amounts described above include the Board of Directors and the Executive Officers and are presented on a cash basis.

30. Commitments

a) Contractual obligations

Mainly relates to agreements for the acquisition of fuel, energy and the acquisition of raw materials and services. The required and non-cancelable minimum payments related to contractual obligations as at December 31, 2020 are as follows:

	December 31, 2020	December 31, 2019
Purchase obligations.....	6,991	5,510
Purchase energy	2,945	3,567
Total minimum payments required	9,936	9,077

b) Financial guarantees provided

As at December 31, 2020 and 2019, corporate financial guarantees provided by the Company (within the limit of its direct or indirect interest) for certain associates and joint ventures were US\$1,557 and US\$1,655, respectively. The fair value of this financial guarantees in December 31, 2020 and 2019 totaled US\$877 and US\$525, respectively, and is recorded in the balance sheet as "Others non-current liabilities".