



Financial Statements

December 31, 2021

BRGAAP in R\$ (English)

**Vale S.A. Financial Statements
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(A free translation of the original in Portuguese)

Independent auditor's report on the parent company and consolidated financial statements

To the Board of Directors and Shareholders of
Vale S.A.

Opinion

We have audited the accompanying parent company financial statements of Vale S.A. (the "Company"), which comprise the statement of financial position as at December 31, 2021 and the income statement, statements of comprehensive income, changes in equity and cash flows for the year then ended, as well as the accompanying consolidated financial statements of Vale S.A. and its subsidiaries ("Consolidated"), which comprise the consolidated statement of financial position as at December 31, 2021 and the consolidated income statement, statements of comprehensive income, changes in equity and cash flows for the year then ended, and notes to the financial statements, including significant accounting policies and other explanatory information.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of Vale S.A. and of Vale S.A. and its subsidiaries as at December 31, 2021, and the financial performance and the cash flows, as well as the consolidated financial performance and the consolidated cash flows for the year then ended, in accordance with accounting practices adopted in Brazil and with the International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB).

Basis for opinion

We conducted our audit in accordance with Brazilian and International Standards on Auditing. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Parent Company and Consolidated Financial Statements section of our report. We are independent of the Company and its subsidiaries in accordance with the ethical requirements established in the Code of Professional Ethics and Professional Standards issued by the Brazilian Federal Accounting Council, and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Key Audit Matters

Key Audit Matters are those matters that, in our professional judgment, were of most significance in our audit of the financial statements of the current year. These matters were addressed in the context of our audit of the parent company and consolidated financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.



Why it is a Key Audit Matter**How the matter was addressed in the audit**

Provisions for de-characterization of dams (Note 26 (a))

Resulting from the Brumadinho dam failure, the Company has been working on the de-characterization of its tailing dams built under the upstream method, as well as certain “centerline structures” and dikes located in Brazil. The provision for the de-characterization of dams balance as of December 31, 2021 is R\$ 19,666 million.

The provision for the de-characterization of dams involves a high degree of critical judgment by management, as well as high degree of complexity in the determination of engineering solutions and assumptions, as the referred dams and structures present different characteristics and are under different stages of project engineering maturity, some of them on the conceptual engineering phase.

The measurement of the provision takes into consideration the evaluation of several significant assumptions like: (i) volume of waste to be removed; (ii) location availability and distance for disposal of waste; (iii) engineering methods and solutions; (iv) security levels; (v) productivity of the equipment used; (vi) advances in geological studies and new hydrological information; (vii) discount rate update.

In addition, for the determination of the provision, the Company relies on specialized engineering and geology advisors to carry on specific aspects of the de-characterization process, and which are relevant for the determination and confirmation of the solutions and significant assumptions, as well as in relation to the estimate of future costs.

Due to the nature of the measurement uncertainties of this provision, the amounts recorded and disclosed as of December 31, 2021, must be reviewed and could come to be changed significantly in future periods, as new facts and circumstances come to be known.

Accordingly, this matter remains an area of focus in our audit.

Our audit procedures included, among others, the update of our understanding and evaluation of the design and operating effectiveness of the significant internal controls put in place by management in relation to the recognition and monitoring of the provision for the de-characterization of dams and corresponding disclosures in the financial statements. We have discussed and reported to management the aspects of improvement to internal controls in relation to this subject.

We have discussed with management regarding the technical engineering rationale and main assumptions used on the most relevant de-characterization projects, aiming to evaluate the reasonableness of the future costs estimate made by the Company’s management.

We have evaluated the competency, ability and objectivity of the engineering and geology specialists engaged by management to support certain aspects of the de-characterization process.

We have obtained, on a sample basis, the supporting documentation of the costs incurred, and we have evaluated the reasonableness of the calculation models and the significant assumptions used in the engineering projects and technical alternatives, with the support of our engineering specialists.

As a result of the procedures performed, we consider that the criteria and assumptions adopted by the Company’s management for the aim to calculate and account for these provisions are reasonable and consistent with the information obtained during our audit work and with the disclosures made in the financial statements.



Vale S.A.

Partial disposal of investment in Vale International S.A. (“VISA”) (Note 2 (g.1))

In December, 2021, the Company approved a reduction of capital from VISA, a wholly-owned foreign subsidiary, in the amount of R\$ 17,109 million. The referred capital reduction was deemed by management as a partial disposal of the investment.

As a consequence, the Company has reclassified a portion of the cumulative translation adjustment (“CTA”) related to this wholly-owned foreign subsidiary in the amount of R\$ 13,634 million, until then presented in as shareholders’ equity, to the income statement, generating a gain of the same amount, registered under “Other financial items, net”.

The Company’s accounting policy set that capital reductions of subsidiaries represent a partial disposal, once there is a decrease of the total investment held. In this context, the CTA balance recorded and accumulated in the shareholders’ equity due to the translation from foreign subsidiaries, of which functional currencies are different from Real, are partially realized and must be reclassified to the income statement by the proportion realized, despite the Company keeping the same share of that subsidiary.

The conclusion over which events trigger a partial disposal of investments in subsidiaries, then a return of capital that generates a reclassification of CTA from shareholders’ equity to the income statement, has demanded a high degree of effort from management due to the complexity in evaluating the events under the applicable accounting practices.

Accordingly, this matter was considered an area of focus in our audit.

Our audit procedures included, among others, the evaluation of the design and operating effectiveness of the significant internal controls related to the reclassification of CTA from the capital reduction of VISA.

We have discussed with management the technical rationale adopted by the Company to determine the events that are deemed to be a partial disposal of investment in a foreign subsidiary and a return of capital that generates a reclassification of CTA, according to the Company’s accounting policies.

In addition, we have read the supporting documents related to the transaction of capital reduction and we have tested the mathematical accuracy of the calculation.

Lastly, we have read the disclosure presented on the explanatory notes.

As a result of the procedures described above, we consider that the criteria adopted by management for the determination of the reclassified amount of CTA, as well as its disclosures, are consistent with the information obtained and technical discussions held.



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Provision for tax contingencies (Notes 8 (e) and 28)

The Company and its subsidiaries have relevant tax matters under discussion at several procedural levels, for which, based on the opinion of their internal and external legal advisors, a provision for tax contingencies in the amount of R\$ 2,542 million was recorded.

The definition of the provided amount mentioned above, as well as the contingent liabilities disclosed depend on critical judgments by management regarding the settlement term, likelihood of loss and amount.

In addition, considering the significance of the amounts involved, any changes in estimates or assumptions, which influence the determination of the likelihood of loss, could have significant impacts on the Company's financial statements.

Accordingly, this matter was maintained as an area of focus in our audit.

Our audit procedures included, among others, the evaluation of the design and operating effectiveness of the significant internal controls related to the process of determining tax contingencies, as well as the assessment of significant information technology systems that support this process.

For tax positions related to income taxes, we met with management to discuss and evaluate the circumstances of the relevant matters in relation to the Interpretation ICPC 22/IFRIC 23, as well as to understand the internal controls related to the identification and monitoring of uncertainty tax treatments and measurement and recognition of the obligation, when applicable.

We requested and obtained confirmation from all the legal advisors, internal and external, who are responsible for the Company's tax claims, confirming amounts and estimates used by the Company's management.

Also, when applicable, for the most significant tax proceedings, we obtained the opinions of other tax advisors, aiming to assess the reasonableness of the estimates determined by the lawyers responsible for the respective claims, and analyze the arguments and case law adopted by the Company's legal advisors.

We consider that the criteria and assumptions adopted by management for determining provisions, as well as disclosures, are consistent with the assessment of legal advisors.



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Other matters

Value Added Statement

The parent company and consolidated Value Added Statements for the year ended December 31, 2021, prepared under the responsibility of the Company's management and presented as supplementary information for IFRS purposes, were submitted to audit procedures performed in conjunction with the audit of the Company's financial statements. For the purposes of forming our opinion, we evaluated whether these statements are reconciled with the financial statements and accounting records, as applicable, and if their form and content are in accordance with the criteria defined in Technical Pronouncement CPC 09 - "Value Added Statement". In our opinion, these Value Added Statements have been properly prepared in all material respects, in accordance with the criteria established in the Technical Pronouncement, and are consistent with the parent company and consolidated financial statements taken as a whole.

Other information accompanying the parent company and consolidated financial statements and the auditor's report

The Company's management is responsible for the other information that comprises the Management Report.

Our opinion on the parent company and consolidated financial statements does not cover the Management Report, and we do not express any form of audit conclusion thereon.

In connection with the audit of the parent company and consolidated financial statements, our responsibility is to read the Management Report and, in doing so, consider whether this report is materially inconsistent with the financial statements or our knowledge obtained in the audit or otherwise appears to be materially misstated. If, based on the work we have performed, we conclude that there is a material misstatement in the Management Report, we are required to report that fact. We have nothing to report in this regard.

Responsibilities of management and those charged with governance for the parent company and consolidated financial statements

Management is responsible for the preparation and fair presentation of the parent company and consolidated financial statements in accordance with accounting practices adopted in Brazil and with the International Financial Reporting Standards (IFRS) as issued by the International Accounting Standards Board (IASB), and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the parent company and consolidated financial statements, management is responsible for assessing the Company's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the financial reporting process of the Company and its subsidiaries.



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Auditor's responsibilities for the audit of the parent company and consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the parent company and consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Brazilian and International Standards on Auditing will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Brazilian and International Standards on Auditing, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the parent company and consolidated financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the internal control of the Company and its subsidiaries.
- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.
- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the ability of the Company to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the parent company and consolidated financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Company to cease to continue as a going concern.
- Evaluate the overall presentation, structure and content of the parent company and consolidated financial statements, including the disclosures, and whether these financial statements represent the underlying transactions and events in a manner that achieves fair presentation.
- Obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the Group to express an opinion on the parent company and consolidated financial statements. We are responsible for the direction, supervision and performance of the group audit. We remain solely responsible for our audit opinion.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the financial statements of the current period and are therefore the key audit matters. We describe these matters in our auditor's report unless law or regulation precludes public disclosure



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about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.

Rio de Janeiro, February 24, 2022

PricewaterhouseCoopers
Auditores Independentes Ltda.
CRC 2SP000160/O-5

Patricio Marques Roche
Contador CRC 1RJ081115/O-4

Income Statement

In millions of Brazilian reais, except earnings per share data

	Notes	Consolidated			Parent Company	
		2021	2020	2019	Year ended December 31,	
		2021	2020	2019	2021	2020
Continuing operations						
Net operating revenue	4(d)	293,524	206,098	144,635	220,109	127,395
Cost of goods sold and services rendered	5(a)	(117,267)	(90,948)	(76,437)	(59,140)	(44,868)
Gross profit		176,257	115,150	68,198	160,969	82,527
Operating expenses						
Selling and administrative	5(b)	(2,601)	(2,529)	(1,872)	(1,368)	(1,271)
Research and development		(2,964)	(2,151)	(1,644)	(1,477)	(1,005)
Pre-operating and operational stoppage	26	(3,467)	(4,517)	(4,559)	(2,609)	(4,081)
Equity results and others results from subsidiaries	15	-	-	-	13,729	10,762
Brumadinho event and de-characterization of dams	24 and 26	(14,379)	(27,016)	(28,818)	(14,379)	(27,016)
Other operating expenses, net	5(c)	(2,212)	(4,202)	(2,107)	(2,028)	(2,677)
		(25,623)	(40,415)	(39,000)	(8,132)	(25,288)
Impairment and disposals of non-current assets	19	(2,352)	(6,968)	(13,813)	(398)	(346)
Operating income		148,282	67,767	15,385	152,439	56,893
Financial income	6	1,822	1,570	1,802	1,063	708
Financial expenses	6	(8,942)	(16,666)	(14,499)	(8,711)	(16,748)
Other financial items, net	6	24,932	(9,056)	(678)	227	(8,191)
Equity results and other results in associates and joint ventures	15 and 25	(6,947)	(5,210)	(2,585)	(6,947)	(5,210)
Income (loss) before income taxes		159,147	38,405	(575)	138,071	27,452
Income taxes						
Current tax	8	(30,079)	(17,828)	(5,985)	(27,938)	(14,739)
Deferred tax		4,759	13,201	8,494	11,095	14,000
		(25,320)	(4,627)	2,509	(16,843)	(739)
Net income of continuing operations		133,827	33,778	1,934	121,228	26,713
Net income (loss) attributable to noncontrolling interests		591	(11)	449	-	-
Net income from continuing operations attributable to Vale's stockholders		133,236	33,789	1,485	121,228	26,713
Discontinued operations						
Loss from discontinued operations	16(a)	(12,484)	(8,875)	(10,631)	-	-
Loss attributable to noncontrolling interests		(476)	(1,799)	(2,474)	-	-
Loss from discontinued operations attributable to Vale's stockholders		(12,008)	(7,076)	(8,157)	-	-
Net income (loss)		121,343	24,903	(8,697)	121,228	26,713
Net income (loss) attributable to noncontrolling interests		115	(1,810)	(2,025)	-	-
Net income (loss) attributable to Vale's stockholders		121,228	26,713	(6,672)	121,228	26,713
Basic and diluted earnings (loss) per share attributable to Vale's stockholders:						
Common share (R\$)	9	24.18	5.21	(1.30)	24.18	5.21

As described in note 16, the coal segment is presented in these financial statements as a discontinued operation, therefore, the comparative balances in the income statement were also reclassified.

The accompanying notes are an integral part of these financial statements.

Statement of Comprehensive Income

In millions of Brazilian reais

	Consolidated			Parent Company	
	2021	2020	2019	Year ended December 31,	
	2021	2020	2019	2021	2020
Net income (loss)	121,343	24,903	(8,697)	121,228	26,713
Other comprehensive income (loss):					
Items that will not be reclassified to income statement					
Retirement benefit obligations (note 29)	2,631	(436)	(486)	736	(528)
Fair value adjustment to investment in equity securities (note 21)	2,188	641	(735)	1,812	583
Equity results (note 15)	-	-	-	2,271	150
	4,819	205	(1,221)	4,819	205
Items that may be reclassified to income statement					
Translation adjustments	5,133	20,011	4,812	4,865	21,257
Net hedge investments (note 20)	(646)	(2,732)	(324)	(646)	(2,732)
Net hedge cash flow (note 20)	47	(631)	427	-	-
Equity results (note 15)	-	-	-	47	(631)
Reclassification of cumulative translation adjustment to income statement (notes 15 and 16)	(26,501)	(702)	-	(26,501)	(702)
	(21,967)	15,946	4,915	(22,235)	17,192
Total comprehensive income (loss)	104,195	41,054	(5,003)	103,812	44,110
Comprehensive income (loss) attributable to noncontrolling interests	383	(3,056)	(1,839)		
Comprehensive income (loss) attributable to Vale's stockholders	103,812	44,110	(3,164)		

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.

Statement of Cash Flows

In millions of Brazilian reais

	Consolidated			Parent Company	
	2021	2020	2019	Year ended December 31,	
	2021	2020	2019	2021	2020
Cash flow from operations (a)	178,815	99,171	67,754	155,528	53,733
Interest on loans and borrowings paid (note 23)	(3,820)	(3,911)	(4,760)	(4,795)	(5,400)
Cash received (paid) on settlement of derivatives, net (note 20)	(1,118)	(280)	(1,287)	(1,083)	(876)
Payments related to Brumadinho event (note 24)	(7,633)	(2,651)	(3,340)	(7,633)	(2,651)
Payments related to de-characterization of dams (note 26)	(1,822)	(1,521)	(642)	(1,822)	(1,521)
Interest on participative stockholders' debentures paid (note 22)	(2,317)	(1,000)	(776)	(2,317)	(1,000)
Income taxes (including settlement program)	(23,607)	(9,138)	(7,119)	(21,384)	(7,663)
Net cash provided by operating activities from continuing operations	138,498	80,670	49,830	116,494	34,622
Net cash used in operating activities from discontinued operations (note 16a)	(1,732)	(5,462)	(2,548)	-	-
Net cash provided by operating activities	136,766	75,208	47,282	116,494	34,622
Cash flow from investing activities:					
Capital expenditures	(27,301)	(21,720)	(13,822)	(16,916)	(11,374)
Additions to investments (note 15)	(237)	(657)	(287)	(899)	(2,243)
Acquisition of subsidiary, net of cash (note 15)	-	-	(3,513)	-	-
Disbursement related to VNC sale (note 15)	(3,134)	-	-	-	-
Proceeds from disposal of Mosaic shares (note 14a)	6,919	-	-	6,044	-
Capital reduction of foreign subsidiary (notes 2g and 15)	-	-	-	17,109	-
Dividends received from associates and joint ventures (note 15)	1,043	904	1,423	3,380	2,973
Judicial deposits and restricted cash related to Brumadinho event (note 24)	-	(50)	(6,169)	-	(50)
Short-term investment	2,671	(1,247)	(3,408)	519	1,031
Other investments activities, net	(2,773)	(795)	(290)	(12,362)	2,331
Net cash used in investing activities from continuing operations	(22,812)	(23,565)	(26,066)	(3,125)	(7,332)
Net cash used in investing activities from discontinued operations (note 16a)	(12,476)	(669)	(474)	-	-
Net cash used in investing activities	(35,288)	(24,234)	(26,540)	(3,125)	(7,332)
Cash flow from financing activities:					
Loans and borrowings from third-parties (note 23)	5,165	34,023	11,886	3,226	44
Payments of loans and borrowings from third-parties (note 23)	(10,759)	(33,207)	(21,874)	(9,051)	(3,534)
Payments of leasing (note 23)	(1,152)	(1,051)	(836)	(396)	(339)
Dividends and interest on capital paid to stockholders (note 30c)	(73,112)	(18,637)	-	(73,112)	(18,637)
Dividends and interest on capital paid to noncontrolling interest	(175)	(72)	(695)	-	-
Share buyback program (note 30b)	(29,121)	-	-	(15,574)	-
Transactions with noncontrolling stockholders	-	981	(3,310)	-	-
Net cash used in financing activities from continuing operations	(109,154)	(17,963)	(14,829)	(94,907)	(22,466)
Net cash used in financing activities from discontinued operations (note 16a)	(72)	(78)	(55)	-	-
Net cash used in financing activities	(109,226)	(18,041)	(14,884)	(94,907)	(22,466)
Increase (reduction) in cash and cash equivalents	(7,748)	32,933	5,858	18,462	4,824
Cash and cash equivalents in the beginning of the year	70,086	29,627	22,413	14,609	9,597
Effect of exchange rate changes on cash and cash equivalents	3,071	7,605	1,356	-	-
Cash and cash equivalents from subsidiaries sold, net (note 15)	-	(79)	-	1,195	188
Cash and cash equivalents at end of the year	65,409	70,086	29,627	34,266	14,609
Cash flow from operating activities:					
Income (loss) before income taxes	159,147	38,405	(575)	138,071	27,452
Adjusted for:					
Equity results and others results from subsidiaries (note 15)	-	-	-	(13,729)	(10,762)
Equity results and other results in associates and joint ventures (note 15)	6,947	5,210	2,585	6,947	5,210
Impairment and disposal of non-current assets (note 19)	2,352	6,968	13,813	398	346
Provisions related to Brumadinho (note 24)	1,140	21,255	15,173	1,140	21,255
Provision for de-characterization of dams (note 26)	9,747	3,175	10,274	9,747	3,175
Depreciation, depletion and amortization	16,379	16,597	13,814	8,510	8,069
Financial results, net (note 6)	(17,812)	24,152	13,375	7,421	24,231
Changes in assets and liabilities:					
Accounts receivable (note 10)	4,604	(14,155)	(126)	1,881	(27,976)
Inventories (note 12)	(2,572)	(691)	583	(503)	(779)
Suppliers and contractors (note 11) (i)	1,286	(766)	3,207	(291)	906
Payroll, related charges and other remunerations (note 27)	85	1,441	(308)	416	1,110
Other assets and liabilities, net	(2,488)	(2,420)	(4,061)	(4,480)	1,496
Cash flow from operations (a)	178,815	99,171	67,754	155,528	53,733
Non-cash transactions:					
Additions to property, plant and equipment - capitalized loans and borrowing costs	318	345	551	318	345

(i) Includes variable lease payments.

The accompanying notes are an integral part of these financial statements.

Statement of Financial Position

In millions of Brazilian reais

	Notes	Consolidated		Parent Company	
		December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Assets					
Current assets					
Cash and cash equivalents	23	65,409	70,086	34,266	14,609
Short-term investments	23	1,028	4,006	906	1,811
Accounts receivable	10	21,840	25,944	47,912	46,559
Other financial assets	14	619	1,707	410	37
Inventories	12	24,429	21,103	7,246	6,142
Recoverable taxes	13	4,809	2,646	3,519	1,036
Others		1,198	1,313	1,867	2,199
		119,332	126,805	96,126	72,393
Non-current assets held for sale	16	5,468	-	35	-
		124,800	126,805	96,161	72,393
Non-current assets					
Judicial deposits	28(c)	6,808	6,591	6,543	6,265
Other financial assets	14	796	9,271	480	3,838
Recoverable taxes	13	5,220	5,670	2,650	2,244
Deferred income taxes	8(a)	63,847	53,711	54,119	42,760
Others		3,604	3,380	894	725
		80,275	78,623	64,686	55,832
Investments	15	9,771	10,557	143,640	181,319
Intangibles	17	50,287	48,309	29,440	28,243
Property, plant, and equipment	18	233,995	213,836	123,959	111,338
		374,328	351,325	361,725	376,732
Total assets		499,128	478,130	457,886	449,125
Liabilities					
Current liabilities					
Suppliers and contractors	11	19,393	17,496	10,603	11,601
Loans, borrowings and leases	23	6,720	5,901	3,415	3,804
Other financial liabilities	14	10,946	9,906	11,954	4,747
Taxes payable	13	12,150	4,950	11,129	3,509
Settlement program ("REFIS")	8(d)	1,810	1,769	1,810	1,733
Liabilities related to associates and joint ventures	25	9,964	4,554	9,964	4,554
Provisions	27	5,830	8,663	4,019	4,077
Liabilities related to Brumadinho	24	6,449	9,925	6,449	9,925
De-characterization of dams and asset retirement obligations	26	3,468	3,029	3,126	2,723
Dividends payable	30	-	6,342	-	6,342
Others		6,106	3,303	2,744	3,960
		82,836	75,838	65,213	56,975
Liabilities associated with non-current assets held for sale	16	1,978	-	-	-
		84,814	75,838	65,213	56,975
Non-current liabilities					
Loans, borrowings, and leases	23	70,189	72,187	16,520	21,646
Participative stockholders' debentures	22	19,078	17,737	19,078	17,737
Other financial liabilities	14	14,344	23,719	95,636	107,470
Settlement program ("REFIS")	8(d)	10,962	12,493	10,962	12,245
Deferred income taxes	8(a)	10,494	9,198	-	-
Provisions	27	19,082	21,377	7,496	8,028
Liabilities related to Brumadinho	24	13,288	13,849	13,288	13,849
De-characterization of dams and asset retirement obligations	26	41,753	32,368	23,658	14,904
Liabilities related to associates and joint ventures	25	7,407	6,228	7,407	6,228
Streaming transactions	7	9,927	10,419	-	-
Others		732	1,731	6,225	4,258
		217,256	221,306	200,270	206,365
Total liabilities		302,070	297,144	265,483	263,340
Stockholders' equity					
Equity attributable to Vale's stockholders	30	192,403	185,785	192,403	185,785
Equity attributable to noncontrolling interests		4,655	(4,799)	-	-
Total stockholders' equity		197,058	180,986	192,403	185,785
Total liabilities and stockholders' equity		499,128	478,130	457,886	449,125

The accompanying notes are an integral part of these financial statements.

Statement of Changes in Equity

In millions of Brazilian reais

	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, 2018	77,300	3,634	42,502	(6,604)	(5,912)	59,483	-	170,403	3,280	173,683
Loss	-	-	-	-	-	-	(6,672)	(6,672)	(2,025)	(8,697)
Other comprehensive income	-	-	-	-	(1,171)	4,679	-	3,508	186	3,694
Interest on capital of Vale's stockholders	-	-	(7,253)	-	-	-	-	(7,253)	-	(7,253)
Dividends of noncontrolling interest	-	-	-	-	-	-	-	-	(337)	(337)
Acquisitions and disposal of noncontrolling interest	-	-	-	-	1,410	-	-	1,410	(5,549)	(4,139)
Capitalization of noncontrolling interest advances	-	-	-	-	-	-	-	-	114	114
Allocation of loss	-	-	(6,672)	-	-	-	6,672	-	-	-
Treasury shares utilized	-	-	-	84	-	-	-	84	-	84
Balance at December 31, 2019	77,300	3,634	28,577	(6,520)	(5,673)	64,162	-	161,480	(4,331)	157,149
Net income (loss)	-	-	-	-	-	-	26,713	26,713	(1,810)	24,903
Other comprehensive income	-	-	-	-	(453)	17,850	-	17,397	(1,246)	16,151
Dividends and interest on capital of Vale's stockholders	-	-	(12,350)	-	-	-	(6,342)	(18,692)	-	(18,692)
Dividends of noncontrolling interest	-	-	-	-	-	-	-	-	(42)	(42)
Acquisitions and disposal of noncontrolling interest	-	-	-	-	(1,181)	-	-	(1,181)	2,559	1,378
Capitalization of noncontrolling interest advances	-	-	-	-	-	-	-	-	71	71
Appropriation to undistributed retained earnings	-	-	20,371	-	-	-	(20,371)	-	-	-
Treasury shares utilized	-	-	-	68	-	-	-	68	-	68
Balance at December 31, 2020	77,300	3,634	36,598	(6,452)	(7,307)	82,012	-	185,785	(4,799)	180,986
Net income	-	-	-	-	-	-	121,228	121,228	115	121,343
Other comprehensive income	-	-	-	-	4,660	(22,076)	-	(17,416)	268	(17,148)
Fair value reclassification of Mosaic shares (note 14a)	-	-	-	-	(2,911)	-	2,911	-	-	-
Dividends and interest on capital of Vale's stockholders (note 30c)	-	-	(22,935)	-	-	-	(43,834)	(66,769)	(148)	(66,917)
Acquisitions and disposal of noncontrolling interest (note 16)	-	-	-	-	(1,666)	-	-	(1,666)	9,219	7,553
Appropriation to undistributed retained earnings	-	-	80,305	-	-	-	(80,305)	-	-	-
Share buyback program (note 30b)	-	-	-	(29,121)	-	-	-	(29,121)	-	(29,121)
Share-based payment program (note 2g)	-	-	-	-	325	-	-	325	-	325
Treasury shares utilized and canceled (note 30b)	-	-	(6,347)	6,384	-	-	-	37	-	37
Balance at December 31, 2021	77,300	3,634	87,621	(29,189)	(6,899)	59,936	-	192,403	4,655	197,058

The accompanying notes are an integral part of these financial statements.

Value Added Statement

In millions of Brazilian Reals

	Consolidated		Parent Company	
	2021	2020	Year ended December 31,	
	2021	2020	2021	2020
Generation of value added				
Gross revenue				
Revenue from products and services	296,805	207,677	223,182	128,818
Revenue from the construction of own assets	9,684	6,064	4,348	2,396
Other revenues	2,684	1,996	1,912	1,369
Less:				
Cost of products, goods and services sold	(38,587)	(25,188)	(22,343)	(14,699)
Material, energy, third-party services and other	(46,797)	(38,500)	(14,598)	(11,406)
Impairment of non-current assets and others results	(2,352)	(6,968)	(398)	(346)
Brumadinho event and de-characterization of dams	(14,379)	(27,016)	(14,379)	(27,016)
Other costs and expenses	(17,625)	(15,383)	(9,498)	(9,169)
Gross value added	189,433	102,682	168,226	69,947
Depreciation, amortization and depletion	(16,379)	(16,597)	(8,510)	(8,069)
Net value added	173,054	86,085	159,716	61,878
Received from third parties				
Equity results from entities	(6,947)	(5,210)	6,782	5,552
Financial income	3,389	5,713	5,132	4,482
Total value added from continuing operations to be distributed	169,496	86,588	171,630	71,912
Value added from discontinued operations to be distributed (note 16)	(15,637)	(9,712)	-	-
Total value added to be distributed	153,859	76,876	171,630	71,912
Personnel and charges	9,941	9,052	5,506	4,581
Taxes and contributions	38,444	13,639	29,781	8,984
Interest (net derivatives and monetary and exchange rate variation)	(14,964)	29,503	12,163	28,448
Other remunerations of third party funds	2,248	616	2,952	3,186
Reinvested net income from continuing operations	133,236	33,789	121,228	26,713
Income (loss) from continuing operations attributable to noncontrolling interest	591	(11)	-	-
Distributed value added from continuing operations	169,496	86,588	171,630	71,912
Distributed value added from discontinued operations (note 16)	(15,637)	(9,712)	-	-
Distributed value added	153,859	76,876	171,630	71,912

The accompanying notes are an integral part of these financial statements.

1. Corporate information

Vale S.A. and its subsidiaries (“Vale” or the “Company”) have as their main operational activity the production of: (i) iron ore and iron ore pellets, which are key raw materials for steelmaking, (ii) nickel, that is used to produce stainless steel and metal alloys employed in the production process of several products, and (iii) copper, used in the construction sector to produce pipes and electrical wires. The Company also produces platinum group metals, gold, silver, and cobalt, as by-products of its main metals and produces thermal and metallurgical coal, considered a discontinued operation as at December 31, 2021 (note 16a). In addition, Vale operates a railroad and port logistics system in Brazil to outflow its production. The information by segment is presented in note 4.

Products are mainly sold in the international market by Vale International S.A. (“VISA”), which is a trading company located in Switzerland.

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 financial statements

The consolidated and individual financial statements of the Company (“financial statements”) have been prepared and are presented in accordance with International Financial Reporting Standards (“IFRS”) as issued by the International Accounting Standards Board (“IASB”), as implemented in Brazil by the Brazilian Accountant Pronouncements Committee (“CPC”), approved by the Brazilian Securities Exchange Commission (“CVM”) and by the Brazilian Federal Accounting Council (“CFC”).

All relevant information from its own financial statements, and only this information, are presented and correspond to those used by the Company’s Management.

The financial statements have been prepared on a historical cost basis and adjusted to reflect: (i) the fair value of certain financial assets and liabilities (including derivative instruments), as well as pension plans assets and (ii) assets impairment. Assets held for sale are measured at the lower of carrying amount and fair value less costs to sell.

As described in note 16, the coal segment is presented in these financial statements as a discontinued operation.

These financial statements were authorized for issue by the Board of Directors on February 24, 2022.

a) Statement of Value Added

The presentation of the parent company and consolidated statements of value added is required by the Brazilian corporate legislation and the accounting practices adopted in Brazil for listed companies, while it is not required by IFRS. Therefore, under the IFRS, the presentation of such statements is considered supplementary information, and not part of the set of financial statements. The Statement of Value Added was prepared in accordance with the criteria defined in Technical Pronouncement CPC 09 - “Statement of Value Added”.

b) Principles for consolidation

The Company’s financial statements reflect the assets, liabilities and transactions of the Parent Company and its direct and indirect subsidiaries (“subsidiaries”). Intercompany balances and transactions, which include unrealized profits, are eliminated. A list of the most relevant companies, including subsidiaries, associates and joint ventures, and the accounting policies applied in the preparation of the consolidated financial statements are described in note 15.

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”), in the case of the Parent Company and its associates and joint ventures in Brazil, is the Brazilian real (“R\$”). The functional currency of direct subsidiaries operating in an international economic environment is the US dollar (“US\$”).

The income statement and cash flows statements of the investees, with a different functional currency from the Parent Company, are translated into Brazilian real at the average monthly exchange rate, the assets and liabilities are translated at the final rate and the

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated

other equity items are translated at the historical rate. All monetary exchange differences are recognized in comprehensive income as "Translation adjustments".

When a foreign operation is totally or partially disposed, the monetary exchange differences that were recorded in the stockholders' equity are recognized in the income statement for the year.

The main exchange rates used by the Company to translate its foreign operations are as follows:

	Closing rate			Average annual rate		
	2021	2020	2019	2021	2020	2019
US Dollar ("US\$")	5.5805	5.1967	4.0307	5.3956	5.1578	3.9461
Canadian dollar ("CAD")	4.3882	4.0771	3.1034	4.3042	3.8480	2.9746
Euro ("EUR")	6.3210	6.3779	4.5305	6.3784	5.8989	4.4159

d) Critical accounting estimates and judgments

The preparation of financial statements requires the use of critical accounting estimates and judgment by management in applying the Company's accounting policies. These estimates are based on experience, best knowledge, information available at the date of statement of financial position and other factors, including expectations of future events that are believed to be reasonable under normal circumstances. Changes in facts and circumstances may lead to the revision of these estimates. Actual future results may differ from estimates.

The impacts of the pandemic and the initiatives related to climate change, described in e) and f) below, were considered in the preparation of these financial statements and the key assumptions related to these topics were considered in the preparation of the critical accounting estimates that are applied in the Company's long-term models.

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	Streaming transactions
8	Deferred income taxes and uncertain tax positions
15	Consolidation
18	Mineral reserves and mines useful life
19	Impairment of assets
20	Fair values estimate
24	Liabilities related to Brumadinho
25	Liabilities related to associates and joint ventures
26	Provision for de-characterization of dam structures and asset retirement obligations
28	Litigation
29	Employee post-retirement obligations

e) COVID-19 impacts

A significant portion of the Company's revenue is derived from sales to customers in Asia and Europe, regions that have had their economic activities affected as a result of the COVID-19 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 continues to monitor the impacts of the pandemic, including the effects on economic activity and on its financial statements. Despite several challenges imposed by the COVID-19, the effects of the pandemic have not significantly impacted the fair value of the Company's assets and liabilities to date. However, if the pandemic continues or increases in intensity in the regions where the Company operates, the financial condition or results of operations could still be negatively impacted.

The Company has pledged R\$238 (US\$44 million) to support humanitarian aid programs in the communities where it operates, with special focus on Brazilian 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, 2021 (R\$592 (US\$109 million) in the income statement for the year ended December 31, 2020).

f) Climate changes

The Company has made a commitment to reduce carbon emissions from its mining operations, in line with the Paris Agreement goal of limiting global warming to less than 2 °Celsius (35.6 °F).

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The Company's strategy considers as main objectives: (i) 33% reduction by 2030 in emissions released into the atmosphere as a direct result of its operations ("scope 1") and indirect emissions from electricity purchased by the Company ("scope 2"), already considering the increase in production levels projected for upcoming years; (ii) 100% of electricity consumption from a renewable matrix by 2030; (iii) 15% reduction by 2035 of indirect emissions not included in scope 2 ("scope 3"); and (iv) neutrality of scope 1 and 2 emissions by 2050.

To meet these objectives, the Company announced investments from R\$22,000 to R\$33,000 (US\$4 billion to US\$6 billion) by 2030 to reduce scope 1 and 2 emissions through the implementation of low carbon technologies. Expenses disbursed will be accounted in the period when incurred.

The investment plan and the Company's strategy for the risk of climate change were assessed in the context of the Company's critical accounting judgments and main estimates. Future changes in this strategy or in the global scenario may affect the Company's main estimates. As a result, they may have a material impact on the income statement and on the carrying value of assets and liabilities of the Company's future financial statements.

g) Significant accounting policies

Certain new accounting standards and interpretations have been published that are not mandatory for December 31, 2021, reporting periods or have not impacted these financial statements. The Company did not early adopt any of these standards and does not expect them to have a material impact on the entity in future reporting periods.

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 following:

g.i) IAS 21 (CPC 02) - Effects of changes in exchange rates and conversion of financial statements

IAS 21 defines that exchange differences arising from transactions and balances of foreign operations are recognized and accumulated in equity until this operation is fully or partially disposed. The IFRS Interpretations Committee defined that "partial disposal" of investment can be interpreted as (i) reduction in the percentage of equity interest; or (ii) reduction in the absolute value of the investment through the reduction of the investee's capital, even if the investor's percentage of ownership interest is not changed. Therefore, according to this interpretation, there is an accounting policy choice regarding the definition of partial disposal and, consequently, for the reclassification of cumulative translation adjustments in this context.

In 2021, Vale has determined its first capital return from a subsidiary, mainly due to the review of intragroup cash flows vis-à-vis the dividend policy in place and considering the profit reserves available for distribution to stockholders.

In December 2021, the Company approved a capital reduction in the amount of R\$17,109 (US\$3,000 million) of VISA, a wholly-owned foreign subsidiary (note 15). The amount received in December 2021 was determined as a return of the Company's investment in VISA, which led to a reduction in the investment held by the Parent Company.

Following this new transaction, Vale concluded that capital reductions in foreign operations will be better reflected in its financial statements through the application of the absolute value approach, as described in ii) above.

Therefore, the return of capital was determined as a partial disposal and, in accordance with the requirements of IAS 21, the exchange differences recorded in the stockholders' equity were reclassified to the income statement in the same proportion as the reduction in the net investment held in VISA, leading to a gain of R\$13,634 (US\$2,413 million) presented as "Other financial items, net" (note 6). The remaining balance of cumulative translation adjustments of VISA represents R\$34,841 (US\$6,243 million) as at December 31, 2021.

g.ii) IFRS 2 (CPC 10) - Share-based payment

IFRS 2/CPC 10 defines that the accounting for share-based payments depends on the form of settlement of the plans, which can be "cash-settled" or "equity-settled". When a plan is settled in cash, the payment obligation to the employee is recognized as a liability, which is updated to fair value recognized in the income statement at each reporting date and on the settlement date of the obligation. When the plan is settled with equity instruments, the fair value of the plan is calculated only on the grant date of the benefit and the fair value of the plan is recognized in the income statement for the year on a straight-line basis to equity over the period of service required.

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Until December 2020, the long-term incentive programs for the Company's executives, were recorded as liabilities based on the practice adopted by the Company to settle its obligation related to these programs with cash payment instead of Vale's stocks for its executives.

On April 30, 2021, the modification of the Regulation of the Performance Share Unit program ("PSU") was approved at the Ordinary and Extraordinary Annual General Meeting ("date of modification"), enabling the use of treasury shares of the Company to settle the obligation. Thus, the plans started to be treated as "settled with equity instruments" and their fair value was remeasured on the modification date. The effects of this change are detailed in note 29.

3. Significant events in the current year

Financial Position, Cash Flows and Income Statement of the Company were particularly affected by the following events and transactions during the year ended December 31, 2021:

Discontinued operation - coal (note 16a) – As part of the strategic sustainable mining agenda, in 2021, the Company acquired a noncontrolling interest in the coal mine in Mozambique and a controlling interest in the Nacala Logistics Corridor. These corporate reorganization steps allowed, in December 2021, to enter into a binding agreement with Vulcan Minerals ("Vulcan") for the sale of the interest in the coal and logistics assets. As a result, the segment is now presented as a discontinued operation in these financial statements and impairment of R\$17,178 (US\$3,282 million) were recognized throughout 2021 as "Impairment and disposals of non-current assets" in the income statement for discontinued operations.

Cumulative translation adjustments (notes 6 and 15) – In 2021, the Company recognized gains in the amount of R\$17,918 (US\$3,184 million), as "Other financial items, net", due to the reclassification of cumulative exchange variation in equity from (i) capital reduction of a foreign wholly-owned subsidiary; and (ii) the liquidation of a wholly-owned subsidiary previously operating in international iron ore logistics.

De-characterization of dams (note 26) – The Company updated its estimates of expenditures to work on de-characterization of upstream dams, located in Brazil, considering new engineering and geotechnical solutions. Different approaches to new risks and the use of remotely operated equipment and reinforcement of the containment plans of certain dams resulted in a supplement to the provision of R\$9,747 (US\$1,725 million) and the impact on the income statement for the year is presented as "Brumadinho event and de-characterization of dams".

Fundação Renova (note 25) – New court decisions were issued on individual compensation for residents of cities impacted by the Fundação dam failure, impacted the provision related to Fundação Renova as at December 31, 2021. These decisions mainly changed and expanded the concept of damage, categories, indemnifiable amounts and affected municipalities. The Company complemented the provision by R\$9,253 (US\$1,699 million) and the impact on the income statement for the year is presented as "Equity results and other results in associates and joint ventures".

Remuneration to stockholders (note 30c) – In 2021, the Company paid dividends and interest on capital to its stockholders in the amount of R\$73,112 (US\$13,483 million).

Share buyback and cancellation (note 30b) – In 2021, the Company approved common share buyback programs, of up to 470,000,000 shares, including their respective ADRs. As at December 31, 2021, the Company had repurchased 291,184,500 common shares and their respective ADRs, corresponding to the total amount of R\$29,121 (US\$5,546 million). In 2021, the Company approved the cancellation of 152,016,372 common shares held in treasury, equivalent to R\$6,347 (US\$2,401 million). In February 2022 (subsequent event) the Company approved the cancellation of 133,418,347 shares, also held in treasury.

Early redemption of debt security (notes 6 and 23) – In 2021, the Company early redeemed the 3.75% bonds with maturity date in January 2023, in the total amount of R\$4,946 (EUR750 million), and paid a premium of R\$354 (US\$63 million), recorded as "Expenses with cash tender offer redemption". The other debt payments made in the year were according with the payment schedule defined in the terms of each loan contracted.

Sale of Mosaic shares (note 14a) – In 2021, the Company sold its entire investment in Mosaic shares for the total amount of R\$6,919 (US\$1,259 million) and the effects of this transaction were recorded in the stockholders' equity, therefore, there was no impact in the income statement for the year ended December 31, 2021.

Sale of interest in VNC (notes 6, 15 and 19) – In 2021, the Company concluded the sale of its interest in Vale Nouvelle-Calédonie SAS ("VNC") to Prony Resources New Caledonia consortium. Upon completion of this transaction, the Company recognized a gain of

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R\$6,391 (US\$1,132 million) referring to the cumulative translation adjustments that were recorded in equity to the income statement, as "Other financial items, net".

4. Information by business segment and geographic area

The Company operates the following reportable segments: Ferrous Minerals, Base Metals and Coal (presented as discontinued operations). The segments are aligned with products and reflect the structure used by Management to evaluate the Company's performance. The responsible bodies for making operational decisions, allocating resources and evaluating performance are the Executive Boards and Board of Directors. Accordingly, the performance of the operating segments is assessed based on a measure of adjusted LAJIDA (EBITDA), among other measures.

The Company allocates to "Others" the revenues and cost of other products, services, research and development, investments in joint ventures and associates of other business and unallocated corporate expenses. Costs related to the Brumadinho event are allocated to "Others" as well.

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 related services.

Base metals - Include the production and extraction of nickel and its by-products (gold, silver, cobalt, precious metals and others), and copper, as well as its by-products (gold and silver).

Coal (discontinued operation) – Comprise of the production and extraction of metallurgical and thermal coal and its logistic related services. The set of assets related to this segment is classified as "Non-current assets and liabilities related to assets held for sale" (note 16).

a) Adjusted LAJIDA (EBITDA)

The definition of Adjusted LAJIDA (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.

	Consolidated						
	Year ended December 31, 2021						
	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 LAJIDA (EBITDA)
Ferrous minerals							
Iron ore	208,242	(61,860)	(720)	(1,073)	(1,791)	55	142,853
Iron ore pellets	37,951	(12,051)	164	(15)	(254)	386	26,181
Ferroalloys and manganese	937	(634)	(3)	(9)	(82)	-	209
Other ferrous products and services	2,013	(1,511)	48	(12)	(9)	-	529
	249,143	(76,056)	(511)	(1,109)	(2,136)	441	169,772
Base metals							
Nickel and other products	29,148	(19,480)	(36)	(416)	(573)	-	8,643
Copper	13,977	(4,733)	(47)	(437)	(22)	-	8,738
	43,125	(24,213)	(83)	(853)	(595)	-	17,381
Brumadinho event and de-characterization of dams	-	-	(14,379)	-	-	-	(14,379)
COVID-19	-	-	(238)	-	-	-	(238)
Others (i)	1,256	(1,568)	(3,756)	(996)	(18)	602	(4,480)
Total of continuing operations	293,524	(101,837)	(18,967)	(2,958)	(2,749)	1,043	168,056
Discontinued operations – Coal	5,877	(7,145)	(141)	(39)	-	424	(1,024)
Total	299,401	(108,982)	(19,108)	(2,997)	(2,749)	1,467	167,032

(i) Includes the negative EBITDA of VNC in the amount of R\$358 (US\$65 million), since upon the decision to sell this operation, the bodies responsible for making decisions on the Company's operating performance no longer analyze this operation as part of the Base Metals operating segment (notes 15 and 19).

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	Consolidated						Adjusted LAJIDA (EBITDA)
	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	
Ferrous minerals							
Iron ore	142,478	(42,391)	(958)	(663)	(2,708)	117	95,875
Iron ore pellets	22,043	(8,562)	52	(25)	(390)	608	13,726
Ferroalloys and manganese	1,177	(915)	-	(11)	(159)	-	92
Other ferrous products and services	1,667	(1,301)	14	(8)	-	8	380
	167,365	(53,169)	(892)	(707)	(3,257)	733	110,073
Base metals							
Nickel and other products	24,112	(14,242)	(115)	(209)	(156)	-	9,390
Copper	11,356	(4,087)	(35)	(351)	(4)	-	6,879
	35,468	(18,329)	(150)	(560)	(160)	-	16,269
Brumadinho event and de-characterization of dams	-	-	(27,016)	-	-	-	(27,016)
COVID-19	-	-	(592)	-	-	-	(592)
Others (i)	3,265	(4,146)	(4,845)	(883)	(60)	171	(6,498)
Total of continuing operations	206,098	(75,644)	(33,495)	(2,150)	(3,477)	904	92,236
Discontinued operations – Coal	2,431	(7,536)	(83)	(142)	-	434	(4,896)
Total	208,529	(83,180)	(33,578)	(2,292)	(3,477)	1,338	87,340

(i) Includes the reclassification of the negative EBITDA of VNC in the amount of R\$764 (US\$150 million), since upon the decision to sell this operation, the bodies responsible for making decisions on the Company's operating performance no longer analyze this operation as part of the Base Metals operating segment (notes 15 and 19).

	Consolidated						Adjusted LAJIDA (EBITDA)
	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	
Ferrous minerals							
Iron ore	92,504	(34,843)	(1,281)	(491)	(2,963)	120	53,046
Iron ore pellets	23,446	(10,515)	(81)	(65)	(282)	1,036	13,539
Ferroalloys and manganese	1,112	(869)	(32)	(9)	(4)	-	198
Other ferrous products and services	1,705	(1,278)	1	(4)	-	37	461
	118,767	(47,505)	(1,393)	(569)	(3,249)	1,193	67,244
Base metals							
Nickel and other products	15,642	(9,201)	(292)	(148)	(111)	-	5,890
Copper	7,506	(3,569)	(22)	(173)	(81)	-	3,661
	23,148	(12,770)	(314)	(321)	(192)	-	9,551
Brumadinho event and de-characterization of dams	-	-	(28,818)	-	-	-	(28,818)
Others (i)	2,720	(3,645)	(2,050)	(754)	(43)	230	(3,542)
Total of continuing operations	144,635	(63,920)	(32,575)	(1,644)	(3,484)	1,423	44,435
Discontinued operations – Coal	4,005	(6,462)	3	(121)	-	447	(2,128)
Total	148,640	(70,382)	(32,572)	(1,765)	(3,484)	1,870	42,307

(i) Includes the reclassification of the negative EBITDA of VNC in the amount of R\$932 (US\$237 million), since upon the decision to sell this operation, the bodies responsible for making decisions on the Company's operating performance no longer analyze this operation as part of the Base Metals operating segment (notes 15 and 19).

Notes to the Financial Statements

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Adjusted LAJIDA (EBITDA) is reconciled to net income (loss) as follows:

Continuing operations

	Consolidated		
	Year ended December 31,		
	2021	2020	2019
Net income from continuing operations attributable to Vale's stockholders	133,236	33,789	1,485
Net income (loss) attributable to noncontrolling interests	591	(11)	449
Net income from	133,827	33,778	1,934
Depreciation, depletion and amortization	16,379	16,597	13,814
Income taxes	25,320	4,627	(2,509)
Financial results	(17,812)	24,152	13,375
LAJIDA (EBITDA) from continuing operations	157,714	79,154	26,614
Items to reconciled adjusted LAJIDA (EBITDA)			
Equity results and other results in associates and joint ventures	6,947	5,210	2,585
Dividends received and interest from associates and joint ventures	1,043	904	1,423
Impairment and disposal of non-current assets	2,352	6,968	13,813
Adjusted LAJIDA (EBITDA) from continuing operations	168,056	92,236	44,435

Discontinued operations (Coal)

	Consolidated		
	Year ended December 31,		
	2021	2020	2019
Loss from discontinued operations attributable to Vale's stockholders	(12,008)	(7,076)	(8,157)
Loss attributable to noncontrolling interests	(476)	(1,799)	(2,474)
Loss	(12,484)	(8,875)	(10,631)
Depreciation, depletion and amortization	359	82	937
Income taxes	(4,336)	(1,602)	-
Financial results	(2,309)	(12)	71
LAJIDA (EBITDA) from discontinued operations	(18,770)	(10,407)	(9,623)
Items to reconciled adjusted LAJIDA (EBITDA)			
Equity results in associates and joint ventures	144	226	99
Dividends received and interest from associates and joint ventures (i)	424	434	447
Impairment of non-current assets	17,178	4,851	6,949
Adjusted LAJIDA (EBITDA) from discontinued operations	(1,024)	(4,896)	(2,128)

(i) Includes the remuneration of the financial instrument of the Coal segment.

b) Assets by segment

	December 31, 2021			December 31, 2020		
	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangibles	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangibles
Ferrous minerals	12,199	6,214	161,770	10,483	5,995	152,970
Base metals	7,725	95	112,317	6,398	91	101,593
Coal (note 16)	-	-	-	129	-	-
Others	120	3,462	10,195	-	4,471	7,582
Total	20,044	9,771	284,282	17,010	10,557	262,145

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated

	Consolidated								
	Year ended December 31,								
	2021			2020			2019		
Capital expenditures (i)			Capital expenditures (i)			Capital expenditures (i)			
	Sustaining capital	Project execution	Depreciation, depletion and amortization	Sustaining capital	Project execution	Depreciation, depletion and amortization	Sustaining capital	Project execution	Depreciation, depletion and amortization
Ferrous minerals	13,551	2,869	9,568	10,958	1,301	9,118	6,726	1,527	8,167
Base metals	8,239	1,854	6,541	7,317	1,244	6,987	4,345	608	4,722
Others (ii)	110	678	270	772	128	492	586	30	925
Total	21,900	5,401	16,379	19,047	2,673	16,597	11,657	2,165	13,814

(i) Amounts disbursed during the periods presented above.

(ii) Includes the reclassification of VNC under the captions "Sustaining capital" and "depreciation, depletion and amortization", in the amount of R\$749 (US\$151 million) and R\$228 (US\$46 million), respectively, for the year ended December 31, 2020 and in the amount of R\$544 (US\$136 million) and R\$630 (US\$160 million) respectively, for the year ended December 31, 2019.

c) Assets by geographic area

	Consolidated								
	December 31, 2021					December 31, 2020			
	Investments in associates and joint ventures		Intangible	Property, plant and equipment	Total	Investments in associates and joint ventures		Intangible	Property, plant and equipment
Brazil	9,656	39,339	132,772	181,767	9,145	38,151	121,416	168,712	
Canada	-	10,927	69,429	80,356	-	10,138	61,313	71,451	
Americas, except Brazil and Canada	-	-	15	15	1,218	-	26	1,244	
Europe	-	-	4,124	4,124	-	-	4,647	4,647	
Indonesia	-	8	15,197	15,205	-	8	14,182	14,190	
Asia, except Indonesia and China	115	-	4,879	4,994	108	-	4,940	5,048	
China	-	11	117	128	86	11	101	198	
Oman	-	2	7,462	7,464	-	1	7,211	7,212	
Total	9,771	50,287	233,995	294,053	10,557	48,309	213,836	272,702	

d) Net operating revenue by geographic area

	Consolidated			
	Year ended December 31, 2021			
	Ferrous minerals	Base metals	Others	Total
Americas, except United States and Brazil	4,713	2,180	21	6,914
United States of America	2,107	6,216	-	8,323
Germany	3,337	7,666	-	11,003
Europe, except Germany	12,698	12,602	-	25,300
Middle East, Africa, and Oceania	11,520	80	-	11,600
Japan	21,446	2,953	-	24,399
China	148,153	5,914	-	154,067
Asia, except Japan and China	19,023	5,217	-	24,240
Brazil	26,146	297	1,235	27,678
Net operating revenue	249,143	43,125	1,256	293,524

	Consolidated			
	Year ended December 31, 2020			
	Ferrous minerals	Base metals	Others	Total
Americas, except United States and Brazil	1,706	384	1,765	3,855
United States of America	1,270	4,066	-	5,336
Germany	1,766	6,082	-	7,848
Europe, except Germany	6,271	12,292	-	18,563
Middle East, Africa, and Oceania	7,400	82	-	7,482
Japan	9,295	2,068	-	11,363
China	116,298	4,827	-	121,125
Asia, except Japan and China	10,747	4,881	-	15,628
Brazil	12,612	786	1,500	14,898
Net operating revenue	167,365	35,468	3,265	206,098

	Consolidated			
	Year ended December 31, 2019			
	Ferrous minerals	Base metals	Others	Total
Americas, except United States and Brazil	2,048	2,097	1,203	5,348
United States of America	1,588	3,683	-	5,271
Germany	4,590	2,063	-	6,653
Europe, except Germany	5,968	6,764	-	12,732
Middle East, Africa and Oceania	8,175	79	-	8,254
Japan	8,121	1,690	-	9,811
China	69,755	2,650	-	72,405
Asia, except Japan and China	8,058	3,226	-	11,284
Brazil	10,464	896	1,517	12,877
Net operating revenue	118,767	23,148	2,720	144,635

Accounting policy

Revenue from sales - Revenue is recognized when the control of a good or service is 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.

In general, the contract payment terms consider the upfront payments or the use of letters of credit. The payment terms do not have a significant financing component. In some cases, the sale price is determined 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

	Consolidated			Parent Company	
	Year ended December 31,				
	2021	2020	2019	2021	2020
Personnel	9,218	8,380	7,592	5,747	4,701
Materials and services	15,705	14,432	11,126	9,976	7,071
Fuel oil and gas	5,472	4,339	4,899	3,951	2,855
Maintenance	15,167	13,049	10,089	11,245	8,941
Royalties (i)	7,372	4,383	3,146	7,004	4,389
Energy	3,446	3,460	3,249	1,762	1,541
Acquisition of products (i)	12,214	5,009	2,403	6,023	3,464
Depreciation, depletion and amortization	15,430	15,304	12,517	7,896	7,001
Freight (ii)	24,744	17,845	15,997	241	190
Others	8,499	4,747	5,419	5,295	4,715
Total	117,267	90,948	76,437	59,140	44,868
Cost of goods sold	114,102	87,966	73,716	57,337	42,723
Cost of services rendered	3,165	2,982	2,721	1,803	2,145
Total	117,267	90,948	76,437	59,140	44,868

(i) In the ferrous minerals segment, the increase is mainly due to the significant increase in the reference price of iron ore compared to 2020.

(ii) The increase is mainly due to the increase in volumes of CFR sales and higher international freight prices, and the effect of the devaluation of the R\$ against the US\$, considering that this cost is fully denominated in US\$.

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b) Selling and administrative expenses

	Consolidated			Parent Company	
				Year ended December 31,	
	2021	2020	2019	2021	2020
Selling	425	421	311	82	93
Personnel	924	857	714	592	554
Services	579	593	336	368	387
Depreciation and amortization	227	251	221	91	89
Advertisement	145	90	26	141	84
Others	301	317	264	94	64
Total	2,601	2,529	1,872	1,368	1,271

c) Other operating expenses, net

	Consolidated			Parent Company	
				Year ended December 31,	
	2021	2020	2019	2021	2020
Asset retirement obligations (note 26b)	682	1,605	378	-	422
Provision for litigations (i)	531	388	1,130	438	307
Profit sharing program	674	874	346	444	667
COVID-19 expenses (note 2)	238	592	-	238	573
Disposals of materials and inventories	22	102	187	78	82
Others	65	641	66	830	626
Total	2,212	4,202	2,107	2,028	2,677

(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.

6. Financial results

	Consolidated			Parent Company	
				Year ended December 31,	
	2021	2020	2019	2021	2020
Financial income					
Short-term investments	1,222	646	982	830	295
Others (i)	600	924	820	233	413
	1,822	1,570	1,802	1,063	708
Financial expenses					
Loans and borrowings gross interest	(3,628)	(3,814)	(3,716)	(4,448)	(5,229)
Capitalized loans and borrowing costs	318	345	551	318	345
Participative stockholders' debentures	(3,691)	(8,250)	(5,687)	(3,691)	(8,250)
Interest on REFIS	(294)	(275)	(605)	(295)	(265)
Interest on lease liabilities	(338)	(333)	(278)	(73)	(102)
Financial guarantees (ii)	1,536	(2,462)	(1,452)	1,536	(2,462)
Expenses with cash tender offer repurchased	(354)	-	(1,100)	(354)	-
Others	(2,491)	(1,877)	(2,212)	(1,704)	(785)
	(8,942)	(16,666)	(14,499)	(8,711)	(16,748)
Other financial items, net					
Net foreign exchange gains (losses)	2,172	(2,741)	263	1,815	(2,318)
Derivative financial instruments (note 20)	(153)	(5,526)	926	(680)	(4,872)
Reclassification of cumulative translation adjustments to the income statement (notes 2 and 15)	24,367	-	-	-	-
Indexation losses, net	(1,454)	(789)	(1,867)	(908)	(1,001)
	24,932	(9,056)	(678)	227	(8,191)
Total	17,812	(24,152)	(13,375)	(7,421)	(24,231)

(i) 2020 includes amounts related to Eletrobras contingent assets in the amount of R\$301 (US\$59 million) (note 28e).

(ii) Refers to the fair value adjustments on financial guarantees given to associates due to their rating improvement, leading to a decrease in the probability of default on the guaranteed loans (notes 15c and 23e).

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 as a component of other 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 Anglo Pacific Group (“APG”), 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 operation was bifurcated into two identifiable components (i) US\$130 allocated to property, plant and equipment, which is amortized over the useful life of the mine, together with the depreciation of assets related to the Voisey's Bay underground mine; and (ii) US\$560 as a contract liability related to the services for cobalt extraction to the extent that Vale operates as an agent for Wheaton and APG.

Wheaton and APG are entitled to receive 42.4% and 32.6%, respectively, of cobalt equivalent to the production from the Voisey's Bay mine, while Vale retains the rights to 25% of the production. Vale also receives additional payments of 20%, on average, of the market reference price for cobalt, for each pound of finished cobalt delivered.

As at December 31, 2021, the outstanding contract liability balance is R\$2,817 (US\$505 million) (R\$3,586 (US\$690 million) as at December 31, 2020).

Gold streaming

Between 2013 and 2016, the Company received cash proceeds of US\$3,600 from Wheaton to sell the mining right related to part of the gold extracted as a by-product of the Salobo copper and nickel mines in Sudbury. Since then, Wheaton holds the rights to 75% of the contained gold in the copper concentrate from the Salobo mine and 70% of the gold extracted as a by-product of the Sudbury nickel mines.

The transactions were bifurcated into two identifiable components (i) the sale of the mineral rights 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.

As at December 31, 2021, the outstanding contract liability is R\$7,110 (US\$1,274 million) (R\$6,833 (US\$1,315 million) as at December 31, 2020).

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 based on the volume produced compared to the total proved and probable reserves of gold or cobalt.

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 the product and the by-product based on relative prices; (ii) expected margin for the independent components (sale of mineral rights and service for gold and cobalt 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

	Consolidated		Parent Company	
	Year ended December 31,			
	2021	2020	2021	2020
Taxes losses carryforward	32,128	22,490	22,777	13,491
Temporary differences:				
Employee post retirement obligations	2,812	3,866	1,028	1,320
Provision for litigation	1,933	1,852	1,928	1,778
Timing differences arising from assets and liabilities	24,463	22,505	23,106	21,289
Fair value of financial instruments	7,664	7,040	7,664	7,040
Allocated goodwill	(15,944)	(13,633)	-	-
Others	297	393	(2,384)	(2,158)
	21,225	22,023	31,342	29,269
Total	53,353	44,513	54,119	42,760
Assets	63,847	53,711	54,119	42,760
Liabilities	(10,494)	(9,198)	-	-
	53,353	44,513	54,119	42,760

Changes in deferred tax are as follows:

	Consolidated			Parent Company
	Assets	Liabilities	Deferred taxes, net	Deferred taxes, net
Balance at December 31, 2019	37,151	7,585	29,566	28,770
Taxes losses carryforward	(119)	-	(119)	2,614
Timing differences arising from assets and liabilities	8,675	-	8,675	8,988
Fair value of financial instruments	3,793	-	3,793	3,793
Allocated goodwill	-	(542)	542	-
Others	310	-	310	(1,395)
Effect in income statement	12,659	(542)	13,201	14,000
Transfers between assets and liabilities	178	178	-	-
Merger of subsidiaries	-	-	-	(58)
Translation adjustment	1,977	2,024	(47)	-
Other comprehensive income	144	(47)	191	48
Tax loss carryforward from coal operations (note 16)	1,602	-	1,602	-
Balance at December 31, 2020	53,711	9,198	44,513	42,760
Taxes losses carryforward	4,347	-	4,347	9,285
Timing differences arising from assets and liabilities	1,337	-	1,337	1,503
Fair value of financial instruments	319	-	319	319
Allocated goodwill	-	731	(731)	-
Others	(513)	-	(513)	(12)
Effect in income statement	5,490	731	4,759	11,095
Transfers between asset and liabilities	(786)	(786)	-	-
Merger of Ferrous Resources do Brasil (note 15)	-	-	-	338
Translation adjustment	1,177	575	602	-
Other comprehensive income	(77)	776	(853)	(74)
Transfer to Held for sale	(4)	-	(4)	-
Tax loss carryforward from coal operations (note 16)	4,336	-	4,336	-
Balance at December 31, 2021	63,847	10,494	53,353	54,119

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 foreign subsidiaries are also taxed in Brazil and there is no restriction on their offset against tax losses generated previously by the foreign entity.

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:

	Consolidated			Parent Company	
	2021	2020	2019	Year ended December 31,	
				2021	2020
Income (loss) before income taxes	159,147	38,405	(575)	138,071	27,452
Income taxes at statutory rate – 34%	(54,110)	(13,058)	196	(46,944)	(9,334)
Adjustments that affect the basis of taxes:					
Income tax benefit from interest on stockholders' equity	1,400	1,660	2,470	1,400	1,660
Tax incentives	15,092	1,184	736	14,187	363
Equity results	896	(113)	330	5,555	3,796
Addition of tax loss carryforward (i)	1,408	3,984	99	8,755	4,559
Unrecognized tax losses of the year	(622)	(1,096)	(2,209)	-	-
Others (ii)	10,616	2,812	887	204	(1,783)
Income taxes	(25,320)	(4,627)	2,509	(16,843)	(739)

(i) In 2020, it refers mainly to exchange variation on tax loss carryforwards of foreign subsidiaries.

(ii) In 2021, it refers substantially to the reclassification of cumulative translation adjustments to the income statement for the year (note 15).

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, copper, and nickel. The incentive is calculated based on the taxable income of the incentive activity (tax operating income) and considers the allocation of tax operating income into different incentives applicable to different tranches of production during specified periods for each product, usually 10 years. Most of the Company's incentives are expected to expire until 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 of the income tax due, the Company can reinvest the acquisition of new machinery and equipment, subject to subsequent approval by the responsible regulatory agency, Superintendence for the Development of the Amazon ("SUDAM"). The reinvestment subsidy expected to expire in 2023, is accounted in retained earnings reserve account, which restricts its distribution as dividends to stockholders.

The Company is subject to the assessment 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")

	Consolidated	
	Year ended December 31,	
	2021	2020
Current liabilities	1,810	1,769
Non-current liabilities	10,962	12,493
REFIS liabilities	12,772	14,262
SELIC rate	9.25%	2.00%

The balance is mainly related to the settlement program of claims regarding the collection of income tax and social contribution on equity gains of foreign subsidiaries and affiliates from 2003 to 2012. As at December 31, 2021, the payment is parceled in 82 months (94 monthly parcels as at December 31, 2020), bearing SELIC interest rate (Special System for Settlement and Custody).

e) Uncertain tax positions

The Company is engaged in discussions with the tax authorities in Brazil related to certain tax positions adopted in the calculation of income tax and social contribution on net income, which current analysis of prognosis, based on internal and external assessment of legal advisors, is that they are likely to be accepted in decisions by higher courts of appeals. However, the final determination is uncertain and depends on factors not controlled by the Company, such as changes in case law and changes in tax laws and regulations.

The assessed amount under discussion with the tax authorities is R\$19,780 (US\$3,544 million) as at December 31, 2021 (R\$11,930 (US\$2,296 million) as at December 31, 2020). In addition, if the tax authority does not accept the tax treatment adopted by the Company in relation to these matters, there would also be a reduction of tax losses in the amount of R\$3,080 (US\$552 million)

(R\$2,340 (US\$450 million) as at December 31, 2020). A summary of these proceedings under discussion, previously disclosed as contingencies with possible risk of loss, and their potential effects, is presented below:

(e.i) Transfer pricing over the exportation of ores to a foreign subsidiary

The Company was assessed for the IRPJ and 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, pellets, copper and manganese to its foreign controlled company. The Company is challenging these assessments in the administrative level and a decision is pending.

The Company maintains the method of calculating the transfer price, as it considers it to be the most appropriate tax treatment for interpreting the rules in force and applicable to the subject, while discussing the aforementioned charges at the administrative level.

The total amount in dispute is R\$3,732 (US\$669 million) as at December 31, 2021 (2020: R\$3,614 (US\$695 million)). In addition, there was a reduction of the tax losses from 2015, 2016 and 2017, with the corresponding tax impact of R\$1,883 (US\$337 million). The amount under discussion is R\$10,519 (US\$1,885 million) for the 2018 to 2021 fiscal years.

(e.ii) Expenses of interest on capital ("JCP")

In 2021, Vale received assessments for the collection of IRPJ, CSLL and fines, on the grounds that the deduction of JCP was improper, referring to the base years of 2017 and 2018. The amount under discussion is R\$5,477 (US\$981 million) as at December 31, 2021 (R\$3,423 (US\$659 million) as at December 31, 2020). In addition, the tax effect of the potential reduction in the tax loss carryforward is R\$699 (US\$125 million). The Company presented administrative defenses for these assessments and is awaiting a decision.

(e.iii) 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 Social Contribution on Net Income ("CSLL") from the taxable base of the corporate income tax ("IRPJ"). The Federal Government filed a rescission action ("*ação rescisória*") in 2006, seeking to reverse the 2004 decision. In 2019, the Federal Court of Appeals ("TRF") upheld the rescission action and, although the decision was not final, the Company decided not to deduct the CSLL from the taxable income from 2018.

In November 2020, the Company received a tax assessment notice for the collection of IRPJ for the years 2016 and 2017, related to the deduction of CSLL from the respective years in which Vale was supported by a final court decision. The total amount assessed is R\$2,357 (US\$422 million) on the base date of these financial statements (2020: R\$2,259 (US\$435 million)).

Vale believes that the rescission action brought by the Federal Government is not applicable (Precedent 343 issued by the 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.iv) Goodwill amortization

The Company received tax assessment notices for the periods between 2013 and 2016, due to the deduction of goodwill amortization expenses recorded by Vale in the acquisition of CAEMI, after its merger by Vale. The Company is discussing the charges at the administrative level and the potential loss is classified as possible in the amount of R\$1,603 (US\$287 million) as at December 31, 2021 (R\$1,558 (US\$300 million) as at December 31, 2020).

(e.v) Proceeding related to income tax paid abroad

In 2021, Vale received a tax assessment for the collection of R\$2,225 (US\$399 million) due to the disregard of taxes paid abroad that were offset by the IRPJ debt in 2016. Tax authorities allege the Company has failed to comply with the applicable rules relating to the offset, in Brazil, of income taxes paid abroad. The Company had filed an administrative appeal and a decision is pending.

(e.vi) Expenses with payments to Fundação Renova

The Company deducts payments made to Fundação Renova arising from the obligation entered into in the Transaction and Conduct Adjustment Agreement ("TTAC") and from its subsidiary liability in the agreement when Samarco does not make these payments directly. Vale understands that the deduction of such expenses is adequate, since its liability is objective, arising from the obligation entered into in the TTAC and its status as a shareholder.

Notes to the Financial Statements

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In December 2021, the Company received a tax assessment notice for the collection of IRPJ and CSLL of R\$115 (US\$21 million) alleging that the expenses incurred with Fundação Renova were improperly deducted from the computation of the Company's income tax, as they understand that these expenses are not necessary for Vale's operational activities. For the fiscal years 2017 to 2021, the amount under discussion is R\$2,376 (US\$426 million)

(e.vii) Incidence of IRPJ and CSLL on SELIC rate in the repetition of undue payment

In September 2021, the Federal Supreme Court ("STF") decided in a judgment with general repercussion, that the incidence of IRPJ and CSLL on amounts referring to the SELIC rate received as a result of repetition of tax overpayment is unconstitutional. After the publication of the decision of the leading case judgment with a conclusion favorable to the taxpayers, the Company recognized a gain of R\$192 (US\$34 million) in the income statement for the year ended December 31, 2021.

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 liabilities related to 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 carryforward. 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

Deferred income tax - 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 carryforward 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.

Uncertain tax positions - 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.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated

9. Basic and diluted earnings (loss) per share

The basic and diluted earnings (loss) per share are presented below:

	Year ended December 31,		
	2021	2020	2019
Net income (loss) attributable to Vale's stockholders:			
Net income from continuing operations	133,236	33,789	1,485
Loss from discontinued operations	(12,008)	(7,076)	(8,157)
Net income (loss)	121,228	26,713	(6,672)
Thousands of shares			
Weighted average number of common shares outstanding	5,012,424	5,129,585	5,127,950
Basic and diluted earnings per share from continuing operations:			
Common share (R\$)	26.58	6.59	0.29
Basic and diluted loss per share from discontinued operations:			
Common share (R\$)	(2.40)	(1.38)	(1.59)
Basic and diluted earnings (loss) per share:			
Common share (R\$)	24.18	5.21	(1.30)

10. Accounts receivable

	Consolidated		Parent Company	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Receivables from customer contracts				
Related parties (note 31)	608	869	46,044	45,008
Third parties				
Ferrous minerals	16,868	21,272	1,897	1,498
Base metals	3,730	3,722	9	49
Others	900	342	23	68
Accounts receivable	22,106	26,205	47,973	46,623
Expected credit loss	(266)	(261)	(61)	(64)
Accounts receivable, net	21,840	25,944	47,912	46,559

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 2021 and 2019, no customer individually represented 10% or more of the Company's accounts receivable or revenues.

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 20). 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:

	Thousand metric tons	December 31, 2021		
		Provisional price (US\$/tone)	Change	Effect on Revenue
Iron ore	22,228	120.3	+/-10%	+/-1,493
Iron ore pellets	704	187.1	+/-10%	+/-74
Copper	104	11,730.7	+/-10%	+/-681

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/CPC 48 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. Suppliers and contractors

	Consolidated			Parent Company
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Third parties – Brazil	9,643	9,256	8,766	8,358
Third parties – Abroad	9,038	7,343	1,006	252
Related parties (note 31)	712	897	831	2,991
Total	19,393	17,496	10,603	11,601

12. Inventories

	Consolidated			Parent Company
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Finished products	15,615	14,103	4,685	4,124
Work in progress	4,566	3,351	148	100
Consumable inventory	4,777	4,583	2,624	2,125
Allowance to net realizable value (i)	(529)	(934)	(211)	(207)
Total	24,429	21,103	7,246	6,142

(i) In 2021, the effect of provision for net realizable value was R\$4 (US\$1 million) (2020: reversal of R\$93 (US\$20 million)).

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 net realizable value. Inventory production cost comprises variable and fixed costs, direct and indirect costs of production and are assigned to individual items of inventory based on 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”.

13. Recoverable and payable taxes

	Consolidated					
	December 31, 2021			December 31, 2020		
	Current assets	Non-current assets	Current liabilities	Current assets	Non-current assets	Current liabilities
Value-added tax	1,209	60	906	1,320	932	89
Brazilian federal contributions	2,903	2,851	66	708	2,376	70
Income taxes	630	2,309	10,385	556	2,361	4,019
Financial compensation for the exploration of mineral resources - CFEM	-	-	328	-	-	414
Others	67	-	465	62	1	358
Total	4,809	5,220	12,150	2,646	5,670	4,950

	Parent Company					
	December 31, 2021			December 31, 2020		
	Current assets	Non-current assets	Current liabilities	Current assets	Non-current assets	Current liabilities
Value-added tax	217	-	451	252	-	9
Brazilian federal contributions	2,730	2,650	47	505	2,244	31
Income taxes	516	-	9,935	226	-	2,760
Financial compensation for the exploration of mineral resources - CFEM	-	-	306	-	-	401
Others	56	-	390	53	-	308
Total	3,519	2,650	11,129	1,036	2,244	3,509

ICMS included in PIS and COFINS computation tax base

Vale discussed the issue of the exclusion of ICMS from the taxable basis of the contribution to PIS and COFINS in two lawsuits filed before March 2017. One of the lawsuits includes the triggering events from March 2012 onwards and has a favorable decision definitive. This lawsuit resulted in the recognition of a gain in the amount of R\$313 (US\$60 million) in the income statement for the year ended December 31, 2020. This amount was calculated based on the assumption that the ICMS to be excluded from the taxable bases is the one paid. With the definition of the subject by the Federal Supreme Court in the leading case, with binding effects to all taxpayers, which determined that the ICMS to be excluded is the one highlighted in the invoices, the Company recognized an additional gain of R\$146 (US\$26 million) in the year ended December 31, 2021.

The lawsuit that covers the triggering events that occurred between December 2001 and February 2012, resulted in the recognition of a gain in the amount of R\$808 (US\$145 million) in the year ended December 31, 2021 due to the favorable decision obtained by the Company and in line with the recent judgment of the Federal Supreme Court in the aforementioned leading case.

14. Other financial assets and liabilities

	Current		Consolidated Non-Current	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Other financial assets				
Restricted cash	-	-	653	197
Derivative financial instruments (note 20)	619	698	110	347
Investments in equity securities (i)	-	-	33	3,936
Loans - Related parties (note 31) (ii)	-	1,009	-	4,791
	619	1,707	796	9,271
Other financial liabilities				
Derivative financial instruments (note 20)	1,355	1,712	3,301	3,578
Loans - Related parties (note 31) (ii)	-	2,537	-	4,655
Other financial liabilities - Related parties (note 31)	2,192	1,222	-	-
Financial guarantees provided (notes 15c and 23e)	-	-	3,026	4,558
Liabilities related to the concession grant (notes 14b and 17a)	4,241	1,088	8,017	10,928
Contract liability	3,158	3,347	-	-
	10,946	9,906	14,344	23,719

	Current		Parent Company Non-Current	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Other financial assets				
Restricted cash	-	-	358	20
Derivative financial instruments (note 20)	410	37	46	338
Investments in equity securities (i)	-	-	33	3,438
Other financial assets	-	-	43	42
	410	37	480	3,838
Other financial liabilities				
Derivative financial instruments (note 20)	879	1,166	3,042	3,076
Loans - Related parties (note 31)	4,574	1,207	81,551	88,908
Other financial liabilities - Related parties (note 31)	2,235	1,277	-	-
Financial guarantees provided (notes 15c and 23e)	-	-	3,026	4,558
Liabilities related to the concession grant (notes 14b and 17a)	4,241	1,088	8,017	10,928
Contract liability	25	9	-	-
	11,954	4,747	95,636	107,470

(i) The Company has an investment of R\$33 (US\$6 million), corresponding to a 3.24% non-controlling interest in Boston Electrometallurgical Company, whose objective is to promote the development of a technology focused on reducing carbon dioxide emissions in steel production.

(ii) The decrease in non-current liabilities refers to the settlement of loans due to the transaction for acquiring Nacala Logistic Corridor (note 16).

a) Investment in equity securities

The Company held 34.2 million common shares of The Mosaic Company ("Mosaic"), the financial instrument was measured at fair value through other comprehensive income. Thus, changes in the fair value of this investment were accumulated in the Company's stockholders' equity.

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In November 2021, the Company sold the entire investment in Mosaic shares for the total amount of R\$6,919 (US\$1,259 million) and the related amount in fair value reserve of R\$2,911 (US\$522 million) was reclassified from other reserves to retained earnings reserve and, therefore, did not result in an impact on the income statement for the year ended December 31, 2021 (note 30c).

b) Liabilities related to the concession grant

In December 2020, the Company entered into an agreement with the Federal Government to continue operating its concessions of the Estrada de Ferro Carajás ("EFC") and Estrada de Ferro Vitória a Minas ("EFVM") for thirty years, extending the maturity date from 2027 to 2057. The recognized liability was discounted at present value using the following rates:

	Liability		Discount rate	
	December 31, 2021	December 31, 2020	2021	2020
Concessions grants	3,271	2,818	11.04%	11.04%
Midwest Integration Railway ("FICO")	6,730	6,789	5.11%	2.59%
Infrastructure program	1,910	1,372	5.22%	3.08%
West-East Integration Railway ("FIOL")	347	1,037	5.75%	2.67%
Total	12,258	12,016		

Concession grants – Payments for the concession grants are made in quarterly installments. This commitment is measured based on the net present value of the thirty-year projected cash flows. On October 28, 2021, the Company approved the prepayment of part of the concession agreements, in the amount of R\$2,050 (US\$367 million), which is expected to be settled in 2022.

Midwest Integration Railway ("FICO") – Construction of 383 km section between the municipalities of Mara Rosa, in Goiás, and Águia Boa, in Mato Grosso. The construction started in 2021 and its execution is expected to take 6 years.

Infrastructure program - Comprises over 450 separate projects designed to improve safety and reduce trespass where the railways pass through urban areas. The program will benefit 25 to 33 municipalities intercepted by EFC and EFVM, respectively.

West-East Integration Railway ("FIOL") - Acquisition and delivery of rails and sleepers, which the Federal Government will use for the construction of section II of FIOL, which will connect the municipalities of Caetité and Barreiras, in Bahia, and other miscellaneous commitments.

The concession contract renewal requires the review and physical inspection of the railway assets by the National Land Transport Agency ("ANTT"). In addition, the ANTT may require, at their discretion, further investments on the concession network. Furthermore, there is a provision for the Company to complete a minimum percentage of certain investments by 2027. In these circumstances, discussions on the economic and financial rebalancing of the contracts will be required and depending on the result of the physical inventory review and if new investments are demanded, the carrying amount may have a material impact in the future.

Financial guarantees

In addition, as a condition for signing the contracts, the Company contracted a financial guarantee with coverage of R\$1,026 (US\$180 million) as at December 31, 2021. These insurance contracts guarantee compensation, up to the amount established in the policy, for any losses arising from non-compliance of the contractual obligations assumed by Vale in the concession contracts.

Accounting policy

Concessions – Railway concessions liabilities consist of the following future payments discounted at present value: (i) fixed payments for the concession; (ii) amounts expected to be disbursed for constructing railways and infrastructure; (iii) cost of acquiring equipment to be made available for the granting authority; and (iv) other miscellaneous obligations and commitments that complement the early extension of the railway concessions agreement.

Grant payments are discounted using the regulatory weighted average cost of capital ("WACC"), which is the interest rate explicit in the concession agreement as determined by the ANTT, and payments related to other investment obligations are discounted at an incremental rate to reflect the time value of money, that is, a risk-free interest rate applicable to the economic environment in which the Company operates and with terms and conditions equivalent to the obligations assumed.

The amounts payable in relation to the concession granted are initially accounted for as intangible in accordance with the accounting policy, disclosed in note 17.

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15. Investments in subsidiaries, associates, and joint ventures

	Business	% ownership	% voting capital	Investments		Equity results in the income statement			Dividends received		
				Year ended December 31,		Year ended December 31,			Year ended December 31,		
				2021	2020	2021	2020	2019	2021	2020	2019
Direct and indirect subsidiaries											
In Brazil											
Companhia Portuária da Baía de Sepetiba	Iron ore	100.00	100.00	313	295	133	145	(54)	120	81	-
Mineração Corumbaense Reunida S.A.	Iron ore and manganese	100.00	100.00	-	-	(89)	(670)	(784)	-	-	-
Minerações Brasileiras Reunidas S.A.	Iron ore	100.00	100.00	2,425	10,960	1,314	1,875	1,112	-	445	901
Minerações Brasileiras Reunidas S.A. – Goodwill	Iron ore	-	-	4,060	4,060	-	-	-	-	-	-
Vale Manganês S.A.	Manganese	100.00	100.00	11	335	(369)	(384)	(66)	-	-	-
Salobo Metais S.A.	Cooper	100.00	100.00	14,183	12,989	3,932	3,616	2,186	2,717	1,562	1,718
Tecnored Desenvolvimento Tecnológico S.A.	Iron ore	100.00	100.00	81	98	(193)	(184)	(113)	-	-	-
Valepar – Goodwill	Iron ore	-	-	3,073	3,073	-	-	-	-	-	-
Others		-	-	293	590	(499)	(852)	(1,339)	-	75	72
Abroad											
New Steel Global	Iron ore	100.00	100.00	1,890	1,866	(85)	(62)	(73)	-	-	-
Vale Holdings B.V.	Holding	100.00	100.00	5,238	10,722	(153)	(2,163)	68	17,109	-	-
Vale Canada Limited	Nickel	100.00	100.00	18,546	11,383	(611)	(4,407)	(11,515)	-	-	-
Vale International S.A.	Trading and holding	100.00	100.00	75,923	105,036	10,103	14,543	4,802	-	-	-
Vale Malaysia Minerals Sdn. Bhd.	Iron ore	100.00	100.00	7,527	7,228	41	181	174	-	-	-
Others		-	-	306	2,127	205	(195)	(1,166)	-	-	-
				133,869	170,762	13,729	11,443	(6,769)	19,946	2,163	2,691
Associates and joint ventures											
In Brazil											
Aliança Geração de Energia S.A.	Energy	55.00	55.00	2,046	1,909	277	140	122	140	126	111
Aliança Norte Energia Participações S.A.	Energy	51.00	51.00	586	606	(20)	(40)	17	-	-	-
Companhia Coreano-Brasileira de Pelotização	Pellets	50.00	50.00	284	249	247	36	186	185	178	253
Companhia Hispano-Brasileira de Pelotização	Pellets	50.89	50.89	211	223	7	57	144	34	144	200
Companhia Ítalo-Brasileira de Pelotização	Pellets	50.90	51.00	270	228	212	50	119	127	119	219
Companhia Nipo-Brasileira de Pelotização	Pellets	51.00	51.11	720	627	214	43	328	41	164	365
Samarco Mineração S.A. (note 25)	Pellets	50.00	50.00	-	-	-	-	-	-	-	-
Companhia Siderúrgica do Pecém	Steel	50.00	50.00	553	-	316	(655)	(282)	-	-	-
Mineração Rio do Norte S.A.	Bauxite	40.00	40.00	-	367	(29)	(7)	58	-	45	-
MRS Logística S.A.	Logistics	48.16	46.75	2,334	2,069	394	185	196	49	115	120
VLI S.A.	Logistics	29.60	29.60	2,278	2,495	(218)	(88)	1	-	8	37
Others	Others	-	-	374	372	16	15	(3)	5	2	-
Abroad											
California Steel Industries, Inc.	Steel	50.00	50.00	-	1,218	1,226	(31)	88	462	-	117
Others		-	-	115	194	11	(34)	(4)	-	3	1
Total Consolidated investment				9,771	10,557	2,653	(329)	970	1,043	904	1,423
Parent Company's total investment				143,640	181,319	16,382	11,114	(5,799)	20,989	3,067	4,114

The amounts of the investments by segments are presented in note 4(b).

Notes to the Financial Statements

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a) Changes in the year

	Consolidated		Parent Company	
	2021	2020	2021	2020
Balance at January 1,	10,557	11,278	181,319	144,594
Additions and capitalizations (i)	237	657	899	2,719
Equity results in income statement	2,653	(329)	16,382	11,114
Dividends declared	(1,238)	(639)	(2,752)	(3,982)
Translation adjustment	138	375	(18,216)	30,828
Capital reduction of foreign subsidiary (note 2g)	-	-	(17,109)	-
Reduction of investment in VLI	-	(676)	-	(676)
Share buyback programs (note 30)	-	-	(13,547)	-
Mergers	-	-	(3,547)	(2,105)
Transfer the equity results to discontinued operations (note 16a)	(144)	(226)	-	-
Transfer of CSI to assets held for sale (nota 16c)	(2,131)	-	-	-
Others	(301)	117	211	(1,173)
Balance at December 31,	9,771	10,557	143,640	181,319

(i) Refers mainly to the capital increase of Companhia Siderúrgica do Pecém. In 2020, at the Parent Company refers to non-cash additions related to loan capitalization of Ferrous Resources Limited in the amount of R\$476 (US\$92 million).

Capital reduction in a foreign subsidiary – In December 2021, the Company approved a capital reduction in the amount of R\$17,109 (US\$3,000 million) in VISA. Therefore, in accordance with the Company's accounting policy for transactions of such nature (note 2), the capital reduction was characterized as a partial disposal, generating a gain of R\$13,634 (US\$2,413 million) related to the reclassification of the cumulative translation adjustments of this investment, recorded in the stockholders' equity to the income statement for year ended December 31, 2021, presented as "Other financial items, net" (note 6).

Call options exercised on VLI shares – In December 2020, BNDES Participações S.A. ("BNDESPar") exercised all its options included in the Call Option Purchase Agreement for share issued by VLI S.A. ("VLI"). In this agreement, options were granted to BNDESPar to purchase shares of VLI held by Vale of up to 8% of VLI's equity.

With the exercise of this option, Vale received R\$1,223 (US\$241 million) for an 8% stake in VLI, and now holds 29.6% of VLI's total shares, resulting in a gain of R\$885 (US\$172 million), recognized in the income statement for the year ended December 31, 2020 as "Equity results and other results in associates and joint ventures".

Merger of subsidiaries – The Parent Company merged the following companies: (i) on April 30, 2021, the Company approved the merger of the spun-off net assets of Minerações Brasileiras Reunidas S.A. and the full merger of Companhia Paulista de Ferroligas and Valesul Alumínio S.A.; and (ii) on April 30, 2020, the General Shareholders' Meeting approved the merger of the wholly-owned subsidiary Ferrous Resources do Brasil S.A. The mergers took place without the issuance of new shares or change in the Vale's share capital.

b) Acquisitions and divestitures

Vale Shipping Holding Pte. Ltd ("VSH") - In October 2021, the Company approved the liquidation of VSH, its wholly-owned subsidiary that owned and operated the Company's vessels. In November 2021, VSH made a repayment of capital to VISA and, as a result, the Company reclassified the total of R\$4,284 (US\$771 million) arising from the cumulative translation adjustments that was recorded in the Company stockholders' equity to the income statement for the year ended December 31, 2021, presented as "Other financial items, net" (note 6).

Vale Nouvelle-Calédonie S.A.S. ("VNC") – In December 2020, the Company signed a binding put option agreement to sell its interest in VNC for an immaterial consideration to Prony Resources consortium. Under the terms of agreement, the Company has assumed an obligation to pay to the buyers an amount of R\$2,573 (US\$500 million) upon closing of the transaction and this amount has been provided for as at December 31, 2020.

In March 2021, the Company signed the share purchase and sale agreement with Prony Resources, concluding the transaction to sell its interest in VNC. With the final agreement, the Company disbursed R\$3,134 (US\$555 million) to VNC on the closing of the transaction, which combined with other working capital adjustments, resulted in an additional loss in the amount of R\$549 (US\$98 million), presented as "Impairment and write-off of non-current assets" in income statement for the year ended December 31, 2021.

The agreement also established that Vale has an offtake agreement to purchase a certain amount of VNC's annual nickel production with a cap price over a period of 13 years. Such cap included in the contract is an embedded derivative. However, it is deemed closely

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related to the host contract (nickel supply agreement) because the cap was out of the money on inception of the contract. Therefore, this derivative will not be separated from the host contract, which will be accounted for as an executory contract.

Upon closing of the transaction, the Company also recognized a gain of R\$6,391 (US\$1,132 million) arising from the accumulated exchange differences reclassified from the stockholders' equity to the income statement under "Other financial items, net".

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 R\$1,560 (US\$278 million). This transaction with non-controlling interests resulted in a loss of R\$1,012 (US\$179 million), which was recognized in the 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 R\$843 (US\$156 million). Therefore, this investment was classified as held for sale and an impairment of R\$630 (US\$163 million) 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 conditions precedent of the agreement were concluded and the Company received the total amount agreed at the closing of the transaction.

Following the conclusion of the transaction, the Company recorded a gain of R\$598 (US\$116 million) due to the recycling of the cumulative translation adjustments to the income statement, which was recorded in the income statement for the year ended December 31, 2020 as "Equity results and other results in associates and joint ventures".

Minerações Brasileiras Reunidas S.A. ("MBR") - In December 2019, the Company purchased an additional 36.4% interest in MBR held by its related party, for the total consideration of R\$3,309 (US\$823 million). 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 R\$1,410 (US\$350 million) 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 R\$592 (US\$104 million), therefore, the Company holds 100% of MBR's share capital.

New Steel Global N.V. ("New Steel") - In January 2019, the Company acquired 100% of the share capital of New Steel and gained its control for the total cash consideration of R\$1,884 (US\$496 million). 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 (note 17). On February 24, 2022 (subsequent event), the Company's Board of Directors approved the proposed recommendation to the General Meeting for the merger of New Steel into Vale S.A.

Ferrous Resources Limited ("Ferrous") - In August 2019 the Company acquired 100% of the share capital of Ferrous, a company that owned iron ore mines nearby some of the Company's operations in the states of Minas Gerais, Brazil for cash consideration of R\$1,629 (US\$525 million). Ferrous has been acquired to gain access to additional reserves for the Company. At the General Shareholders' Meeting in 2020, its main wholly-owned subsidiary Ferrous Resources do Brasil S.A. was merged into Vale S.A.

Project West III - 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 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 R\$600 (US\$110 million) to R\$900 (US\$160 million). The construction of the project will start after both parties obtain the anti-trust and other regulatory approvals in China and is expected to last 3 years.

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c) Financial guarantees

As of December 31, 2021 and 2020, the total guarantees granted by the Company (within the limit of its direct or indirect interest) for certain associates and joint ventures totaled R\$8,443 (US\$1,513 million) and R\$8,091 (US\$1,557 million), respectively. The fair value of the financial guarantees as of December 31, 2021 and 2020 totaled R\$3,026 (US\$542 million) and R\$4,558 (US\$877 million), respectively, and is recorded in the balance sheet as "Other non-current liabilities".

d) 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 reported herein, which is prepared considering Vale's accounting policies. The summarized financial information about Samarco is presented in note 25.

	December 31, 2021					
	Aliança Geração de Energia	Aliança Norte Energia	CSP (i)	Pelletizing plants (ii)	MRS Logística	VLI S.A.
Current assets	624	-	3,157	2,369	2,776	2,759
Non-current assets	4,600	1,149	14,596	1,489	10,660	19,814
Total assets	5,224	1,149	17,753	3,858	13,436	22,573
Current liabilities	257	-	2,443	926	2,495	3,239
Non-current liabilities	1,247	-	14,205	3	6,094	11,637
Total liabilities	1,504	-	16,648	929	8,589	14,876
Stockholders' equity	3,720	1,149	1,105	2,929	4,847	7,697
Net revenue	1,000	-	12,097	2,138	4,427	5,981
Net income (loss)	504	(39)	4,681	1,342	818	(736)

	December 31, 2020							
	Aliança Geração de Energia	Aliança Norte Energia	CSI	CSP (i)	Pelletizing plants (ii)	MRS Logística	Nacala Corridor Holding Netherlands (i)	VLI S.A.
Current assets	718	1	1,746	1,799	1,560	2,139	2,724	3,192
Non-current assets	3,696	1,189	1,786	11,612	1,339	8,842	22,603	19,421
Total assets	4,414	1,189	3,533	13,411	2,899	10,981	25,326	22,614
Current liabilities	250	-	330	3,829	278	2,020	2,976	3,153
Non-current liabilities	694	1	767	13,631	4	4,665	24,343	11,030
Total liabilities	944	1	1,097	17,460	282	6,685	27,318	14,183
Stockholders' equity (negative reserves)	3,470	1,188	2,436	(4,049)	2,617	4,296	(1,992)	8,431
Net revenue	958	-	3,432	6,067	534	3,302	3,151	5,214
Net income (loss)	255	(78)	(62)	(4,305)	367	385	(451)	(236)

(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) Aggregated entities: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, and Companhia Nipo-Brasileira de Pelotização.

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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 financial statements of those entities may differ from the financial information reported herein, which is prepared considering Vale's accounting policies.

	December 31, 2021				
	PTVI	Vale Moçambique	Vale Oman Pelletizing	Others	Total
Current assets	4,300	2,348	512	-	-
Non-current assets	10,462	1,085	3,534	-	-
Related parties – Stockholders	459	32	139	-	-
Total assets	15,221	3,465	4,185	-	-
Current liabilities	972	1,251	548	-	-
Non-current liabilities	388	415	875	-	-
Related parties – Stockholders	-	67,364	1,651	-	-
Total liabilities	1,360	69,030	3,074	-	-
Stockholders' equity (negative reserves)	13,861	(65,565)	1,111	-	-
Equity (negative reserves) attributable to noncontrolling interests	7,715	(3,278)	333	(115)	4,655
Net income	1,083	1,537	148	-	-
Net income (loss) attributable to noncontrolling interests	603	(475)	44	(57)	115
Dividends paid to noncontrolling interests	98	-	77	-	175

	December 31, 2020					
	PTVI	VNC	Vale Moçambique	Vale Oman Pelletizing	Others	Total
Current assets	3,090	11	1,827	304	-	-
Non-current assets	9,773	-	868	3,377	-	-
Related parties - Stockholders	318	256	151	243	-	-
Total assets	13,181	267	2,846	3,924	-	-
Current liabilities	844	3	1,766	191	-	-
Non-current liabilities	273	2	510	1,028	-	-
Related parties - Stockholders	-	1,458	63,323	1,691	-	-
Total liabilities	1,117	1,463	65,599	2,910	-	-
Stockholders' equity (negative reserves)	12,064	(1,196)	(62,753)	1,014	-	-
Equity (negative reserves) attributable to noncontrolling interests	6,715	(60)	(12,111)	304	353	(4,799)
Net income (loss)	443	(3,504)	(9,347)	101	-	-
Net income (loss) attributable to noncontrolling interests	184	(175)	(1,799)	30	(50)	(1,810)
Dividends paid to noncontrolling interests	-	-	-	72	-	72

	December 31, 2019					
	PTVI	VNC	Vale Moçambique	Vale Oman Pelletizing	Others (i)	Total
Net income (loss)	286	(8,353)	(12,852)	47	-	-
Net income (loss) attributable to noncontrolling interests	117	(418)	(2,474)	14	736	(2,025)
Dividends paid to noncontrolling interests	-	-	-	84	611	695

(i) Dividends paid to noncontrolling interests refers to Minerações Brasileiras Reunidas.

Accounting policy

Subsidiaries – The Company consolidates all entities over which it has control, that is, when: (i) the Company is exposed or has rights over variable returns from its involvement with the investee; and (ii) has the ability to direct the investee's significant activities. Subsidiaries are fully consolidated from the date on which control is transferred to the Company. Consolidation is interrupted from the date on which the Company ceases to have control.

Transactions with noncontrolling interests – 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 the Company’s stockholders. For purchases or disposals of non-controlling interests, the difference between the consideration paid and the book value of the acquired portion of the subsidiary’s net assets is recorded directly in equity under “Acquisitions and disposals of non-controlling interests”.

Loss of control – When the Company ceases to have control, any interest retained in the entity is remeasured at its fair value, with the change in the carrying amount recognized in profit or loss. Amounts previously recognized in other comprehensive income are reclassified to the income statement.

Investments in associates and joint arrangements – Associates are all entities over which the Company has significant influence, but not control, generally through an equity interest of 20% to 50% of the voting rights. If the equity interest in the associate is reduced, but significant influence is retained, only a proportionate portion of the amounts previously recognized in other comprehensive income will be reclassified to profit or loss, when appropriate. Dilution gains and losses, incurred on interests in associates, are recognized in the income statement.

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. Accordingly, the assets, liabilities, income and expenses related to the joint operation are recorded individually in the financial statements.

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.

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 has 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.

16. Non-current assets and liabilities held for sales and discontinued operations

	December 31, 2021			
	Coal (Discontinued operation)	Manganese	Other assets	Total
Assets				
Accounts receivable	2	59	-	61
Inventories	933	66	-	999
Taxes	2,031	95	-	2,126
Investments	-	-	2,131	2,131
Other assets	112	4	35	151
Total assets	3,078	224	2,166	5,468
Liabilities				
Suppliers and contractors	613	54	-	667
Other liabilities	1,292	19	-	1,311
Total liabilities	1,905	73	-	1,978
Net non-current assets held for sale	1,173	151	2,166	3,490

a) Coal (Discontinued operation)

The Company has metallurgical and thermal coal mining and processing operations in Vale Moçambique S.A. ("Vale Moçambique") which is a company controlled by Vale, with a non-controlling interest held by Mitsui & Co. Ltd. ("Mitsui"). Coal products are transported from the Moatize mine to the maritime terminal by the Nacala Logistics Corridor ("NLC"), which was a joint venture between Vale and Mitsui. The NLC's main assets are the railways and port concessions located in Mozambique and Malawi.

As part of the sustainable mining strategic agenda, the Company announced in 2021 its intention to divest from coal assets. To achieve this objective, it was necessary to carry out the corporate reorganization through the acquisition of the interests held by Mitsui in these assets, which, upon completion, allowed the Company to reach an agreement with Vulcan Minerals ("Vulcan") in December 2021, for the sale of all coal assets. Following the signing of the agreement, the Company started to treat coal as a discontinued operation. Below is a summary of the main events:

(a.i) Acquisition of non-controlling interest in Vale Moçambique

On June 22, 2021, the Company acquired 15% interest held by Mitsui in Vale Moçambique for an immaterial consideration, which resulted in a loss of R\$1,666 (US\$331 million) due to the negative reserves of Vale Moçambique at the conclusion of the transaction. This transaction with non-controlling interests was recognized in the Stockholders' Equity as "Acquisition and disposal of non-controlling interest". After the acquisition of the interests previously held by Mitsui, the Company holds 95% of the share capital of Vale Moçambique and the remaining interest is held by the government of Mozambique.

(a.ii) Business combinations – NLC

Also on June 22, 2021, the Company concluded the acquisition of NLC's control through the disbursement of R\$12,665 (US\$2,517 million) to settle NLC's loans with third parties ("Project Finance"), satisfying all conditions for acquiring the additional 50% held by Mitsui. Therefore, the Company started consolidating the NLC's assets and liabilities on its balance sheet.

In addition, the Company has updated the discounted cash flow model to assess the fair value of the acquired business, resulting in a loss of R\$3,880 (US\$771 million) on the fair value of the loans receivable from NLC, mainly due to the decrease in the long-term price assumption for both metallurgical and thermal coal as well as the reduction in the expected production to reflect the operational challenges to reach the ramp-up of the coal business, after the revamp of the processing plants. The cash flows were discounted at a rate of 11.6%, and the loss was recognized as "Impairment and disposals of non-current assets" in the net income from discontinued operations for the year ended December 31, 2021.

The fair values of identifiable assets acquired, and liabilities assumed as a result of the NLC's acquisition were as follows:

	June 22, 2021
Acquired assets	
Cash and cash equivalents	865
Inventory, recoverable tax and other assets	2,128
Intangible	11,166
Property, plant and equipment	6,858
Assumed liabilities	(795)
Net identifiable assets acquired	20,223
Fair value adjustments (i)	(8,001)
Total identifiable net assets at fair value	12,222
Pre-existing relation (Loans receivable from NLC)	4,322
Loss on pre-existing relation	(3,880)
	12,665
Cash consideration	12,665
(-) Balances acquired	
Cash and cash equivalents	865
Net cash outflow	11,800

(i) Of this amount, R\$2,218 (US\$441 million) was allocated to property, plant, and equipment and R\$3,978 (US\$791 million) was allocated to intangible and the remaining amount was allocated to other assets.

(a.iii) Fair value adjustments

Following the decision to divest from the coal segment, the Company initiated interactions with potential interested parties in acquiring these assets, and the negotiations that were underway at the time, resulted in the decision to provision in full the book value of these assets, mainly due to the difficulties to prove the expected productivity levels of metallurgical coal and thermal coal, due to the delays that occurred to implement the mining plan and the strategy for the plant to reach the ramp-up of the asset due to the travel and transportation restrictions of equipment resulting from the pandemic of COVID-19. The Company recorded the impact of R\$13,298 (US\$2,511 million) in the net income from discontinued operations for the year ended December 31, 2021, presented as "Impairment and disposal of non-current assets".

(a.iv) Binding agreement with Vulcan Minerals ("Vulcan")

On December 21, 2021, the Company signed a binding agreement with Vulcan, a private company part of the mining group Jindal. The agreement establishes that Vale will receive R\$1,507 (US\$270 million) for the coal net assets and it is not expected that there will be a material impact on the income statement at the time of the transaction, as the value of the net coal assets approximates the consideration that will be received by the Company. The agreement also establishes a variable royalty consideration with a term of 10 years subject to certain conditions of production volume of coal. Due to the nature and uncertainties related to the measurement of these royalties, gains will be recognized as incurred.

In addition, upon closing the transaction, expected for the first half of 2022, the Company will recognize in the income statement a gain of approximately R\$12,000 (US\$2,150 million) related to the reclassification of cumulative translation adjustments included the NCI disposal presented in note 15.

The closing of the transaction is subject to the satisfaction of customary conditions precedent, including the approval of the Ministry of Mineral Resources and Energy of Mozambique pursuant to the Mining Law No. 20/2014, and the approval of the Government of Mozambique pursuant to the Concession Agreements for the change of control and antitrust.

(a.v) Net income and cash flows from discontinued operations

	Consolidated		
	Year ended December 31,		
	2021	2020	2019
Net income from discontinued operations			
Net operating revenue	5,877	2,431	4,005
Cost of goods sold and services rendered	(7,504)	(7,619)	(7,399)
Operating expenses	(180)	(224)	(118)
Impairment and disposals of non-current assets	(17,178)	(4,851)	(6,949)
Operating income (loss)	(18,985)	(10,263)	(10,461)
Financial Results, net	2,309	12	(71)
Equity results in associates and joint ventures	(144)	(226)	(99)
Loss before income taxes	(16,820)	(10,477)	(10,631)
Income taxes	4,336	1,602	-
Loss from discontinued operations	(12,484)	(8,875)	(10,631)
Loss attributable to noncontrolling interests	(476)	(1,799)	(2,474)
Loss attributable to Vale's stockholders	(12,008)	(7,076)	(8,157)

Reclassification of cumulative translation adjustments

Simultaneously, due to the classification of the coal segment as a discontinued operation, the Company concluded that its Australian subsidiaries (also part of the coal segment), which were no longer operational, were considered "abandoned" for the purposes of applying IAS 21 - *The Effects of Changes in Foreign Exchange Rates* and, consequently, the Company recognized a gain arising from the cumulative translation adjustments in the amount of R\$2,134 (US\$424 million), which was reclassified to the net income from discontinued operations, as "Other financial items, net".

	Consolidated		
	Year ended December 31,		
	2021	2020	2019
Cash flow from discontinued operations			
Operating activities			
Loss before income taxes	(16,820)	(10,477)	(10,631)
Adjustments:			
Equity results in associates and joint ventures	144	226	99
Depreciation, amortization and depletion	359	82	937
Impairment and disposals of non-current assets	17,178	4,851	6,949
Financial Results, net	(2,309)	(12)	71
Increase (decrease) in assets and liabilities	(284)	(132)	27
Net cash provided by operating activities	(1,732)	(5,462)	(2,548)
Investing activities			
Additions to property, plant and equipment	(1,056)	(1,007)	(952)
Acquisition of NLC, net of cash	(11,800)	-	-
Others	380	338	478
Net cash provided (used) in investing activities	(12,476)	(669)	(474)
Financing activities			
Payments	(72)	(78)	(55)
Net cash used in financing activities	(72)	(78)	(55)
Net cash provided (used) by discontinued operations	(14,280)	(6,209)	(3,077)

b) Manganese ferroalloys operations in Minas Gerais

In September 2021, the Company signed an agreement to sell certain assets and liabilities located in the state of Minas Gerais, which are part of Vale Manganês S.A. and relates to the manganese ferroalloys business, for R\$223 (US\$40 million). Due to that agreement, those assets and liabilities were classified as “held for sale” and measured at fair value less costs of disposal, resulting in the recognition of an impairment loss of R\$143 (US\$25 million) recognized in the income statement as “Impairment and disposal of non-current assets” for the year ended December 31, 2021. The transaction was concluded in January 2022 (subsequent event) and will not have material impact in the income statement for the year 2022.

c) Other assets

In December 2021, the Company entered into a binding agreement with Nucor Corporation (“Nucor”) for the sale of its 50% interest in California Steel Industries, Inc (“CSI”). In February 2022 (subsequent event), the Company concluded the sale and transferred its 50% interest in CSI for the total amount of R\$2,440 (US\$437 million). Upon completion of the transaction the Company will record a gain of approximately R\$1,200 (US\$218 million) in income statement for the year ending December 31, 2022, of which R\$309 (US\$57 million) relates to a gain from the sale and R\$891 (US\$161 million) is due the reclassification of the cumulative translation adjustments from the stockholders’ equity to the income statement.

Accounting policy

Business combinations - 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 operations - 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.

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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.

17. Intangibles

	Consolidated					
	Goodwill	Concessions	Contract right	Software	Research and development project and patents	Total
Balance at December 31, 2019	14,628	16,005	563	304	2,757	34,257
Additions	-	12,955	-	148	-	13,103
Disposals	-	(36)	(694)	(1)	-	(731)
Amortization	-	(909)	(6)	(120)	-	(1,035)
Translation adjustment	2,513	-	137	65	-	2,715
Balance at December 31, 2020	17,141	28,015	-	396	2,757	48,309
Cost	17,141	33,220	531	3,861	2,757	57,510
Accumulated amortization	-	(5,205)	(531)	(3,465)	-	(9,201)
Balance at December 31, 2020	17,141	28,015	-	396	2,757	48,309
Additions	-	2,442	-	257	-	2,699
Disposals	-	(40)	-	-	(3)	(43)
Amortization	-	(1,288)	-	(189)	-	(1,477)
Acquisition of NLC (note 16)	-	7,188	-	-	-	7,188
Impairment of discontinued operations (note 16)	-	(7,510)	-	-	-	(7,510)
Translation adjustment	764	342	-	15	-	1,121
Balance at December 31, 2021	17,905	29,149	-	479	2,754	50,287
Cost	17,905	35,338	-	2,882	2,754	58,879
Accumulated amortization	-	(6,189)	-	(2,403)	-	(8,592)
Balance at December 31, 2021	17,905	29,149	-	479	2,754	50,287

	Parent Company				
	Concessions	Contract right	Software		Total
Balance at December 31, 2019	15,993	99	179		16,271
Additions	12,955	-	104		13,059
Disposals	(36)	(94)	(1)		(131)
Amortization	(909)	(5)	(59)		(973)
Merger of Ferrous Resources do Brasil	12	-	5		17
Balance at December 31, 2020	28,015	-	228		28,243
Cost	33,220	130	2,618		35,968
Accumulated amortization	(5,205)	(130)	(2,390)		(7,725)
Balance at December 31, 2020	28,015	-	228		28,243
Additions	2,355	-	147		2,502
Disposals	(59)	-	-		(59)
Amortization	(1,162)	-	(84)		(1,246)
Balance at December 31, 2021	29,149	-	291		29,440
Cost	35,338	-	1,471		36,809
Accumulated amortization	(6,189)	-	(1,180)		(7,369)
Balance at December 31, 2021	29,149	-	291		29,440

a) Concessions – Substantially refers to EFC and EFVM operating concession agreements (note 14).

b) Goodwill – Includes the goodwill derived from 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 of 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. Annually, the Company assesses the impairment of this asset, or more frequently when an indication of impairment is identified (note 19).

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c) 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) acquired in 2019. The intangible assets of research and development are not subject to amortization until the operational phase is reached. Thus, the Company annually assesses the impairment of this asset, or more frequently when an indication of impairment is identified (note 19).

Accounting policy

Intangibles are carried at acquisition cost, net of accumulated amortization and impairment charges.

The estimated useful lives are as follows:

	Useful life
Railway concessions	5 to 37 years
Contract right	22 to 31 years
Software	5 years

18. Property, plant and equipment

	Consolidated								
	Building and land	Facilities	Equipment	Mineral properties	Railway equipment	Right of use assets	Others	Constructions in progress	Total
Balance at December 31, 2019	43,137	38,713	22,921	33,302	13,063	6,819	12,138	17,640	187,733
Additions (i)	-	-	-	-	-	646	-	21,528	22,174
Disposals	(75)	(504)	(39)	(64)	(29)	-	(39)	(436)	(1,186)
Assets retirement obligation	-	-	-	2,931	-	-	-	-	2,931
Depreciation, depletion and amortization	(2,245)	(2,384)	(3,726)	(2,344)	(936)	(875)	(1,489)	-	(13,999)
Impairment (note 19)	(729)	(904)	(124)	(458)	-	(2)	(434)	(799)	(3,450)
Transfer to assets held for sale	(178)	(648)	(17)	(324)	-	(1)	(9)	(526)	(1,703)
Translation adjustment	3,578	2,642	3,672	7,016	74	1,534	1,529	1,291	21,336
Transfers	1,158	2,533	2,950	1,794	936	-	1,272	(10,643)	-
Balance at December 31, 2020	44,646	39,448	25,637	41,853	13,108	8,121	12,968	28,055	213,836
Cost	78,653	60,750	55,500	88,716	20,022	10,216	30,627	28,055	372,539
Accumulated depreciation	(34,007)	(21,302)	(29,863)	(46,863)	(6,914)	(2,095)	(17,659)	-	(158,703)
Balance at December 31, 2020	44,646	39,448	25,637	41,853	13,108	8,121	12,968	28,055	213,836
Additions (i)	-	-	-	-	-	1,014	-	28,768	29,782
Disposals	(77)	(171)	(367)	(11)	(49)	-	(26)	(343)	(1,044)
Assets retirement obligation	-	-	-	318	-	-	-	-	318
Depreciation, depletion and amortization	(2,355)	(2,562)	(3,587)	(2,445)	(890)	(938)	(1,435)	-	(14,212)
Acquisition of NLC (note 16)	1,185	663	515	-	1,640	167	10	460	4,640
Impairment (note 19)	(61)	(37)	(66)	(119)	-	(75)	(33)	(336)	(727)
Impairment of discontinued operations (note 16)	(1,221)	(604)	(451)	-	(1,673)	(172)	(20)	(1,647)	(5,788)
Transfers to assets held for sale (note 16)	(10)	(2)	(8)	-	-	-	(1)	(14)	(35)
Translation adjustment	1,036	591	1,201	2,215	59	462	389	1,272	7,225
Transfers	2,265	3,031	3,589	1,395	829	-	2,012	(13,121)	-
Balance at December 31, 2021	45,408	40,357	26,463	43,206	13,024	8,579	13,864	43,094	233,995
Cost	83,358	64,508	60,099	95,072	20,741	11,240	30,526	43,094	408,638
Accumulated depreciation	(37,950)	(24,151)	(33,636)	(51,866)	(7,717)	(2,661)	(16,662)	-	(174,643)
Balance at December 31, 2021	45,408	40,357	26,463	43,206	13,024	8,579	13,864	43,094	233,995

(i) Includes capitalized interests.

	Parent Company								
	Building and land	Facilities	Equipment	Mineral properties	Railway equipment	Right of use assets	Others	Constructions in progress	Total
Balance at December 31, 2019	28,352	30,220	10,213	7,153	12,766	2,114	6,841	8,216	105,875
Additions (i)	-	-	-	-	-	348	-	10,700	11,048
Disposals	(49)	(424)	(20)	-	(29)	-	13	(117)	(626)
Assets retirement obligation	-	-	-	227	-	-	-	-	227
Depreciation, depletion and amortization	(1,234)	(1,637)	(1,424)	(490)	(904)	(350)	(1,087)	-	(7,126)
Merger	679	325	73	990	1	3	5	(136)	1,940
Transfers	551	2,083	1,390	1,136	879	-	1,293	(7,332)	-
Balance at December 31, 2020	28,299	30,567	10,232	9,016	12,713	2,115	7,065	11,331	111,338
Cost	37,516	41,631	19,890	12,124	19,162	2,773	15,631	11,331	160,058
Accumulated depreciation	(9,217)	(11,064)	(9,658)	(3,108)	(6,449)	(658)	(8,566)	-	(48,720)
Balance at December 31, 2020	28,299	30,567	10,232	9,016	12,713	2,115	7,065	11,331	111,338
Additions (i)	-	-	-	-	-	769	-	17,874	18,643
Disposals	(16)	(52)	(38)	-	(52)	(1,025)	(18)	(296)	(1,497)
Assets retirement obligation	-	-	-	(200)	-	-	-	-	(200)
Depreciation, depletion and amortization	(1,365)	(1,665)	(1,568)	(696)	(791)	(200)	(1,099)	-	(7,384)
Merger os subsidiaries (note 15)	434	293	277	641	25	-	104	1,320	3,094
Transfers held for sale (note 16)	(10)	(2)	(8)	-	-	-	(1)	(14)	(35)
Transfers	1,893	2,317	2,293	475	758	-	1,492	(9,228)	-
Balance at December 31, 2021	29,235	31,458	11,188	9,236	12,653	1,659	7,543	20,987	123,959
Cost	41,567	45,178	22,866	13,318	19,920	2,517	17,003	20,987	183,356
Accumulated depreciation	(12,332)	(13,720)	(11,678)	(4,082)	(7,267)	(858)	(9,460)	-	(59,397)
Balance at December 31, 2021	29,235	31,458	11,188	9,236	12,653	1,659	7,543	20,987	123,959

(i) Includes capitalized interests.

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The additions in the year mainly refer to: (i) Salobo III project, expansion of the Voisey's Bay mine and Serra Sul 120 Mtpy project; (ii) start of execution of the Capanema (ferrous) and Sol do Cerrado (solar energy) project; and (iii) higher expenses in the Coal business.

Right-of-use assets (leases)

	December 31, 2020	Additions and contract modifications	Impairment	Impairment of discontinued operations (note 16a)	Depreciation	Translation adjustment	December 31, 2021
Ports	3,732	170	(75)	-	(257)	227	3,797
Vessels	2,779	-	-	-	(232)	197	2,744
Pelletizing plants	683	723	-	-	(203)	-	1,203
Properties	579	40	-	-	(151)	-	468
Energy plants	287	2	-	-	(36)	18	271
Mining equipment and locomotives	61	246	-	(172)	(59)	20	96
Total	8,121	1,181	(75)	(172)	(938)	462	8,579

Lease liabilities are presented in note 23.

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
Locomotives	12 to 25 years
Wagons	30 to 45 years
Railway equipment	5 to 37 years
Vessels	20 to 25 years
Others	2 to 50 years

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 23.

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.

19. Impairment and onerous contracts

The impairment losses recognized in the year are presented below:

	Income statement		
	2021	2020	2019
			Impairment
Segments by class of assets			
Base metals – Nickel	549	4,728	10,319
Manganese	192	412	-
Other assets	535	681	487
Impairment of non-current assets	1,276	5,821	10,806
Onerous contracts	100	-	987
Disposals of non-current assets	976	1,147	2,020
Impairment and disposals of non-current assets	2,352	6,968	13,813

a) Impairment of 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.

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 – The New Caledonia operation faced difficulties throughout 2019, mainly in relation to the production and processing of refined nickel, associated with the challenges resulting from the remote location of this asset. Therefore, the Company initiated studies of alternatives for New Caledonia, considering operational and commercial alternatives to improve Vale Nova Caledonia’s short-term cash flows. Based on the review of the business plans carried out in 2019, the Company reduced the expected production levels of refined nickel products for the remaining useful life of the mine, resulting in an impairment of R\$10,319 (US\$2,511 million) recognized as at December 31, 2019.

Based on the operational difficulties faced by VNC, in 2020, the Company started a program for the sale of this asset. As a result of negotiations with interested parties, VNC’s assets and liabilities were classified as “held for sale” and measured at fair value less cost to sell, resulting in the recognition of an impairment of R\$4,728 (US\$882 million) in the income statement for the year ended December 31 2020, mainly due to the need for financing for the continuity of VNC’s operations, including the commitment to make investments for the conversion of the tailings deposit from wet stacking to dry stacking (“Project Lucy”), which were estimated in the amount of R\$2,820 (US\$500 million).

In March 2021, the Company signed the share purchase and sale agreement with Prony Resources, concluding the transaction for the sale of its interest in VNC (note 15). Under the terms of the definitive agreement, there was an increase in the value of the obligations assumed by Vale for the maintenance of VNC’s activities, which, combined with other adjustments in working capital, resulted in an additional loss of R\$549 (US\$98 million) in the income for the year ended December 31, 2021.

Ferrous Minerals

Manganese ferroalloys operations in Minas Gerais – In September 2021, the Company signed an agreement to sell certain assets and liabilities located in the state of Minas Gerais, which are part of Vale Manganês S.A. (“Vale Manganês”) and relates to the manganese ferroalloys business, for R\$223 (US\$40 million). Thus, those assets and liabilities were classified as “held for sale” and measured at fair value less costs of disposal, resulting in the recognition of an impairment of R\$143 (US\$25 million) recognized in the income statement as “Impairment and disposal of non-current assets” for the year ended December 31, 2021 (note 16).

Simões Filho, Ferroalloys of Manganese - In 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 business and produced manganese ferroalloys. The Company tested this CGU for impairment, resulting in full impairment of inventories and other assets related to the Simões Filho plant, and provision for

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closure of the site. As a result, the Company recognized an impairment of R\$412 (US\$76 million) as “Impairment and disposals of non-current assets” for the year ended December 31, 2020. In 2021, the Company recognized an additional loss of R\$49 (US\$10 million) due to the review of the recoverability of the remaining obligations to close the operations, recorded in the income statement for the year ended December 31, 2021, as “Impairment and disposals of non-current assets”.

b) Onerous contract

In 2021, 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 R\$100 (US\$18 million) in relation to the costs of certain long-term contracts, with minimum guaranteed volume for fluvial transportation and port structure. In 2019, this review resulted in an additional provision of R\$987 (US\$240 million).

c) Impairment test for the goodwill

	Carrying amount	Discount rate	Period of cash flow projections
Ferrous mineral	7,133	4.4%	2051
Nickel	10,772	3.2% - 3.8%	2045
	17,905		

Goodwill, Iron ore and pellets - The Company recorded a goodwill related to the acquisition of Caemi Mineração e Metalurgia S.A., merged into Vale in 2006. In 2021, the Company did not identify changes in circumstances or indicatives that could result in a reduction of the recoverable value of the Iron ore and Pellets CGU. The Company did not identify losses on the goodwill impairment testing and based on the projected cash flows.

Goodwill, Nickel - In 2006, the Company recorded a goodwill related to the acquisition of Inco Limited, currently Vale Canada Limited, which is allocated to Nickel CGUs, which is tested annually. The impairment test of goodwill for 2021 carried out based on projected cash flows demonstrates that there were no losses in relation to the goodwill allocated to the Nickel business.

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.

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.

20. Financial and capital risk management

The Company is exposed to several financial and capital risk factors that may impact its performance and equity position. The evaluation of the exposure to financial and capital risks is performed periodically to support 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 of 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 monthly, allowing the monitoring of financial results and their impact on cash flow. The Company applies hedge accounting to its net investment in foreign operation and nickel, palladium and coal revenue programs.

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	Financial instruments and other financial liabilities that are not denominated in US\$	Swap and forward operations
Market risk - Interest rate	Loans and financing indexed to different interest rates including, but not limited to, LIBOR and CDI	Swap operations
Market risk - Product and input prices	Volatility of commodity and input prices	Forward operations and 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 options the Company generally uses the Black & Scholes model. In this model, the fair value of the derivative is

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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.

a.i) Effects of derivatives on the balance sheet

	Consolidated			
	Assets			
	December 31, 2021		December 31, 2020	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
IPCA swap	228	-	37	197
Eurobond's swap	-	-	-	13
Pre-dollar swap and forward transactions	112	46	-	46
Libor swap	6	62	-	-
	346	108	37	256
Commodities price risk				
Base metals products	156	2	158	-
Gasoil, Brent and freight	47	-	503	-
	203	2	661	-
Others	70	-	-	91
	70	-	-	91
Total	619	110	698	347

	Consolidated			
	Liabilities			
	December 31, 2021		December 31, 2020	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	842	2,453	576	2,724
IPCA swap	26	629	382	520
Eurobond's swap	-	-	19	-
Pre-dollar swap and forward transactions	321	213	324	303
Libor swap	-	6	5	31
	1,189	3,301	1,306	3,578
Commodities price risk				
Base metals products	149	-	242	-
Gasoil, Brent and freight	14	-	64	-
	163	-	306	-
Others	3	-	100	-
Total	1,355	3,301	1,712	3,578

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	Parent Company			
	December 31, 2021		December 31, 2020	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
IPCA swap	228	-	37	197
Pre-dollar swap and forward transactions	112	46	-	46
	340	46	37	243
Others	70	-	-	95
	70	-	-	95
Total	410	46	37	338

	Parent Company			
	December 31, 2021		December 31, 2020	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	532	2,200	493	2,253
IPCA swap	26	629	288	520
Pre-dollar swap and forward transactions	321	213	286	303
	879	3,042	1,067	3,076
Others	-	-	99	-
Total	879	3,042	1,166	3,076

a.ii) Net exposure

	Consolidated		Parent Company	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	(3,295)	(3,300)	(2,732)	(2,746)
IPCA swap	(427)	(668)	(427)	(574)
Eurobonds swap	-	(6)	-	-
Pre-dollar swap and forward (NDF)	(376)	(581)	(376)	(543)
Libor swap (i)	62	(36)	-	-
	(4,036)	(4,591)	(3,535)	(3,863)
Commodities price risk				
Base metals products	9	(84)	-	-
Gasoil, Brent and freight	33	439	-	-
	42	355	-	-
Others	67	(9)	70	(4)
	67	(9)	70	(4)
Total	(3,927)	(4,245)	(3,465)	(3,867)

(i) In March 2021, the UK Financial Conduct Authority ("FCA"), the financial regulator in the United Kingdom, announced the discontinuation of the LIBOR rate for all terms in pounds, euros, Swiss francs, yen and for terms of one week and two months in dollars at the end of December 2021 and the other terms at the end of June 2023. The Company has a multidisciplinary group dedicated to studying the rate transition and its potential impacts and is monitoring and advising various areas of Vale on the necessary initiatives.

a.iii) Effects of derivatives on the income statement

	Consolidated			Parent Company	
	Gain (loss) recognized in the income statement				
	Year ended December 31,				
	2021	2020	2019	2021	2020
Foreign exchange and interest rate risk					
CDI & TJLP vs. US\$ fixed and floating rate swap	(725)	(3,498)	(168)	(610)	(2,974)
IPCA swap	146	(1,259)	469	146	(1,223)
Eurobonds swap	(154)	182	(153)	-	-
Pre-dollar swap and forward transactions	(250)	(761)	6	(292)	(721)
Libor swap	92	(37)	-	-	-
	(891)	(5,373)	154	(756)	(4,918)
Commodities price risk					
Base metals products	(8)	58	222	-	-
Gasoil, Brent and freight	666	(496)	158	-	-
	658	(438)	380	-	-
Others	80	285	392	76	46
	80	285	392	76	46
Total	(153)	(5,526)	926	(680)	(4,872)

a.iv) Effects of derivatives on the cash flows

	Consolidated			Parent Company	
	Financial settlement inflows (outflows)				
	Year ended December 31,				
	2021	2020	2019	2021	2020
Foreign exchange and interest rate risk					
CDI & TJLP vs. US\$ fixed and floating rate swap	(770)	(737)	(1,536)	(624)	(625)
IPCA swap	(97)	1	(101)	-	-
Eurobonds swap	(162)	(24)	(19)	-	-
Pre-dollar swap and forward transactions	(459)	(251)	35	(459)	(251)
Libor swap	(8)	(2)	-	-	-
	(1,496)	(1,013)	(1,621)	(1,083)	(876)
Commodities price risk					
Base metals products	10	55	195	-	-
Gasoil, Brent and freight	1,096	(1,112)	12	-	-
	1,106	(1,057)	207	-	-
Others	-	327	79	-	-
Derivatives designated as cash flow hedge accounting					
Nickel	(371)	1,460	48	-	-
Palladium	26	3	-	-	-
Coal	(383)	-	-	-	-
	(728)	1,463	48	-	-
Total	(1,118)	(280)	(1,287)	(1,083)	(876)

a.v) Hedge accounting

	Consolidated			Parent Company	
	Gain (loss) recognized in the other comprehensive income				
	Year ended December 31,				
	2021	2020	2019	2021	2020
Net investments hedge	(646)	(2,732)	(324)	(646)	(2,732)
Cash flow hedge (Nickel and Palladium)	(47)	(631)	427	-	-

Net investment hedge - The Company uses hedge accounting for 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 United States dollars and euros serves as a hedge instrument for investments in these subsidiaries. In March 2021, the Company redeemed all its euro bonds (note 23). As a result, the amount of debt designated as a hedge instrument for this investment is R\$11,700 (US\$2,097 million) as at December 2021. 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, as "Translation adjustments".

Cash flow hedge (Nickel) - 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 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 to increase the Company's cash position as a result of the pandemic 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 program was renewed for 2022 mainly due to the high volatility of nickel prices linked to future cash flows forecast for the year.

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.

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Flow	Notional (ton)		Bought / Sold	Average strike (US\$/ton)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2021	December 31, 2020			December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	December 2022
Nickel Revenue Hedge Program									
Call options	-	58,620	S	-	-	(240)	(360)	-	-
Put options	-	58,620	B	-	-	143	-	-	-
Forward	39,575	-	S	20,008	(143)	-	-	127	(143)
Total					(143)	(97)	(360)	127	(143)

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)	Value at Risk	Fair value by year
	December 31, 2021	December 31, 2020			December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022
Palladium Revenue Hedge Program									
Call Options	44,228	7,200	S	3,370	(5)	(5)	(2)	11	(5)
Put Options	44,228	7,200	B	2,436	146	1	29	82	146
Total					141	(4)	27	93	141

Cash flow hedge (Metallurgical Coal) – To reduce the volatility of its cash flow as a result of fluctuations in metallurgical coal prices, in July 2021, the Company implemented a Metallurgical Coal Revenue Hedge Program. Under this program, hedge transactions were executed through forward contracts to protect a portion of the projected sales of this product at fluctuating prices that is highly probable to occur. Hedge accounting treatment is being given to the program. The contracts are traded over-the-counter and the cash settlement in/out results are offset by the protected items' loss/gain results due to metallurgical coal price variations. The program was liquidated in December 2021.

Flow	Notional (ton)		Buy / Sell	Fair value		Financial settlement Inflows (Outflows)	Risk Value	Fair Value by year
	December 31, 2021	December 31, 2020		December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022
Metallurgical Coal Revenue Hedge Program	-	-	S	-	-	(46)	-	-

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Cash flow hedge (Thermal Coal) – In order to reduce the volatility in thermal coal prices, the Company implemented in May 2021, the Thermal Coal Revenue Hedge Program. Under this program, hedge transactions were executed through forward contracts to protect a portion of the projected sales of this product at fluctuating prices. The program was liquidated in December 2021.

Flow	Notional (ton)			Fair Value		Financial settlement Inflows (Outflows)	Risk Value	Fair value by year
	December 31, 2021	December 31, 2020	Bought / Sold	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022
Thermal coal revenue Hedge Program								
New Castle	-	-	S	-	-	(231)	-	-
API4	-	-	S	-	-	(100)	-	-
Total				-	-	(331)	-	-

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 and other liabilities – mainly currency volatility. The hedges cover most of the debt denominated in Brazilian real. The Company uses swap and forward transactions to convert debt and financial obligations linked to Brazilian real into U.S. dollar, with volumes, flows and settlement dates similar to those of the debt instruments and financial obligations - 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 debt and financial obligations 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\$ 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. 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\$.

Flow	Notional				Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year		
	December 31, 2021	December 31, 2020	Index	Average rate	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022	2023	2024+
CDI vs. US\$ fixed rate swap											
Receivable	R\$ 8,142	R\$ 9,445	CDI	100.40%	(2,572)	(2,454)	(350)	224	(586)	(356)	(1,630)
Payable	US\$ 1,906	US\$ 2,213	Fix	2.54%							
TJLP vs. US\$ fixed rate swap											
Receivable	R\$ 1,192	R\$ 1,651	TJLP +	1.10%	(723)	(846)	(278)	35	(257)	(71)	(395)
Payable	US\$ 320	US\$ 460	Fix	3.19%							
R\$ fixed rate vs. US\$ fixed rate swap											
Receivable	R\$ 5,730	R\$ 2,512	Fix	3.82%	(354)	(575)	(499)	123	(294)	(31)	(29)
Payable	US\$ 1,084	US\$ 621	Fix	-1.58%							
IPCA vs. US\$ fixed rate swap											
Receivable	R\$ 1,508	R\$ 2,363	IPCA +	4.54%	(656)	(900)	(304)	47	(25)	(71)	(560)
Payable	US\$ 373	US\$ 622	Fix	3.88%							
IPCA vs. CDI swap											
Receivable	R\$ 769	R\$ 694	IPCA +	6.63%	228	232	35	1	228	-	-
Payable	R\$ 1,350	R\$ 550	CDI	98.76%							
EUR fixed rate vs. US\$ fixed rate swap											
Receivable	-	EUR 500	Fix	0.00%	-	(6)	(162)	-	-	-	-
Payable	-	US\$ 613	Fix	0.00%							
Forward	R\$ 6,013	R\$ 916	B	5.57	(22)	(6)	74	110	85	(51)	(56)

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				Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year		
	December 31, 2021	December 31, 2020	Index	Average rate	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022	2023	2024+
Libor vs. US\$ fixed rate swap											
Receivable	US\$ 950	US\$ 950	Libor	0.13%	62	(36)	(8)	11	4	46	12
Payable	US\$ 950	US\$ 950	Fix	0.48%							

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)	Value at Risk	Fair value by year
	December 31, 2021	December 31, 2020			December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022+
Brent crude oil (bbl)									
Call options	762,000	13,746,945	B	81	39	478	913	8	39
Put options	762,000	13,746,945	S	55	(14)	(59)	-	2	(14)
Forward Freight Agreement (days)									
Freight forwards (days)	330	1,625	B	23,650	8	23	158	2	8

Brent Crude Oil - 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 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.

d) Other derivatives, including embedded derivatives in contracts

Flow	Notional		Bought / Sold	Average strike (US\$/bbl)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value
	December 31, 2021	December 31, 2020			December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2021	2022+
Option related to a Special Purpose Entity "SPE" (quantity)									
Call option	137,751,623	137,751,623	B	3.12	70	95	-	11	70
Embedded derivative in natural gas purchase agreement (volume/month)									
Call options	729,571	746,667	S	233	(3)	-	16	4	(3)
Embedded derivative in raw material purchase contract (tons)									
Nickel forwards	4,269	1,497	S	19,817	-	9	-	13	-
Copper forwards	1,603	1,009	S	9,571	-	(1)	-	2	-
Minimum return guarantee on part of the stake in an associate sold to investment fund									
Put option	-	-	S	-	-	(99)	-	-	-
Fixed price sales protection (ton)									
Nickel forwards	342	-	B	16,284	8	-	8	1	8
Hedge program for products acquisition for resale (tons)									
Nickel forwards	1,206	-	S	20,055	(6)	-	3	4	(6)

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.

Embedded derivative in natural gas purchase agreement - 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.

Embedded derivative in raw material purchase contract - 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.

Minimum return guarantee on part of the stake in an associate sold to investment fund - 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.

Fixed price sales protection - The Company started an operational program to protect nickel sales at a fixed price, to convert to floating price commercial contracts with customers to maintain the Company's exposure to price fluctuations. The transactions usually carried out in this program are nickel purchases for future settlement.

Hedge program for products acquisition for resale - The Company started a hedge program with forward transactions with the objective of reducing the risk of price mismatch between the period of purchase and sale of products to third parties.

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, 2021
- 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

Instrument	Instrument's main risk events	Probable	Scenario I	Scenario II
CDI vs. US\$ fixed rate swap	R\$ depreciation	(2,572)	(5,274)	(7,976)
	US\$ interest rate inside Brazil decrease	(2,572)	(2,749)	(2,934)
	Brazilian interest rate increase	(2,572)	(2,775)	(2,982)
Protected item: R\$ denominated liabilities	R\$ depreciation	n.a.	-	-
TJLP vs. US\$ fixed rate swap	R\$ depreciation	(722)	(1,139)	(1,557)
	US\$ interest rate inside Brazil decrease	(722)	(739)	(757)
	Brazilian interest rate increase	(722)	(773)	(819)
	TJLP interest rate decrease	(722)	(752)	(783)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
R\$ fixed rate vs. US\$ fixed rate swap	R\$ depreciation	(354)	(1,810)	(3,265)
	US\$ interest rate inside Brazil decrease	(354)	(409)	(465)
	Brazilian interest rate increase	(354)	(572)	(774)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
IPCA swap vs. US\$ fixed rate swap	R\$ depreciation	(657)	(1,208)	(1,759)
	US\$ interest rate inside Brazil decrease	(657)	(694)	(734)
	Brazilian interest rate increase	(657)	(756)	(853)
	IPCA index decrease	(657)	(709)	(762)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
IPCA swap vs. CDI swap	Brazilian interest rate increase	228	215	203
	IPCA index decrease	228	221	215
Protected item: R\$ denominated debt linked to IPCA	IPCA index decrease	n.a.	(221)	(215)

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US\$ floating rate vs. US\$ fixed rate swap	US\$ Libor decrease	62	17	(28)
Protected item: Libor US\$ indexed debt	US\$ Libor decrease	n.a.	(17)	28
NDF BRL/USD	R\$ depreciation	(22)	(1,369)	(2,717)
	US\$ interest rate inside Brazil decrease	(22)	(59)	(97)
	Brazilian interest rate increase	(22)	(161)	(292)
Protected item: R\$ denominated liabilities	R\$ depreciation	n.a.	-	-

Instrument	Instrument's main risk events	Probable	Scenario I	Scenario II
Fuel oil protection				
Options	Price input decrease	25	(21)	(79)
Protected item: Part of costs linked to fuel oil prices	Price input decrease	n.a.	21	79
Forward Freight Agreement				
Forwards	Freight price decrease	8	(5)	(18)
Protected item: Part of costs linked to maritime freight prices	Freight price decrease	n.a.	5	18
Nickel sales fixed price protection				
Forwards	Nickel price decrease	8	(2)	(11)
Protected item: Part of nickel revenues with fixed prices	Nickel price decrease	n.a.	2	11
Hedge program for products acquisition for resale (tons)				
Forwards	Nickel price increase	(6)	(27)	(62)
Protected item: Part of revenues from products for resale	Nickel price increase	n.a.	27	62
Nickel Revenue Hedging Program				
Options	Nickel price increase	(143)	(1,298)	(2,454)
Protected item: Part of nickel revenues with fixed sales prices	Nickel price increase	n.a.	1,298	2,454
Palladium Revenue Hedging Program				
Options	Palladium price increase	141	55	(13)
Protected item: Part of palladium future revenues	Palladium price increase	n.a.	(55)	13
Option - SPCs	SPCs stock value decrease	70	15	-

Instrument	Main risks	Probable	Scenario I	Scenario II
Embedded derivatives - Raw material purchase (nickel)	Nickel price increase	(6)	(125)	(245)
Embedded derivatives - Raw material purchase (copper)	Copper price increase	-	(21)	(43)
Embedded derivatives - Gas purchase	Pellet price increase	(3)	(10)	(17)

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. Historically, the expected credit loss on the Company's accounts receivable portfolio is immaterial (note 10).

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:

	Consolidated	
	December 31, 2021	December 31, 2020
Cash and cash equivalents (note 23)	65,409	70,086
Short-term investments (note 23)	1,028	4,006
Restricted cash	653	197
Judicial deposits (note 28)	6,808	6,591
Derivative financial instruments	729	1,045
Investments in equity securities (note 14a)	33	3,936
Related parties - Loans (note 31)	-	5,800
Total	74,660	91,661

	Parent Company	
	December 31, 2021	December 31, 2020
Cash and cash equivalents (note 23)	34,266	14,609
Short-term investments (note 23)	906	1,811
Restricted cash	358	20
Judicial deposits (note 28)	6,543	6,265
Derivative financial instruments	456	375
Investments in equity securities (note 14a)	33	3,438
Related parties - Loans (note 31)	43	42
Total	42,605	26,560

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 in foreign currency as published by Moody's regarding the main financial institutions used by the Company to contract derivative instruments, cash and cash equivalents transaction.

	December 31, 2021		December 31, 2020	
	Cash and cash equivalents and investment	Derivatives	Cash and cash equivalents and investment	Derivatives
Aa1	712	-	479	-
Aa2	1,592	81	1,884	75
Aa3	2,761	187	5,959	191
A1	6,387	19	13,375	111
A2	19,408	220	24,735	288
A3	8,471	111	2,804	207
Baa1	500	-	18	-
Baa2	59	-	10	-
Ba2 (i)	15,420	28	15,238	12
Ba3 (i)	11,096	-	9,572	20
Others	31	83	18	141
	66,437	729	74,092	1,045

(i) A substantial part of the balances is held with financial institutions in Brazil and, in local currency, they are deemed investment grade.

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.

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The available revolving credit facilities are intended to assist short term liquidity management and to enable more efficiency in cash management and were provided by a syndicate of several global commercial banks. The Company has two revolving credit facilities, in the amount of R\$27,903 (US\$5,000 million), for which R\$16,742 (US\$3,000 million) have maturity date in 2024 and R\$11,161 (US\$2,000 million) in 2026. As at December 31, 2021, 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/CPC 48 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.

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".

21. 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, 2021				Consolidated December 31, 2020			
	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 23)	65,409	-	-	65,409	70,086	-	-	70,086
Short-term investments (note 23)	-	-	1,028	1,028	-	-	4,006	4,006
Derivative financial instruments (note 20)	-	-	619	619	-	-	698	698
Accounts receivable (note 10)	3,921	-	17,919	21,840	23,377	-	2,567	25,944
Loans - Related parties (note 31) (i)	-	-	-	-	1,009	-	-	1,009
	69,330	-	19,566	88,896	94,472	-	7,271	101,743
Non-current								
Judicial deposits (note 28)	6,808	-	-	6,808	6,591	-	-	6,591
Restricted cash	653	-	-	653	197	-	-	197
Derivative financial instruments (note 20)	-	-	110	110	-	-	347	347
Investments in equity securities (note 14a)	-	33	-	33	-	3,936	-	3,936
Loans - Related parties (note 31) (i)	-	-	-	-	4,791	-	-	4,791
	7,461	33	110	7,604	11,579	3,936	347	15,862
Total of financial assets	76,791	33	19,676	96,500	106,051	3,936	7,618	117,605
Financial liabilities								
Current								
Suppliers and contractors (note 11)	19,393	-	-	19,393	17,496	-	-	17,496
Derivative financial instruments (note 20)	-	-	1,355	1,355	-	-	1,712	1,712
Loans, borrowings and leases (note 23)	6,720	-	-	6,720	5,901	-	-	5,901
Dividends payable	-	-	-	-	6,342	-	-	6,342
Liabilities related to the concession grant (note 14b)	4,241	-	-	4,241	1,088	-	-	1,088
Loans - Related parties (note 31) (i)	-	-	-	-	2,537	-	-	2,537
Other financial liabilities - Related parties (note 31)	2,192	-	-	2,192	1,222	-	-	1,222
Contract liability	3,158	-	-	3,158	3,347	-	-	3,347
	35,704	-	1,355	37,059	37,933	-	1,712	39,645
Non-current								
Derivative financial instruments (note 20)	-	-	3,301	3,301	-	-	3,578	3,578
Loans, borrowings and leases (note 23)	70,189	-	-	70,189	72,187	-	-	72,187
Loans - Related parties (note 31) (i)	-	-	-	-	4,655	-	-	4,655
Participative stockholders' debentures (note 22)	-	-	19,078	19,078	-	-	17,737	17,737
Liabilities related to the concession grant (note 14b)	8,017	-	-	8,017	10,928	-	-	10,928
Financial guarantees (notes 15c and 23e)	-	-	3,026	3,026	-	-	4,558	4,558
	78,206	-	25,405	103,611	87,770	-	25,873	113,643
Total of financial liabilities	113,910	-	26,760	140,670	125,703	-	27,585	153,288

(i) Presented in note 31 as "Discontinued operations – Coal".

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	December 31, 2021				Parent Company December 31, 2020			
	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 23)	34.266	-	-	34.266	14.609	-	-	14.609
Short-term investments (note 23)	-	-	906	906	-	-	1.811	1.811
Derivative financial instruments (note 20)	-	-	410	410	-	-	37	37
Accounts receivable (note 10)	46.560	-	1.352	47.912	46.559	-	-	46.559
	80.826	-	2.668	83.494	61.168	-	1.848	63.016
Non-current								
Judicial deposits (note 28)	6.543	-	-	6.543	6.265	-	-	6.265
Restricted cash	358	-	-	358	20	-	-	20
Derivative financial instruments (note 20)	-	-	46	46	-	-	338	338
Investments in equity securities (note 14a)	-	33	-	33	-	3.438	-	3.438
Other financial assets	43	-	-	43	42	-	-	42
	6.944	33	46	7.023	6.327	3.438	338	10.103
Total of financial assets	87.770	33	2.714	90.517	67.495	3.438	2.186	73.119
Financial liabilities								
Current								
Suppliers and contractors (note 11)	10.603	-	-	10.603	11.601	-	-	11.601
Derivative financial instruments (note 20)	-	-	879	879	-	-	1.166	1.166
Loans, borrowings and leases (note 23)	3.415	-	-	3.415	3.804	-	-	3.804
Dividends payable	-	-	-	-	6.342	-	-	6.342
Liabilities related to the concession grant (note 14b)	4.241	-	-	4.241	1.088	-	-	1.088
Loans - Related parties (note 31)	4.574	-	-	4.574	1.207	-	-	1.207
Other financial liabilities - Related parties (note 31)	2.235	-	-	2.235	1.277	-	-	1.277
Contract liability	25	-	-	25	9	-	-	9
	25.093	-	879	25.972	25.328	-	1.166	26.494
Non-current								
Derivative financial instruments (note 20)	-	-	3.042	3.042	-	-	3.076	3.076
Loans, borrowings and leases (note 23)	16.520	-	-	16.520	21.646	-	-	21.646
Loans - Related parties (note 31)	81.551	-	-	81.551	88.908	-	-	88.908
Participative stockholders' debentures (note 22)	-	-	19.078	19.078	-	-	17.737	17.737
Liabilities related to the concession grant (note 14b)	8.017	-	-	8.017	10.928	-	-	10.928
Financial guarantees (notes 15c and 23e)	-	-	3.026	3.026	-	-	4.558	4.558
	106.088	-	25.146	131.234	121.482	-	25.371	146.853
Total of financial liabilities	131.181	-	26.025	157.206	146.810	-	26.537	173.347

b) Hierarchy of fair value

	December 31, 2021				Consolidated December 31, 2020			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Financial assets								
Short-term investments (note 23)	1,028	-	-	1,028	4,006	-	-	4,006
Derivative financial instruments (note 20)	-	659	70	729	-	950	95	1,045
Accounts receivable (note 10)	-	17,919	-	17,919	-	2,567	-	2,567
Investments in equity securities (note 14a)	33	-	-	33	3,936	-	-	3,936
Total	1,061	18,578	70	19,709	7,942	3,517	95	11,554
Financial liabilities								
Derivative financial instruments (note 20)	-	4,656	-	4,656	-	5,190	100	5,290
Participative stockholders' debentures (note 22)	-	19,078	-	19,078	-	17,737	-	17,737
Financial guarantees (notes 15c and 23e)	-	3,026	-	3,026	-	4,558	-	4,558
Total	-	26,760	-	26,760	-	27,485	100	27,585

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	December 31, 2021				Parent Company December 31, 2020			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	Financial assets							
Short-term investments	906	-	-	906	1,811	-	-	1,811
Derivative financial instruments	-	386	70	456	-	280	95	375
Accounts receivable (note 10)	-	1,352	-	1,352	-	-	-	-
Investments in equity securities	33	-	-	33	3,438	-	-	3,438
Total	939	1,738	70	2,747	5,249	280	95	5,624
Financial liabilities								
Derivative financial instruments	-	3,921	-	3,921	-	4,142	100	4,242
Participative stockholders' debentures	-	19,078	-	19,078	-	17,737	-	17,737
Financial guarantees	-	3,026	-	3,026	-	4,558	-	4,558
Total	-	26,025	-	26,025	-	26,437	100	26,537

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

	Consolidated		Parent Company	
			Derivative financial instruments	
	Financial assets	Financial liabilities	Financial assets	Financial liabilities
Balance at December 31, 2020	95	100	95	100
Gain and losses recognized in income statement	(25)	(100)	(25)	(100)
Balance at December 31, 2021	70	-	70	-

c) Fair value of loans and borrowings

Loans and borrowings 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 book values are close to their fair values and therefore information on their fair values is not being presented.

	Consolidated			
	December 31, 2021		December 31, 2020	
Quoted in the secondary market:				
<i>Bonds</i>	41,564	51,068	38,708	52,100
<i>Eurobonds</i>	-	-	4,783	5,118
<i>Debentures</i>	2,160	2,160	2,577	2,578
Debt contracts in Brazil in:				
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	1,975	2,508	4,470	4,452
R\$, with fixed interest	73	-	180	180
Basket of currencies and bonds in US\$ indexed to LIBOR	61	61	290	291
Debt contracts in the international market in:				
US\$, with variable and fixed interest	20,173	18,030	16,759	17,036
Other currencies, with variable interest	486	299	-	-
Other currencies, with fixed interest	597	654	616	698
Total	67,089	74,780	68,383	82,453

	Parent Company			
	December 31, 2021		December 31, 2020	
Quoted in the secondary market:				
<i>Bonds</i>	2,904	3,468	2,704	3,651
<i>Eurobonds</i>	-	-	4,783	5,118
<i>Debentures</i>	2,159	2,159	2,576	2,576
Debt contracts in Brazil in:				
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	1,976	2,077	4,011	3,972
R\$, with fixed interest	71	-	155	155
Basket of currencies and bonds in US\$ indexed to LIBOR	62	62	290	290
Debt contracts in the international market in:				
US\$, with variable interest	10,298	9,956	8,276	8,333
Other currencies, with variable interest	489	491	-	-
Total	17,959	18,213	22,795	24,095

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 FVTPL.

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.

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.

22. 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 related to the debentures 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. On October 1, 2021, the Company made available for withdrawal as remuneration the amount of R\$1,244 (US\$225 million) for the first semester of 2021, as disclosed on the “Shareholders’ debentures report” made available on the Company’s website.

To calculate the fair value of the liability, the Company uses the weighted average price of trades in the secondary market for the last month of the quarter. The average price increased from R\$45.65 per debenture for the year ended December 31, 2020, to R\$49.10 per debenture for the year ended December 30, 2021, resulting in an expense of R\$3,691 (US\$716 million) recorded in the income statement for year ended December 31, 2021. As at December 31, 2021, the liability was R\$19,078 (US\$3,419 million) (R\$17,737 (US\$3,413 million) as at December 31, 2020).

Accounting policy

The participative stockholders’ debentures are measured at fair value through profit or loss based on the market approach, representing the amount that would be paid for the acquisition of these securities on the measurement date and, therefore, also implicitly includes the remuneration to the debenture holder. 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.

23. 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.

	Consolidated	
	December 31, 2021	December 31, 2020
Debt contracts	67,967	69,426
Leases	8,942	8,662
Total of loans, borrowings and leases	76,909	78,088
(-) Cash and cash equivalents	65,409	70,086
(-) Short-term investments	1,028	4,006
Net debt	10,472	3,996

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 R\$37,468 (US\$6,714 million) (R\$14,805 (US\$2,849 million) in 2020) denominated in R\$, indexed to the CDI, R\$26,613 (US\$4,769 million) (R\$52,979 (US\$10,195 million) in 2020) denominated in US\$ and R\$1,328 (US\$238 million) (R\$2,302 (US\$443 million) in 2020) denominated in other currencies at the year ended of December 31, 2021.

c) Short-term investments

As at December 31, 2021, the balance of R\$1,028 (US\$184 million) (R\$4,006 (US\$771 million) as at December 31, 2020) substantially comprises investments in exclusive investment fund immediately liquidity, whose portfolio is composed of committed transactions and Financial Treasury Bills ("LFTs"), which are floating-rate securities issued by the Brazilian government.

d) Loans, borrowings and leases

i) Total debt

	Average interest rate (i)	Consolidated			
		Current liabilities		Non-current liabilities	
		December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Quoted in the secondary market:					
<i>Bonds</i>	6.01%	-	-	41,564	38,709
<i>Eurobonds</i>	4.29%	-	-	-	4,783
<i>R\$, Debentures (ii)</i>	10.48%	1,038	555	1,122	2,021
Debt contracts in Brazil in (iii):					
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	9.29%	530	1,662	1,445	2,808
R\$, with fixed interest	2.86%	67	107	6	73
Basket of currencies and bonds in US\$ indexed to LIBOR	2.32%	61	232	-	58
Debt contracts in the international market in:					
US\$, with variable and fixed interest	2.24%	2,673	942	17,500	15,817
Other currencies, with variable interest	4.10%	430	-	56	-
Other currencies, with fixed interest	3.36%	67	61	530	555
Accrued charges		878	1,043	-	-
Total		5,744	4,602	62,223	64,824

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	Average interest rate (i)	Parent Company			
		Current liabilities		Non-current liabilities	
		December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Quoted in the secondary market:					
Bonds	6.01%	-	-	2,904	2,704
Eurobonds	-	-	-	-	4,783
R\$, Debentures (ii)	10.48%	1,037	555	1,122	2,021
Debt contracts in Brazil in (iii):					
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	9.29%	532	771	1,444	2,808
R\$, with fixed interest	2.86%	63	84	8	71
Basket of currencies and bonds in US\$ indexed to LIBOR	2.32%	62	232	-	58
Debt contracts in the international market in:					
US\$, with variable interest	2.24%	698	871	9,600	7,405
Other currencies, with variable interest	4.10%	432	432	57	-
Accrued charges		191	369	-	-
Total		3,015	3,314	15,135	19,850

(i) In order to determine the average interest rate for debt contracts with floating rates, the Company used the rate applicable at December 31, 2021.

(ii) The Company has debentures in Brazil with BNDES raised for the Company's infrastructure investment projects.

(iii) The Company entered into derivatives to mitigate the exposure to cash flow variations of all floating rate debt contracted in Brazil, resulting in an average cost of 2.93% per year in US\$.

Future flows of debt payments, principal and interest

	Consolidated		Parent Company
	Principal	Estimated future interest payments (i)	Principal
2022	4,866	67	2,824
2023	1,612	3,270	7,067
2024	11,185	53	736
2025	811	3,125	457
Between 2026 and 2030	13,698	12,898	2,035
2031 onwards	34,917	15,719	4,840
Total	67,089	35,132	17,959

(i) Based on interest rate curves and foreign exchange rates applicable as at December 31, 2021 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.

Covenants

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 (as defined in note 4a) and interest coverage. The Company did not identify any instances of noncompliance as at December 31, 2021.

Reconciliation of debt to cash flows arising from financing activities

	Consolidated			
	Quoted in the secondary market	Debt contracts in Brazil	Debt contracts on the international market	Total
December 31, 2020	47,010	4,980	17,436	69,426
Additions	-	-	5,165	5,165
Repayments (i)	(5,944)	(2,023)	(2,792)	(10,759)
Interest paid (ii)	(2,791)	(723)	(306)	(3,820)
Cash flow from financing activities	(8,735)	(2,746)	2,067	(9,414)
Effect of exchange rate	3,684	(772)	1,564	4,476
Interest accretion	2,542	658	279	3,479
Non-cash changes	6,226	(114)	1,843	7,955
December 31, 2021	44,501	2,120	21,346	67,967

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Parent Company

	Quoted in the secondary market	Debt contracts in Brazil	Debt contracts on the international market	Total
December 31, 2020	10,396	4,471	8,297	23,164
Additions	-	-	3,226	3,226
Repayments (i)	(5,772)	(1,997)	(1,282)	(9,051)
Interest paid (ii)	(740)	(364)	(142)	(1,246)
Cash flow from financing activities	(6,512)	(2,361)	1,802	(7,071)
Effect of exchange rate	669	(297)	617	989
Interest accretion	629	310	121	1,060
Non-cash changes	1,298	13	738	2,049
December 31, 2021	5,182	2,123	10,837	18,142

(i) Includes expenses with redemption of bonds in the amount of R\$354 (US\$63 million).

(ii) Classified as cash flow due to operational activities.

Funding and repayments

In January 2021, the Company contracted a credit facility indexed to Libor, in the amount of R\$1,633 (US\$300 million) with maturity date of 2035, with the New Development Bank (“NDB”, the BRICS bank) for investments in expanding the logistics capacity of the Northern Corridor.

In October and December 2021, the Company contracted credit facilities indexed to Libor in the amounts of R\$1,953 (US\$350 million) e R\$1,563 (US\$280 million), with maturities in 2027 and 2032, with a commercial bank and a Japanese development bank, respectively.

In March 2021, the Company redeemed all of its 3.75% bonds due in January 2023, in the total amount of R\$4,946 (EUR750 million), and for it paid a premium of R\$354 (US\$63 million), which was recorded as “Expenses with cash tender offer redemption” in the financial result for the year ended December 31, 2021. The payments of principal and interest of other instruments were made in accordance with the conditions defined in the terms of each contracted debt.

ii) Lease liabilities

	Consolidated						
	December 31, 2020	Additions and contract modifications (i)	Payments (ii)	Interest (iii)	Transfer to liabilities held for sale	Translation adjustment	December 31, 2021
Ports	3,860	170	(411)	151	-	212	3,982
Vessels	2,770	-	(351)	112	-	200	2,731
Pelletizing plants	708	723	(215)	37	-	-	1,253
Properties	738	40	(155)	28	(10)	(64)	577
Energy plants	322	2	(33)	26	-	11	328
Mining equipment and locomotives	264	341	(59)	11	(498)	12	71
Total	8,662	1,276	(1,224)	365	(508)	371	8,942

(i) Additions and contract modifications includes the effect of R\$167 (US\$53 million) due to Nacala Logistic Corridor acquisition (note 16).

(ii) 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, 2021, 2020 and 2019 was R\$2,119 (US\$395 million), R\$335 (US\$63 million) and R\$2,187 (US\$560 million), respectively.

(iii) The interest accretion recognized in the income statement is disclosed in note 6. Includes the amount of R\$27 (US\$5 million) related to coal operations, whose impact is recorded in the financial results of discontinued operations (note 16).

Discount rates

	Discount rate
Ports	3% to 6%
Vessels	3% to 4%
Pelletizing plants	3% to 5%
Properties	3% to 7%
Energy plants	4% to 5%
Mining equipment	3% to 7%

Annual minimum payments and remaining lease term

The following table 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.

	2022	2023	2024	2025	2026 onwards	Total	Average remaining term (years)
Ports	368	353	349	346	4,139	5,555	4 to 21
Vessels	355	345	337	328	1,929	3,294	3 to 11
Pelletizing plants	268	230	217	217	611	1,543	2 to 11
Properties	198	112	98	53	164	625	2 to 9
Energy plants	37	35	32	32	311	447	8
Mining equipment	19	12	8	7	32	78	2 to 6
Total	1,245	1,087	1,041	983	7,186	11,542	-

e) Guarantees

As at December 31, 2021 and 2020, loans and borrowings are secured by property, plant and equipment in the amount of R\$458 (US\$82 million) and R\$915 (US\$176 million), respectively. The securities issued through Vale's wholly owned finance subsidiary Vale Overseas Limited are fully and unconditionally guaranteed by Vale.

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. In 2021, 9% of total interest incurred was capitalized (note 6). Borrowing costs that are not capitalized are recognized in the income statement in the period in which they are incurred.

The accounting policy applied to lease liabilities is disclosed in note 18.

24. 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, including 6 victims still missing, and caused extensive property and environmental damage in the region.

As a result of the dam failure, the Company has been recognizing provisions to meet its assumed obligations, including indemnification to those affected by the event, remediation of the affected areas and compensation to the society, as shown below:

	Consolidated				
	December 31, 2020	Operating expense	Present value adjustment	Disbursements (ii)	December 31, 2021
Global Settlement for Brumadinho	20,726	-	1,798	(5,870)	16,654
Individual indemnification and other commitments	3,048	1,140	(93)	(1,012)	3,083
Incurring expenses (iii)	-	3,492	-	(3,492)	-
	23,774	4,632	1,705	(10,374)	19,737

(i) In 2021, the effect of the present value adjustment on Global Settlement provision resulted in a reduction of R\$940 (US\$170 million) due to the increase in the discount rate from 5.92% to 8.08% (2020: R\$43 (US\$5 million)).

(ii) Disbursement is presented net of the judicial deposits utilization.

(iii) 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 2020, the Company incurred expenses in the amount of R\$2,586 (US\$510 million).

a) Global Settlement for Brumadinho

On February 4, 2021, 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. The Global Settlement was ratified by the Minas Gerais State Court on February 4, 2021, and the res judicata was drawn up on April 7, 2021.

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.

The provision is discounted at presented value using an observable rate that reflects the current market assessments of the time value of money and the risks specific to the liability at the reporting date. In this year, the provisions were updated mainly by the consumer price index (“IPCA”), as required by the Global Agreement, resulting in an impact of R\$1,798 (US\$340 million), recorded under financial results in the income statement for year ended December 31, 2021.

	Consolidated	
	December 31, 2021	December 31, 2020
Payment obligations	7,964	12,172
Provision for socio-economic reparation and others	4,757	4,468
Provision for social and environmental reparation	3,933	4,086
	16,654	20,726
	December 31, 2021	December 31, 2020
Current liabilities	4,925	8,110
Non-current liabilities	11,729	12,616
Liabilities	16,654	20,726

(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. In October 2021, the Company paid in full the income transfer program in the amount of R\$4,383 (US\$777 million). The remaining amount of R\$7,964 (US\$1,427 million) represents the present value for the fixed semiannual 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 aim 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 5 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.

(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, although Vale monitors this provision, the amount recorded may change depending on several factors that are not under the sole control of the Company.

b) Provision for individual indemnification and other commitments

The Company is also 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, including dredging part of the released material and de-sanding from the channel of the river Paraopeba. As at December 31, 2021, the provision recorded is R\$1,772 (US\$317 million) (2020: R\$1,387 (US\$267 million)).

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, 2021, the provision recorded is R\$640 (US\$115 million) (2020: R\$930 (US\$179 million)).

c) Contingencies and other legal matters

(c.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 justice institutions, claiming compensation for socioeconomic and socio-environmental damages resulting from the dam failure and seeking a broad range of preliminary injunctions ordering Vale to take specific remediation and reparation actions.

As a result of the Global Settlement, the requests for the reparation of socio-environmental and socioeconomic damages caused by the dam rupture were substantially resolved. Indemnifications for individual damages was excluded from the Global Settlement, and the parties ratified the agreement with the Public Defendants of the State of Minas Gerais. Thus, the Company is continuing to enter into individual agreements.

(c.ii) Collective Labor Civil Action

In 2021, public civil actions were filed in the Betim Labor Court in the state of Minas Gerais, by a workers' union claiming the payment of compensation for death damages to own and outsourced employees, who died as a result of the rupture of Dam I. An initial sentence was published condemning Vale to pay R\$1 (US\$180 thousand) per fatal victim. Vale is defending itself on the lawsuits and understands that the likelihood of loss is possible.

(c.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 Vale made false and misleading statements or omitted to make disclosures concerning the risks of the operations of Dam I in the Córrego 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 in 2022.

On November 24, 2021, a new Complaint was filed before the same Court by eight Plaintiffs, all investment funds, as an "opt-out" litigation from the putative class action already pending in the Eastern District of New York court, asserting virtually the same claims against the same defendants as those in the putative class case.

Based on the evaluation of the Company's legal counsel and given the very preliminary stage, the expectation of loss of these processes 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. The Plaintiff did not specify the amounts alleged in this demand.

(c.iv) Arbitration proceedings in Brazil filed by minority stockholders and a class association

In Brazil, Vale is a defendant in (i) one arbitration filed by 385 minority stockholders, (ii) two arbitrations filed by a class association allegedly representing all Vale's minority stockholders, and (iii) three arbitrations filed by foreign investment funds.

In the six proceedings, the Claimants argue Vale was aware of the risks associated with the dam, and failed to disclose it to the stockholders, which would be required under the Brazilian applicable laws and the rules of *Comissão de Valores Mobiliários* (Securities and Exchange Commission in Brazil). Based on such argument, they claim compensation for losses caused by the decrease of the value of the shares.

Based on the assessment of the Company's legal advisors, the expectation of loss is classified as possible for the six procedures and, considering the initial phase, it is not possible at this time to reliably estimate the amount of a possible loss.

In one of the proceedings filed by foreign funds, the Claimants initially estimated the amount of the alleged losses would be approximately R\$1,800 (US\$323 million). In another proceeding recently filed by foreign funds, the Claimants initially estimated the amount of the alleged losses would be approximately R\$3,900 (US\$700 million). The Company disagrees with the ongoing proceedings and understands that, in this case and at the current stage of the proceedings, the probability of loss in the amount claimed by the foreign funds is remote.

(c.v) Investigations conducted by CVM and the Securities and Exchange Commission ("SEC")

Vale has been notified that the SEC staff has made a preliminary determination to recommend that the SEC commence proceedings against Vale alleging violations of U.S. securities laws related to Vale's disclosures about its dam safety management and the dam at Brumadinho. If the SEC authorizes an action against Vale, the SEC could seek an injunction against future violations of U.S. federal securities laws, the imposition of civil monetary penalties, disgorgement and other relief within the SEC's authority in a lawsuit filed in a federal court. The CVM is also conducting investigations relating 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. At this time, it is not yet possible to estimate the value or a range of potential loss to the Company.

(c.vi) Criminal proceedings and investigations

In January 2020, the State Prosecutors of Minas Gerais ("MPMG") filed criminal charges against 16 individuals (including former executive officers of Vale and former employees) for a number of potential crimes, including homicide, and against Vale S.A. for alleged environmental crimes. Vale is defending itself against the criminal claims and is still not possible to estimate when a decision on this criminal proceeding will be issued.

d) Insurance

The Company is negotiating with insurers the payment of indemnification under its civil liability and Directors and Officers Liability Insurance. However, these negotiations are still in progress, 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 related to these insurers was recognized in these financial statements. The adjustment of the claim of Brumadinho in the Operational Risk policy was concluded and the Company received a compensation in the amount of R\$108 (US\$19 million) for the year ended December 31, 2021.

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.

Thus, the amounts actually incurred by the Company may differ from the amounts currently provisioned, due to the confirmation of the assumptions used and which depend on several factors, some of which are not under the Company's control. These changes could result in a material impact on the amount of the provision in future periods. At each presentation date of its financial statements, the Company will reassess the main assumptions used in the preparation of projected cash flows and will adjust the provision, when applicable.

25. Liabilities related to associates and joint ventures

a) Rupture of Samarco dam

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 (“TacGov Agreement”), 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.

Judicial recovery of Samarco

Under the Framework Agreement, the TacGov 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.

In April 2021, Samarco announced the request for Judicial Reorganization (“RJ”) that was filed with the Minas Gerais Court to renegotiate its debt, which is held by bondholders abroad. The purpose of RJ is to restructure Samarco’s debts and establish an independent and sustainable financial position, allowing Samarco to keep working to resume its operations safely and to fulfill its obligations related to the Fundação Renova.

The RJ does not affect Samarco’s obligation to remediate and compensate the impacts of the Fundão tailings dam failure. However, as Samarco began the gradual resumption of operations in December 2020, it is not yet possible to reliably estimate when Samarco will generate cash to comply with its assumed obligation in the Framework Agreement. Thus, the liability recorded by Vale on December 31, 2021 are recognized base on the assumption that Samarco does not have the capacity to generate cash enough to make all cash contributions to the Fundação Renova.

In addition, ongoing discussions in the context of the RJ may lead to the loss of deductibility of part of the expenses incurred with the Fundação Renova and of the deferred taxes over the total provision, depending on the method determined for restructuring Samarco’s debts. The total amount exposed as at December 31, 2021 is R\$8,476 (US\$1,519 million), of which R\$2,376 (US\$426 million) refers to expenses already incurred and considered as part of the Company’s uncertain tax positions (note 8).

The Company works in the perspective that the mechanisms resulting from the RJ will continue to allow the deductibility of these expenses, however, future decisions resulting from the negotiations regarding Samarco’s capital structure, which are not under Vale’s control, could materially change the value of the deferred tax recognized by the Company.

Changes on the provisions in the year

	Consolidated	
	2021	2020
Balance at January 1,	10,782	6,853
Additional provision	9,260	5,666
Disbursements	(2,169)	(2,059)
Present value valuation	(502)	322
Balance at December 31,	17,371	10,782
	December 31, 2021	December 31, 2020
Current liabilities	9,964	4,554
Non-current liabilities	7,407	6,228
Liabilities	17,371	10,782

Fundação Renova

New court decisions on individual indemnities for residents of cities impacted by the Fundão dam failure were issued at the end of the fiscal year, impacting the provision related to Fundação Renova, on December 31, 2021. These decisions mainly changed and expanded the number of types of damage, categories, indemnifiable amounts to the affected municipalities.

The addition in the provision in the amount of R\$9,253 (US\$1,699 million) was substantially driven by these court decisions. As at December 31, 2021, the Company has a provision of R\$16,245 (US\$2,910 million) (R\$9,633 (US\$1,853 million) as at December 31, 2020) for remediation and compensation programs, which corresponds to the Company's proportionate responsibility with Fundação Renova.

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 the Brazilian National Mining Agency ("Agência Nacional de Mineração – 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. As at December 31, 2021, Vale total provision is R\$1,126 (US\$202 million) (R\$1,149 (US\$221 million) as at December 31, 2020), for de-characterization of Germano tailings dam.

Samarco's working capital

In addition to the provision, Vale made available the amount of R\$113 (US\$21 million) for the year ended December 31, 2021 and (2020: R\$845 (US\$166 million)) which was fully used to fund Samarco's working capital and recognized in Vale's income statement as an expense in "Equity results and other results in associates and joint ventures".

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, 2021	December 31, 2020
Current assets	3,132	450
Non-current assets	16,301	23,810
Total assets	19,433	24,260
Current liabilities	60,840	43,494
Non-current liabilities	39,287	33,181
Total liabilities	100,127	76,675
Negative reserves	(80,694)	(52,415)
Loss for the year ended	(17,311)	(5,983)

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 Framework Agreements represents a model for 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 Fundação Renova reparation programs upon the completion of studies carried by specialist engaged to assist the Public Prosecutor's Office in this process. In October 2020, the MPF requested the resumption of its public civil action of R\$155 billion (US\$27.5 billion), due to a difficulty in hiring of technical advisors. Discussion for the renegotiation began in April 2021, and a letter of principles was finalized and signed in June 2021 by the companies Vale, BHPB and Samarco, as well as representatives of the Government and various Justice Institutions. Depending on the conclusion of the specialists hired and the court decision in this regard, the Company may recognize additional provisions for the fulfillment of the programs determined in the Framework Agreement.

(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 in June 2021. Thus, the case is closed and will be archived.

(iii) 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. The Company cannot estimate when a final decision on the case will be issued.

Insurance

Since the Fundão dam rupture, the Company has been negotiating with insurers the indemnification payments based on its general liability policies. In 2021, the Company received payments in the amount of R\$181 (US\$33 million) (2020: R\$86 (US\$17 million)). The Company recorded 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 Fundação Renova 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) activity level 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.

26. Provision for de-characterization of dam structures and asset retirement obligations

The Company is subject to regulations, which requires the decommissioning of the assets and mine sites that Vale operates at the end of their useful lives. Depending on the geotechnical characteristics of the structures, the Company is required to de-characterize the structures, as described below.

a) De-characterization of dam structures located in Brazil

As a result of the Brumadinho dam rupture (note 24), the Company has decided to speed up the plan to "de-characterize" of all its tailings dams built under the upstream method, certain "centerline structures" and dikes, located in Brazil. The Company also operates tailings dams in Canada, including upstream compacted dams, however, there are no safety, technical or regulatory reasons for these dams to be de-characterized. Therefore, these dams will be decommissioned using other methods, as presented in item (b) below.

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 de-characterize the structures built using the upstream method by 2022, or by a later date if it is proven that the de-characterization is not technically feasible by 2022. A substantial part of the Company's de-characterization projects will be completed in a period

exceeding the date established in the regulation due to the characteristics and safety levels of the Company's geotechnical structures. Thus, on February 21, 2022 (subsequent event), the Company filed with the relevant bodies a request for an extension to perform the projects.

In 2021, as a result of advances in engineering and geotechnical studies, the Company reviewed the estimates to de-characterize the geotechnical structures. In the last quarter 2021, the Company recorded R\$9,747 (US\$1,725 million) in addition to the provision recorded in 2020, mainly due to changes in the engineering methods and solutions of geotechnical structures to ensure safety in the execution of the de-characterization. These changes resulted in the increase on the volume of tailings to be removed from certain structures, changes in containment plans and reinforcement of structures, and the use of remotely controlled equipment, instead of conventional equipment.

These engineering projects for these structures are in different stages of maturity, some of them still in the conceptual engineering phase, for which the estimation of expenditures includes in its methodology a high degree of uncertainty in the definition of the total cost of the project in accordance with best market practices.

The Company's de-characterization projects will last up to 15 years and were discounted at present value at a rate, which increased from 3.50% to 5.48%. Changes in the provisions are as follows:

	Consolidated	
	2021	2020
Balance at January 1,	11,897	10,034
Additional provision	9,747	3,175
Disbursements	(1,822)	(1,521)
Present value valuation	(156)	209
Balance at December 31,	19,666	11,897
	December 31, 2021	December 31, 2020
Current liabilities	2,518	1,981
Non-current liabilities	17,148	9,916
Liabilities	19,666	11,897

In addition, due to the de-characterization projects, the Company has suspended some operations due to judicial decisions or technical analysis performed by Vale on its upstream dam structures located in Brazil. The Company has been recording losses in relation to the operational stoppage and idle capacity of the ferrous mineral segment in the amounts of R\$2,041 (US\$376 million) and R\$3,206 (US\$634 million) for the year ended December 31, 2021 and 2020, respectively. The Company is working on legal and technical measures to resume all operations at full capacity.

b) Asset retirement obligations and environmental obligations

	Consolidated		Parent Company		Discount rate	Flow duration
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020		
Liability by geographical area						
Brazil	7,786	7,940	7,118	5,730	5.48%	2119
Canada	15,221	12,947	-	-	0.00%	2151
Oman	684	547	-	-	3.03%	2035
Indonesia	432	314	-	-	4.20%	2061
Other regions	1,432	1,752	-	-	0.00 - 7.79%	-
	25,555	23,500	7,118	5,730		

Provision changes during the year

	Consolidated		Parent Company	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Asset retirement obligations				
Balance at beginning of the year	21,929	15,961	4,728	4,055
Adjustment to present value	622	141	457	7
Disbursements	(475)	(236)	(407)	(56)
Revisions on projected cash flows (i)	1,000	2,461	(200)	722
Translation adjustment	1,108	3,602	-	-
Transfer to assets held for sale (note 16)	(278)	-	-	-
Incorporation of net assets from MBR (note 15)	-	-	1,231	-
Balance at end of the year	23,906	21,929	5,809	4,728
Environmental obligations				
Balance at beginning of the year	1,571	1,567	1,002	1,076
Adjustment to present value	108	28	108	37
Disbursements	(310)	(319)	(267)	(162)
Revisions on projected cash flows	276	238	251	51
Translation adjustment	4	57	-	-
Incorporation of net assets from MBR (note 15)	-	-	215	-
Balance at end of the year	1,649	1,571	1,309	1,002
Liability	25,555	23,500	7,118	5,730
Current	950	1,048	608	742
Non-current	24,605	22,452	6,510	4,988
Liability	25,555	23,500	7,118	5,730

(i) Includes R\$682 (US\$121 million) related to the decommissioning of the water structure of the base metals operations in Canada recorded in income for the year ended December 31, 2021 as "Other operating expenses" (note 5) and R\$318 (US\$57 million) capitalized as part of property, plant, and equipment (note 18). In 2020, the total amount was R\$1,605 (US\$312 million) referring to the decommissioning of base metals infrastructure in Canada of R\$778 (US\$151 million) and iron ore in Brazil of R\$827 (US\$161 million).

Financial guarantees

The Company has issued letters of credit and surety bonds for R\$3,373 (US\$605 million) as at December 31, 2021 (R\$3,379 (US\$651 million) at 2020), in connection with the asset retirement obligations for its base metals operations.

Critical accounting estimates and judgments

De-characterization of dam structures - 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 solutions; (iv) security levels; (v) productivity of the equipment used; (vi) advances in geological studies and new hydrological information; and (vii) discount rate update.

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.

Asset retirement obligations - 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.

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.

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 significantly impact the recorded provision. Therefore, the estimated costs for closure of the mining assets are deemed to be a critical accounting estimate and annually reviewed.

27. Provisions

	Consolidated			
	Current liabilities		Non-current liabilities	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Provisions for litigation (note 28)	516	455	5,647	5,216
Employee postretirement obligations (note 29)	553	534	8,556	11,802
Payroll, related charges and other remunerations	4,553	4,560	-	-
Onerous contracts (note 19)	208	303	4,879	4,359
Provision related to VNC sale (note 15)	-	2,598	-	-
Others	-	213	-	-
	5,830	8,663	19,082	21,377

	Parent Company			
	Current liabilities		Non-current liabilities	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Provisions for litigation (note 28)	511	455	5,260	4,782
Employee postretirement obligations (note 29)	249	255	2,236	3,246
Payroll, related charges and other remunerations	3,259	3,154	-	-
Others	-	213	-	-
	4,019	4,077	7,496	8,028

Accounting policy

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. The accrued amounts of these obligations are not deducted from the potential costs covered by insurance or indemnities.

28. 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, 2021 is R\$2,243 (US\$402 million) (R\$2,197 (US\$423 million) for the year ended December 31, 2020). This proceeding is guaranteed by a judicial deposit in the amount of R\$2,586 (US\$463 million) recorded as at December 31, 2021 (R\$2,529 (US\$487 million) as at December 31, 2020).

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.

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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.

Environmental litigations - Refers mainly to proceedings for environmental damages and issues related to environmental licensing.

	Consolidated				
	Tax litigation	Civil litigation	Labor litigation	Environmental litigation	Total of litigation provision
Balance at December 31, 2019	2,804	1,213	1,835	43	5,895
Additions and reversals, net	133	168	78	9	388
Payments	(128)	(154)	(304)	-	(586)
Indexation and interest	(416)	129	130	4	(153)
Translation adjustment	127	(2)	2	-	127
Balance at December 31, 2020	2,520	1,354	1,741	56	5,671
Additions and reversals, net	24	105	397	5	531
Payments	(57)	(117)	(301)	(20)	(495)
Indexation and interest	57	238	164	1	460
Translation adjustment	-	-	5	-	5
Acquisition of NLC (note 16)	-	11	38	-	49
Discontinued operations - Coal (note 16)	(2)	(12)	(44)	-	(58)
Balance at December 31, 2021	2,542	1,579	2,000	42	6,163
Current liabilities	77	118	314	7	516
Non-current liabilities	2,465	1,461	1,686	35	5,647
	2,542	1,579	2,000	42	6,163

	Parent Company				
	Tax litigation (i)	Civil litigation	Labor litigation	Environmental litigation	Total of litigation provision
Balance at December 31, 2019	2,325	1,004	1,734	39	5,102
Additions and reversals, net	136	53	112	6	307
Payments	(116)	(81)	(287)	-	(484)
Indexation and interest	65	114	128	5	312
Balance at December 31, 2020	2,410	1,090	1,687	50	5,237
Additions and reversals, net	24	44	364	5	437
Payments	(57)	(113)	(263)	(20)	(453)
Indexation and interest	57	113	168	1	339
Merger of subsidiaries (note 15)	79	125	4	3	211
Balance at December 31, 2021	2,513	1,259	1,960	39	5,771
Current liabilities	78	112	314	7	511
Non-current liabilities	2,435	1,147	1,646	32	5,260
	2,513	1,259	1,960	39	5,771

(i) Includes amounts regarding to social security claims that were classified as labor claims.

b) Contingent liabilities

	Consolidated		Parent Company	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Tax litigations	28,891	29,857	28,377	27,157
Civil litigations	8,384	6,159	6,461	4,676
Labor litigations	2,882	2,926	2,785	2,846
Environmental litigations	5,322	4,717	4,391	3,837
Total	45,479	43,659	42,014	38,516

The main contingent liabilities, updated by applicable interest rates, for which the likelihood of loss is considered possible are presented by nature as follows:

(b.i) Tax proceedings - CFEM

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 R\$8,893 (US\$1,594 million) as at December 31,

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2021 (R\$10,730 (US\$2,065 million) as at December 31, 2020). The reduction in the amount under discussion was mainly due to the review of the amount assessed by the ANM and payments made by the Company.

(b.ii) Tax proceedings - PIS/COFINS

The Company is a party to several collections related to the alleged improper use of PIS and COFINS credits (federal taxes levied on the companies' gross revenue). Brazilian tax legislation authorizes taxpayers to use PIS and COFINS tax credits, such as those referring to the acquisition of inputs for the production process and other items. The tax authorities mainly claim that (i) some credits were not related to the production process, and (ii) the right to use the tax credits was not adequately proven. The Company is discussing the aforementioned charges related to credits determined as at 2002. The chances of loss related to these lawsuits classified as possible total R\$5,667 (US\$1,016 million) as at December 31, 2021 (R\$5,602 (US\$1,004 million) as at December 31, 2020).

(b.iii) Tax proceedings - Tax on Services ("ISS")

The Company is party to 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, 2021, the total amount of the possible loss is R\$2,935 (US\$526 million) (R\$2,621 (US\$504 million) as at December 31, 2020).

(b.iv) Tax proceedings - Value added tax on services and circulation of goods ("ICMS")

Vale 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) use of undue tax credit; (ii) failing to comply with certain accessory obligations; (iii) the Company is required to pay the ICMS on acquisition of electricity (iv) operations related to the collection of tax rate differential ("DIFAL") and (v) incidence of ICMS on its own transportation. The total amount classified as a possible loss is R\$2,923 (US\$524 million) as at December 31, 2021 (R\$3,369 (US\$648 million) as at December 31, 2020).

(b.v) Tax proceedings - Fines arising from offsets not approved for settlement of federal debts

Vale is a party to several assessments by the Brazilian Federal Revenue Service ("RFB") referring to the imposition of fines of 50% on the value of compensation not approved for the settlement of federal debts. The RFB understands that these offsets were made with undue credits. The Company contests the aforementioned fines and also the non-approval of compensation in other proceedings, which are already disclosed if related to a contingency with possible likelihood of loss. If the Company is successful in the proceedings in which the non-approval of the compensation is being discussed, the expectation is that the corresponding collection of fines will be cancelled. The constitutionality of the fine collection is discussed by another company in a leading case before the STF, and a favorable decision in this case will be applicable to all taxpayers who dispute this thesis. As at December 31, 2021, the total amount of fines imposed was R\$1,604 (US\$287 million) (R\$1,542 (US\$297 million) as at December 31, 2020).

(b.vi) Civil proceedings - Environmental licensing of the Company's operations

The Company is a party to several civil proceedings, which are not individually material. Among these processes, 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.

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.

(b.vii) Environmental litigations— Iron ore operations in Itabira

The Company is a party to several environmental proceedings, which are not individually material. Among these processes, the Company is 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 alleges that Vale iron ore operations have caused environmental and social harm, and claims damages with respect to the alleged environmental degradation, as well as the immediate restoration of the affected ecological complex and the performance of compensatory environmental programs in the region. In the second action, filed in

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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 mining activities. The damages sought, as adjusted from the date of the claim, amount to approximately R\$1,925 (US\$345 million) (R\$1,494 (US\$287 million) as at December 31, 2020).

c) Judicial deposits

	Consolidated		Parent Company	
	December 31, 2021	December 31, 2020	December 31, 2021	December 31, 2020
Tax litigations	5,341	5,132	5,227	4,962
Civil litigations	559	441	431	325
Labor litigations	783	924	760	885
Environmental litigations	125	94	125	93
Total	6,808	6,591	6,543	6,265

d) Guarantees contracted for legal proceedings

In addition to the above-mentioned tax, civil, labor and environmental judicial deposits, the Company contracted R\$11.2 billion (US\$2 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 Eletrobras shares in the period within 1987 to 1993. In November 2019, the Company requested for the payment recognized by Eletrobras as due and such requirement was granted by the court. In August 2020, the Company received R\$301 (US\$55 million) and the remaining amount still under evaluation is R\$198 (US\$35 million).

(e.ii) 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.

The arbitral tribunal in London ruled in the Company's favor and ordered BSGR to pay to the Company the amount of approximately R\$11,161 (US\$2,0 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 continues 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.iii) 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 VCL in merger and acquisition transactions that occurred in 2006. In 2019, the Company recognized an asset in the amount of R\$889 (US\$162 million) (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 R\$84 (US\$15 million) (CAD21 million) related to interest. In 2020, the Company received the amount of R\$973 (US\$177 million) (CAD242 million).

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.

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Contingent assets are disclosed when the related economic benefits are probable and are only recognized in the financial statements in the period in which their realization is virtually certain.

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.

29. 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, 2021 and 2020.

Defined benefit plan ("Plano BD") - The Plano BD has been closed to new entrants since 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 at December 31, 2021 and 2020 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, 2021 and 2020.

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 nature of underfunded benefits, and are presented as underfunded plans as at December 31, 2021 and 2020.

The Foreign plans are managed in accordance with their region. They are divided between plans in Canada, United States of America, United Kingdom and Indonesia. 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, 2021 and 2020.

Employers' disclosure about pensions and other post-retirement benefits on the status of the defined benefit elements of all plans is provided as follows.

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i. Evolution of present value obligation

	Consolidated			Parent Company		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Benefit obligation as at December 31, 2019	16,148	17,818	6,066	16,148	1,661	1,220
Service costs	38	271	92	38	(2)	-
Interest costs	1,123	690	328	1,123	114	160
Benefits paid	(1,793)	(1,281)	(270)	(1,793)	(168)	(86)
Participant contributions	-	2	-	-	2	-
Effect of changes in the actuarial assumptions	622	1,399	809	622	43	1,123
Translation adjustment	-	5,174	1,982	-	-	-
Benefit obligation as at December 31, 2020	16,138	24,073	9,007	16,138	1,650	2,417
Service costs	52	364	6	38	-	153
Interest costs	1,056	658	179	1,032	103	-
Benefits paid	(1,269)	(1,387)	(303)	(1,211)	(163)	(98)
Participant contributions	-	(167)	-	-	1	-
Effect of changes in the actuarial assumptions	(1,778)	(1,349)	(1,408)	(1,647)	(271)	(790)
Translation adjustment	18	1,627	486	-	-	-
Transfer	1,591	(1,591)	-	-	-	-
Benefit obligation as at December 31, 2021	15,808	22,228	7,967	14,350	1,320	1,682

ii. Evolution of assets fair value

	Consolidated			Parent Company		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Fair value of plan assets as at December 31, 2019	21,380	15,019	-	21,380	658	-
Interest income	1,503	545	-	1,503	43	-
Employer contributions	(217)	272	270	(217)	23	186
Participant contributions	-	2	-	-	2	-
Benefits paid	(1,793)	(1,262)	(270)	(1,793)	(167)	(186)
Return on plan assets (excluding interest income)	(247)	1,794	-	(247)	7	-
Translation adjustment	-	4,374	-	-	-	-
Fair value of plan assets as at December 31, 2020	20,626	20,744	-	20,626	566	-
Interest income	1,368	548	-	1,347	34	-
Employer contributions	158	214	303	86	15	98
Participant contributions	-	1	-	-	1	-
Benefits paid	(1,269)	(1,387)	(303)	(1,211)	(163)	(98)
Return on plan assets (excluding interest income)	(1,450)	999	-	(1,606)	63	-
Translation adjustment	(8)	1,485	-	-	-	-
Transfer	1,518	(1,518)	-	-	-	-
Fair value of plan assets as at December 31, 2021	20,943	21,086	-	19,242	516	-

iii. Reconciliation of assets and liabilities recognized in the statement of financial position

	Consolidated Plans in Brazil					
	December 31, 2021			December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	4,488	-	-	5,232	-	-
Interest income	313	-	-	376	-	-
Changes on asset ceiling	91	-	-	(1,120)	-	-
Balance at end of the year	4,892	-	-	4,488	-	-
Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(14,350)	(1,320)	(1,681)	(16,138)	(1,650)	(2,417)
Fair value of assets	19,242	516	-	20,626	566	-
Effect of the asset ceiling	(4,892)	-	-	(4,488)	-	-
Liabilities	-	(804)	(1,681)	-	(1,084)	(2,417)
Current liabilities	-	(226)	(23)	-	(167)	(255)
Non-current liabilities	-	(578)	(1,658)	-	(917)	(2,162)
Liabilities	-	(804)	(1,681)	-	(1,084)	(2,417)

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	Consolidated Foreign plan					
	December 31, 2021			December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Movements of assets ceiling						
Balance as of January 1,	-	-	-	-	-	-
Changes on asset ceiling and onerous liability	235	-	-	-	-	-
Translation adjustment	8	-	-	-	-	-
Balance at December 31,	243	-	-	-	-	-

Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(1,458)	(20,908)	(6,285)	-	(22,423)	(6,590)
Fair value of assets	1,701	20,569	-	-	20,178	-
Effect of the asset ceiling	(243)	-	-	-	-	-
Liabilities	-	(339)	(6,285)	-	(2,245)	(6,590)
Current liabilities	-	(41)	(263)	-	(36)	(244)
Non-current liabilities	-	(298)	(6,022)	-	(2,209)	(6,346)
Liabilities	-	(339)	(6,285)	-	(2,245)	(6,590)

	Consolidated Total					
	December 31, 2021			December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	4,488	-	-	5,232	-	-
Interest income	313	-	-	376	-	-
Changes on asset ceiling	326	-	-	(1,120)	-	-
Translation adjustment	8	-	-	-	-	-
Balance at end of the year	5,135	-	-	4,488	-	-

Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(15,808)	(22,228)	(7,967)	(16,138)	(24,073)	(9,007)
Fair value of assets	20,943	21,086	-	20,626	20,744	-
Effect of the asset ceiling	(5,135)	-	-	(4,488)	-	-
Liabilities	-	(1,142)	(7,967)	-	(3,329)	(9,007)
Current liabilities	-	(266)	(287)	-	(204)	(499)
Non-current liabilities	-	(876)	(7,680)	-	(3,125)	(8,508)
Liabilities	-	(1,142)	(7,967)	-	(3,329)	(9,007)

	Parent Company Plans in Brazil					
	December 31, 2021			December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	4,488	-	-	5,232	-	-
Interest income	313	-	-	376	-	-
Changes on asset ceiling	91	-	-	(1,120)	-	-
Balance at end of the year	4,892	-	-	4,488	-	-

Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(14,350)	(1,320)	(1,681)	(16,138)	(1,650)	(2,417)
Fair value of assets	19,242	516	-	20,626	566	-
Effect of the asset ceiling	(4,892)	-	-	(4,488)	-	-
Liabilities	-	(804)	(1,681)	-	(1,084)	(2,417)
Current liabilities	-	(226)	(23)	-	(167)	(255)
Non-current liabilities	-	(578)	(1,658)	-	(917)	(2,162)
Liabilities	-	(804)	(1,681)	-	(1,084)	(2,417)

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iv. Costs recognized in the income statement

	Consolidated								
	Year ended December 31,								
	2021			2020			2019		
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	52	364	6	37	268	89	25	218	38
Interest expense	1,056	658	179	1,123	681	328	1,203	606	223
Interest income	(1,368)	(548)	-	(1,503)	(545)	-	(1,640)	(487)	-
Interest expense on effect of (asset ceiling)/ onerous liability	313	-	-	376	-	-	432	-	-
Total of cost, net	53	474	185	33	404	417	20	337	261

	Parent Company						
	Year ended December 31,						
	2021			2020			
Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits		
Service cost	38	-	153	37	(2)	-	-
Interest expense	1,032	103	-	1,123	114	(160)	-
Interest income	(1,347)	(34)	-	(1,503)	(44)	-	-
Interest expense on effect of (asset ceiling)/ onerous liability	313	-	-	375	-	-	-
Total of cost, net	36	69	153	32	68	(160)	

v. Costs recognized in the statement of comprehensive income

	Consolidated								
	Year ended December 31,								
	2021			2020			2019		
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	(525)	(2,078)	(1,870)	(695)	(1,852)	(960)	(640)	(1,812)	(494)
Effect of changes actuarial assumptions	1,778	1,349	1,420	(622)	(1,579)	(1,321)	(2,965)	(1,389)	(713)
Return on plan assets (excluding interest income)	(1,450)	999	-	(248)	1,794	-	2,965	1,452	-
Change of asset ceiling	(330)	-	-	1,120	-	-	(83)	-	-
Others	(27)	17	24	-	45	74	-	-	-
	(29)	2,365	1,444	250	260	(1,247)	(83)	63	(713)
Deferred income tax	27	(713)	(463)	(85)	(76)	462	28	(32)	251
Others comprehensive income	(2)	1,652	981	165	184	(785)	(55)	31	(462)
Translation adjustments	2	(88)	(73)	-	(402)	(125)	-	(71)	(4)
Transfers/ disposal/ others	-	-	-	5	(8)	-	-	-	-
Accumulated other comprehensive income	(525)	(514)	(962)	(525)	(2,078)	(1,870)	(695)	(1,852)	(960)

	Parent Company						
	Year ended December 31,						
	2021			2020			
Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits		
Balance at beginning of the year	(525)	(579)	(1,111)	(695)	(547)	(442)	
Effect of changes actuarial assumptions	1,647	271	789	(622)	(43)	(1,123)	-
Return on plan assets (excluding interest income)	(1,606)	63	-	(248)	7	-	-
Change of asset ceiling	(91)	-	-	1,120	-	-	-
Others	-	-	42	-	-	72	-
	(50)	334	831	250	(36)	(1,051)	
Deferred income tax	17	(114)	(283)	(85)	12	382	-
Others comprehensive income	(33)	220	548	165	(24)	(669)	
Transfers/ disposal/ others	-	-	-	5	(8)	-	-
Accumulated other comprehensive income	(558)	(359)	(563)	(525)	(579)	(1,111)	

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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 made for the different plans considering a 10-year horizon. Asset Liability Management studies are performed for defined benefit obligations, while for defined contribution obligations there are efficient frontier (investment profiles) and glidepath (life cycles) studies. These projections consider the market risks of the investment asset classes. In addition, the short-term market risk of the plans is periodically monitored through metrics such as VaR - Value at Risk (parametric with 95% confidence), Benchmark VaR, Maximum Drawdown, Stress Tests, among others.

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 non-financial companies, the assessment is conducted a monitoring of the company until the maturity of the security.

Liquidity - The monitoring of the liquidity of plans with defined benefit obligations is carried out in different time horizons with specific indicators and by technical study. Indicators help in monitoring short-term risks. The technical study aims to project the cash flows of all classes of assets and liabilities until the maturity of longer fixed-income securities and until the exhaustion of the actuarial liabilities of the plans, verifying that the assets for trading and held to maturity are sufficient to coverage of plan obligations. Portfolios of defined contribution bonds, namely investment profiles and life cycles, contain assets that can be sold at any time in normal market situations and, therefore, their market risk is assessed by specific indicators.

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, 2021			December 31, 2020		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Discount rate to determine benefit obligation	8.62% - 8.82%	10.25%	8.68% - 8.86%	6.62% - 7.18%	6.50%	6.16% - 7.17%
Nominal average rate to determine expense/ income	8.62% - 8.82%	10.25%	N/A	6.62% - 7.18%	6.50%	N/A
Nominal average rate of salary increase	3.25% - 5.32%	7.50%	N/A	3.80%	6.00%	N/A
Nominal average rate of benefit increase	3.25%	7.50%	N/A	3.80%	6.00%	N/A
Immediate health care cost trend rate	N/A	N/A	6.35%	N/A	N/A	6.35% - 6.91%
Ultimate health care cost trend rate	N/A	N/A	6.35%	N/A	N/A	6.35% - 6.91%
Nominal average rate of price inflation	3.25%	5.00%	3.25%	3.31% - 3.80%	3.50%	3.25% - 3.80%

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	December 31, 2021		Foreign December 31, 2020	
	Underfunded pension plans	Other benefits	Underfunded pension plans	Other benefits
	Discount rate to determine benefit obligation	2.84%	3.03%	2.43%
Nominal average rate to determine expense/ income	2.62%	2.62%	3.04%	3.04%
Nominal average rate of salary increase	3.28%	N/A	3.21%	N/A
Nominal average rate of benefit increase	3.00%	N/A	3.00%	N/A
Immediate health care cost trend rate	N/A	5.11%	N/A	5.35%
Ultimate health care cost trend rate	N/A	4.57%	N/A	4.56%
Nominal average rate of price inflation	2.10%	N/A	2.08%	N/A

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:

	Brazil December 31, 2021		
	Overfunded pension plans	Underfunded pension plans	Other benefits
	Nominal discount rate - 1% increase		
Actuarial liability adjusted for the sensitivity test	13,585	1,539	2,156
Assumptions made	9.72%	7.50%	9.68%
Nominal discount rate - 1% reduction			
Actuarial liability adjusted for the sensitivity test	15,197	1,767	1,671
Assumptions made	7.72%	5.50%	7.68%

	Foreign December 31, 2021		
	Overfunded pension plans	Underfunded pension plans	Other benefits
	Nominal discount rate - 1% increase		
Actuarial liability adjusted for the sensitivity test	1,233	18,365	5,419
Assumptions made	2.85%	3.84%	4.03%
Nominal discount rate - 1% reduction			
Actuarial liability adjusted for the sensitivity test	1,808	23,773	7,327
Assumptions made	0.85%	1.84%	2.03%

viii. Assets of pension plans

Brazilian plan assets as at December 31, 2021 and 2020 includes respectively (i) investments in a portfolio of Vale's stock and other instruments in the amount of R\$281 (US\$50 million) and R\$105 (US\$20 million), which are presented as "Investments funds – Equity" and (ii) Brazilian Federal Government securities in the amount of R\$20,550 (US\$3,682 million) and R\$18,773 (US\$3,612 million), which are presented as "Debt securities governments" and "Investments funds – Fixed".

Foreign plan assets as at December 31, 2021 and 2020 includes Canadian Government securities in the amount of R\$3,806 (US\$682 million) and R\$3,575 (US\$688 million), respectively.

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ix. Overfunded pension plans

Assets by category are as follows:

	December 31, 2021				Consolidated December 31, 2020			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	Cash and cash equivalents	-	5	-	5	-	-	-
Debt securities - Corporate	7	412	-	419	-	219	-	219
Debt securities - Government	11,394	-	-	11,394	9,563	-	-	9,563
Investments funds - Fixed Income	10,660	978	-	11,638	11,649	-	-	11,649
Investments funds - Equity	2,524	-	-	2,524	2,057	-	-	2,057
International investments	510	-	-	510	164	-	-	164
Structured investments - Private Equity funds	-	718	573	1,291	-	-	653	653
Structured investments - Real estate funds	-	-	24	24	642	-	28	670
Real estate	-	-	1,187	1,187	-	-	1,325	1,325
Loans to participants	-	-	597	597	-	-	545	545
Total	25,095	2,113	2,381	29,589	24,075	219	2,551	26,845
Funds not related to risk plans (i)				(8,646)				(6,219)
Fair value of plan assets at end of year				20,943				20,626

(i) Financial investments not related to coverage of overfunded pension plans. Funds are related to the Company's unconsolidated entities and former employees.

Measurement of overfunded plan assets at fair value with no observable market variables (level 3) are as follows:

	December 31, 2021				
	Private equity funds	Real estate funds	Real estate	Loans to participants	Total
Balance as at December 31, 2019	632	70	1,301	567	2,570
Return on plan assets	94	(42)	46	99	197
Assets purchases	4	3	52	609	668
Assets sold during the year	(77)	(3)	(74)	(730)	(884)
Balance as at December 31, 2020	653	28	1,325	545	2,551
Return on plan assets	56	(5)	(80)	87	58
Assets purchases	1	2	19	360	382
Assets sold during the year	(137)	(1)	(77)	(395)	(610)
Balance as at December 31, 2021	573	24	1,187	597	2,381

x. Underfunded pension plans

Assets by category are as follows:

	December 31, 2021				Consolidated December 31, 2020			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
	Cash and cash equivalents	29	391	-	420	-	530	-
Equity securities	9,532	17	-	9,549	8,135	-	-	8,135
Debt securities - Corporate	-	3,106	-	3,106	-	2,697	-	2,697
Debt securities - Government	744	3,811	-	4,555	688	3,586	-	4,274
Investments funds - Fixed Income	211	-	-	211	188	821	-	1,009
Investments funds - Equity	16	964	298	1,278	5	1,820	-	1,825
Structured investments - Private Equity funds	-	-	1,010	1,010	-	-	1,299	1,299
Real estate	-	-	19	19	-	-	28	28
Loans to participants	-	-	7	7	-	-	12	12
Others	-	-	931	931	-	-	935	935
Total	10,532	8,289	2,265	21,086	9,016	9,454	2,274	20,744

Measurement of underfunded plan assets at fair value with no observable market variables (level 3) are as follows:

	Consolidated					
	Private equity funds	Equity pool	Real estate	Loans to participants	Others	Total
Balance as at December 31, 2019	855	-	221	12	668	1,756
Return on plan assets	5	-	(5)	-	-	-
Assets purchases	104	-	-	-	-	104
Assets sold during the year	(171)	-	-	-	-	(171)
Translation adjustment	506	-	(188)	-	268	586
Balance as at December 31, 2020	1,299	-	28	12	936	2,274
Return on plan assets	58	76	-	-	(76)	58
Assets purchases	151	210	-	-	-	361
Assets sold during the year	(588)	-	(4)	(3)	-	(595)
Translation adjustment	90	12	(5)	(2)	71	166
Balance as at December 31, 2021	1,010	298	19	7	931	2,264

xi. Disbursement of future cash flow

Vale expects to disburse R\$499 (US\$89 million) in 2022 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, 2021		
	Overfunded pension plans	Underfunded pension plans	Other benefits
2022	1,283	1,276	384
2023	1,297	1,274	390
2024	1,309	1,266	402
2025	1,323	1,259	392
2026	1,325	1,245	404
2027 and thereafter	6,676	6,054	2,163

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 R\$2,555 (US\$478 million), R\$2,460 (US\$476 million) and R\$1,243 (US\$316 million) for the years ended on December 31, 2021, 2020 and 2019, respectively.

c) Long-term incentive programs

For the long-term awarding of eligible executives, the Company compensation plans includes Matching program and Performance Share Unit program ("PSU"), with three years-vesting cycles, respectively, with the aim of encouraging employee's retention and encouraging their performance.

Matching Program

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 would lose its right of receiving the related award to be paid by Vale.

Performance Shares Units

For PSU program, the eligible executives may receive during a three year-vesting cycle an award equivalent to the market value of a determined number of common shares and depending on the Vale's performance factor, which is measured based on indicators of the 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.

At the Annual and Extraordinary Shareholders' Meeting ("AGOE") held on April 30, 2021, the Company's shareholders approved changes in the PSU program to be implemented as from the 2021 grant, consisting of (i) a change in the payment of the program award, which will be paid with common shares of the Company, and (ii) additional payment at the end of each cycle based on the remuneration that will be paid by Vale to its stockholders during the cycle.

d) Modification altering manner of settlement

As described in note 2, both programs were classified as "cash-settled" due to the PSU requirements and the Company's settlement practice for the Matching program and, therefore, presented as a liability. However, the decision taken at the AGOE ("modification date") demonstrates the Company's declared intention to change the form of liquidation of the programs. As a result, those programs were modified to become "equity-settled" and were remeasured at the modification-date fair value.

Remeasurement of the fair value of plans

The fair value of the Matching program was estimated using the Company's share price and ADR on the modification date, as described in note 2, in the amount of R\$109.02 and US\$20.12 per share, respectively. The number of shares granted on the grant date for the 2019, 2020 and 2021 cycles were 1,222,721, 2,154,534 and 1,046,255, respectively. The fair value of the program is recognized on a straight-line basis over three years (period of service required), net of estimated losses.

For the PSU, the program was remeasured by estimating the performance factor using Monte Carlo simulations for the Return to Shareholders Indicator and health and safety and sustainability indicators. The assumptions used for the Monte Carlo simulations are shown in the table below, as well as the result used to calculate the expected value of the total performance factor.

PSU	2021
Granted shares	1,474,723
Date shares were granted	04/30/2021
VALE (BRL)	109.02
VALE ON (USD)	20.12
Expected volatility	39.00%p.y.
Expected dividend yield	3.18%p.y.
Expected term (in years)	3
Expected shareholder return indicator	51.20%
Expected performance factor	60.96%

Reclassification from cash-settled to equity-settled

Matching	April 30, 2021	Remeasurement	Reclassification	May 1, 2021	Expense	December 31, 2021
Liability	164	23	(187)	-	-	-
Stockholders' equity	-	-	187	187	105	292
Net income	-	(23)	-	(23)	(105)	(128)

PSU	April 30, 2021	Remeasurement	Reclassification	May 1, 2021	Expense	December 31, 2021
Liability	16	(5)	(11)	-	-	-
Stockholders' equity	-	-	11	11	22	33
Net income	-	5	-	5	(22)	(17)

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 Performance Share unit ("PSU") Programs) with the goal of encouraging employee retention and optimum performance. Share-based long-term compensation programs are equity-settled, under which the Company receives employee services as consideration for equity instruments. The fair value of employee services received in exchange for the grant of options is recognized as an expense. The total amount of expenses is recognized during the period in which the right is acquired; period during which the specific vesting conditions are met.

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.

30. Stockholders' equity

a) Share capital

As at December 31, 2021, the share capital was R\$77,300 (US\$61,614 million) corresponding to 5,132,458,410 shares issued and fully paid without par value. The Board of Directors may, regardless of changes to by-laws, approve the issue and cancellation of common shares, including the capitalization of profits and reserves to the extent authorized.

Stockholders	December 31, 2021		
	Common shares	Golden shares	Total
Shareholders with more than 5% of total capital	1,910,844,005	-	1,910,844,005
Previ	415,794,956	-	415,794,956
Capital World Investors	335,249,101	-	335,249,101
Capital Research Global Investors	326,001,911	-	326,001,911
Mitsui&co	286,347,055	-	286,347,055
Blackrock, Inc	279,562,772	-	279,562,772
Capital International Investors	267,888,210	-	267,888,210
Others	2,928,772,919	-	2,928,772,919
Golden shares	-	12	12
Total outstanding (without shares in treasury)	4,839,616,924	12	4,839,616,936
Shares in treasury	292,841,474	-	292,841,474
Total capital	5,132,458,398	12	5,132,458,410

The information presented above is based on communications sent by stockholders pursuant to Instruction 358 issued by the Brazilian Securities Exchange Commission ("CVM").

b) Share buyback program and treasury shares

(b.i) Share buyback program

On April 1, 2021, the Board of Directors approved a share buyback program for Vale's stocks limited to a maximum of 270,000,000 stocks, and their respective ADRs, representing up to 5.3% of the total number of outstanding shares on that date. This program was concluded in November with the repurchase of all shares, corresponding to the amount of R\$27,642 (US\$5,281 million), of which R\$12,068 (US\$2,273 million) through wholly-owned subsidiaries and R\$15,574 (US\$3,008 million) directly by the Parent Company.

Following the previous program, the Board of Directors approved on October 28, 2021, a new share buyback program for Vale's stocks limited to a maximum of 200,000,000 stocks, and their respective ADRs, representing up to 4.1% of the total number of outstanding stocks on that date. Until December 31, 2021, the Company repurchased 21,184,500 shares, in the amount of R\$1,479 (US\$264 million), through wholly-owned subsidiaries.

Thus, as at December 31, 2021, the Company repurchased 291,184,500 stocks at an average price of R\$ 100.01 (US\$19.04) per stock, being 152,166,153 through its wholly-owned subsidiaries and 139,018,347 directly by the Parent Company. The total amount acquired was R\$29,121 (US\$5,546 million), of which R\$13,547 (US\$2,538 million) through its wholly owned subsidiaries and R\$15,574 (US\$3,008 million) by the Parent Company. The subsidiaries continue to hold the acquired stocks as at December 31, 2021.

(b.ii) Cancellation of treasury shares

In 2021, the Board of Directors approved the cancellation of 152,016,372 common shares of the Company acquired in previous buyback programs and held in treasury, without reducing its share capital. The impact of R\$6,347 (US\$2,401 million) was recorded in the stockholders' equity as "Treasury shares utilized and canceled".

On February 24, 2022 (subsequent event), the Board of Directors approved the cancellation of 133,418,347 common shares issued by the Company and held in treasury, without reducing the value of its capital stock.

(b.iii) Treasury shares used for the share-based payment program

In 2021, the Company used 890,482 stocks from its treasury stocks (2020: 1,628,485 stocks), for share-based payment program of its executives (note 2g), corresponding to R\$37 (US\$7 million) (2020: R\$68 (US\$14 million)) recorded as "Treasury shares utilized and canceled" in the stockholders' equity for the year ended December 31, 2021.

c) Profit distribution

	2021
Net income of the year	121,228
Appropriation to legal reserve	(6,061)
Appropriation to tax incentive reserve	(13,779)
Net income after appropriations to legal reserve and tax incentive reserve	101,388
Reclassification of the fair value adjustment reserve (nota 14a)	2,911
Approved remuneration (i)	43,834
Additional Stockholders' remuneration	17,849
Appropriation to investments reserve	42,616

(i) Of the total remuneration to shareholders for fiscal year 2021, R\$25,346 (US\$4,542 million) totals the minimum mandatory remuneration for fiscal year 2021, which, according to the Company's Bylaws, must represent 25% of net income, after the allocations of the legal reserve and tax incentive reserve. This amount was paid in full in 2021.

(c.i) Remuneration approved

In 2021, the Company approved and paid dividends and interest on capital to stockholders in the amount of R\$51,246 (US\$9,844 million) as follows, (i) R\$11,046 (US\$2,200 million) as approved by the Board of Directors on June 17, 2021; and (ii) R\$40,200 (US\$7,644 million), approved by the Board of Directors on September 16, 2021. Of the total amount paid, R\$7,411 (US\$1,476 million) was approved from the profits reserve and the remaining amount as an anticipation of the income for the year ended December 31, 2021.

(c.ii) Additional remuneration

On February 24, 2022 (subsequent event), the Board of Directors approved the stockholder's remuneration in the total gross amount of R\$17,849 (US\$3,500 million). The payment is expected to be on March 16, 2022.

(c.iii) Stockholder's remuneration for the year 2020

On February 25, 2021, the Board of Directors approved the stockholder's remuneration in the amount of R\$21,866 (US\$3,972 million). Of the total amount, R\$6,342 (US\$1,152 million) represents the minimum mandatory remuneration for 2020 and was recorded as "Dividends payable" in the Company's current liabilities as at December 31, 2020. The remaining amount of R\$15,524 (US\$2,820 million) was approved as additional remuneration to the Company's stockholders and recorded in the stockholders' equity as "Additional remuneration reserve" as at December 31, 2020. This amount was paid in full on March 15, 2021.

(c.iv) Profit reserves

Of the total amount of profit reserves, after deducting the balance of legal, tax incentive and treasury shares reserves, as required by Brazilian corporate law, R\$26,485 (US\$4,746 million) represents the amount of reserves available for distribution to the Company's stockholders.

	Legal reserve	Tax incentive reserve	Investment's reserve	Additional remuneration reserve	Total of profit reserves
Balance as at December 31, 2019	6,675	3,418	18,484	-	28,577
Allocation of income	1,336	9	3,502	15,524	20,371
Deliberated dividends and interest on capital of Vale's stockholders	-	-	(12,350)	-	(12,350)
Balance as at December 31, 2020	8,011	3,427	9,636	15,524	36,598
Allocation of income	6,061	13,779	42,616	17,849	80,305
Deliberated dividends and interest on capital of Vale's stockholders	-	-	(7,411)	(15,524)	(22,935)
Treasury shares cancellation	-	-	(6,347)	-	(6,347)
Balance as at December 31, 2021	14,072	17,206	38,494	17,849	87,621

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.

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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.

Additional remuneration reserve - Results from the remuneration proposed by Management that exceeds the mandatory minimum remuneration of 25% of the adjusted net income.

Accounting policy

Share capital and treasury shares - The Company holds stocks in treasury for a future sale, cancellation or for the payment of the executives' long-term compensation programs. These stocks are recognized in a specific account as a reduction of stockholders' equity to the acquisition value and maintained at the cost of the transaction. 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.

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.

31. Related parties

The Company's related parties are subsidiaries, joint ventures, associates, stockholders and its related entities and key management personnel of the Company.

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.

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.

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.

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a) Transactions with related parties

	Consolidated								
	Year ended December 31, 2021			Year ended December 31, 2020			Year ended December 31, 2019		
	Net operating revenue	Cost and operating expenses	Financial result	Net operating revenue	Cost and operating expenses	Financial result	Net operating revenue	Cost and operating expenses	Financial result
Joint Ventures	3,464	(4,599)	(68)	1,945	(2,819)	(52)	1,480	(4,160)	(62)
Companhia Siderúrgica do Pecém	3,438	-	14	1,845	-	38	1,412	-	8
Aliança Geração de Energia S.A.	26	(564)	-	100	(540)	-	65	(507)	-
Pelletizing companies (i)	-	(1,872)	(79)	-	(507)	(87)	-	(2,250)	(150)
MRS Logística S.A.	-	(1,498)	-	-	(1,187)	-	-	(793)	-
Norte Energia S.A.	-	(612)	-	-	(515)	-	-	(562)	-
Others	-	(53)	(3)	-	(70)	(3)	3	(48)	80
Associates	1,379	(115)	(9)	1,233	(127)	9	1,164	(127)	(3)
VLI	1,374	(115)	(9)	1,208	(127)	(6)	1,107	(127)	(3)
Others	5	-	-	25	-	15	57	-	-
Major stockholders (ii)	1,416	-	(2,906)	964	-	(166)	809	-	(46)
Bradesco	-	-	(2,978)	-	-	(255)	-	-	(126)
Banco do Brasil	-	-	72	-	-	89	-	-	80
Mitsui	1,416	-	-	964	-	-	809	-	-
Total of continuing operations	6,259	(4,714)	(2,983)	4,142	(2,946)	(209)	3,453	(4,287)	(111)
Discontinued operation - Coal (note 16)	-	(518)	81	-	(2,078)	116	-	(2,723)	269
Total	6,259	(5,232)	(2,902)	4,142	(5,024)	(93)	3,453	(7,010)	158

	Parent Company					
	Year ended December 31, 2021			Year ended December 31, 2020		
	Net operating revenue	Cost and operating expenses	Financial result	Net operating revenue	Cost and operating expenses	Financial result
Subsidiaries	193,821	(2,510)	(1,682)	114,856	(3,383)	(6,394)
Vale International	193,650	-	(1,631)	114,692	-	(6,498)
Others	171	(2,510)	(51)	164	(3,383)	104
Joint Ventures	3,428	(4,599)	(28)	1,801	(2,819)	1
Companhia Siderúrgica do Pecém	3,428	-	14	1,801	-	38
Aliança Geração de Energia S.A.	-	(564)	-	-	(540)	-
Pelletizing companies (i)	-	(1,872)	(39)	-	(507)	(33)
MRS Logística S.A.	-	(1,498)	-	-	(1,187)	-
Norte Energia S.A.	-	(612)	-	-	(515)	-
Others	-	(53)	(3)	-	(70)	(4)
Associates	1,379	(115)	(9)	1,233	(127)	7
VLI	1,374	(115)	(9)	1,208	(127)	(6)
Others	5	-	-	25	-	13
Major stockholders (iii)	-	-	(2,911)	-	-	(168)
Bradesco	-	-	(2,978)	-	-	(255)
Banco do Brasil	-	-	67	-	-	87
Total of continuing operations	198,628	(7,224)	(4,630)	117,890	(6,329)	(6,554)
Total	198,628	(7,224)	(4,630)	117,890	(6,329)	(6,554)

(i) Aggregated entities: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, and Companhia Nipo-Brasileira de Pelotização.

(ii) Refers to the stockholders that were part of the controlling "shareholders' agreement", which has expired on November 10, 2020.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



b) Outstanding balances with related parties

	December 31, 2021				Consolidated December 31, 2020			
	Assets				Assets			
	Cash and cash equivalents	Accounts receivable	Loans	Dividends receivable	Cash and cash equivalents	Accounts receivable	Loans (iii)	Dividends receivable
Joint Ventures	-	419	-	536	-	565	-	288
Companhia Siderúrgica do Pecém	-	414	-	219	-	563	-	187
Pelletizing companies (i)	-	-	-	208	-	-	-	72
MRS Logística S.A.	-	-	-	105	-	-	-	27
Others	-	5	-	4	-	2	-	2
Associates	-	102	-	17	-	236	-	8
VLI	-	87	-	-	-	81	-	-
Others	-	15	-	17	-	155	-	8
Major stockholders (ii)	10,184	23	-	28	10,817	11	-	12
Bradesco	9,744	-	-	28	7,886	-	-	12
Mitsui	-	23	-	-	-	11	-	-
Banco do Brasil	440	-	-	-	2,931	-	-	-
Pension plan	-	64	-	-	-	57	-	-
Total	10,184	608	-	581	10,817	869	-	308
Discontinued operation - Coal (note 16)	-	-	-	-	-	-	5,800	167
Total	10,184	608	-	581	10,817	869	5,800	475

(i) Aggregated entities: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, and Companhia Nipo-Brasileira de Pelotização.

(ii) Refers to the stockholders that were part of the controlling “shareholders’ agreement”, which has expired on November 10, 2020.

(iii) Refers to the loan with Nacala Logistics Corridor, presented in note 16.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



	December 31, 2021			Consolidated December 31, 2020		
	Liabilities			Liabilities		
	Supplier and contractors	Loans	Financial instruments and other liabilities	Supplier and contractors	Loans	Financial instruments and other liabilities
Joint Ventures	388	-	2,192	622	-	1,222
Pelletizing companies (i)	73	-	2,192	190	-	1,222
MRS Logística S.A.	228	-	-	249	-	-
Others	87	-	-	183	-	-
Associates	265	-	262	214	-	248
VLI	32	-	262	34	-	248
Others	233	-	-	180	-	-
Major stockholders (ii)	-	-	1,460	-	4,907	1,282
Bradesco	-	-	1,451	-	-	1,282
Mitsui	-	-	9	-	-	-
BNDES (iii)	-	-	-	-	4,907	-
Others	5	-	-	1	-	-
Pension plan	54	-	-	55	-	-
Total	712	-	3,914	892	4,907	2,752
Discontinued operation - Coal (note 16)	-	-	-	5	7,192	-
Total	712	-	3,914	897	12,099	2,752

(i) Aggregated entities: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, and Companhia Nipo-Brasileira de Pelotização.

(ii) Refers to regular financial instruments with the stockholders were part of the controlling "shareholders' agreement", which has expired on November 10, 2020.

(iii) *Banco Nacional de Desenvolvimento* ("BNDES") is no longer considered a Company's related party, and therefore, balances with BNDES as at December 31, 2021 are not presented in this note.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



	December 31, 2021						Parent Company
	Assets			Assets			December 31, 2020
	Cash and cash equivalents	Accounts receivable	Dividends receivable	Cash and cash equivalents	Accounts receivable	Dividends receivable	
Subsidiaries	-	45,475	-	-	44,309	-	-
Vale International S.A.	-	45,430	-	-	44,265	-	-
Other	-	45	-	-	44	-	-
Joint Ventures	-	403	449	-	545	262	
Companhia Siderúrgica do Pecém	-	401	219	-	544	187	
Pelletizing companies (i)	-	-	208	-	-	72	
MRS Logística S.A.	-	-	18	-	-	1	
Other	-	2	4	-	1	2	
Associates	-	102	17	-	97	8	
VLI	-	87	-	-	81	-	
Other	-	15	17	-	16	8	
Major stockholders (ii)	8,355	-	28	5,253	-	12	
Bradesco	7,970	-	28	4,427	-	12	
Banco do Brasil	385	-	-	826	-	-	
Pension Plan	-	64	-	-	57	-	
Total	8,355	46,044	494	5,253	45,008	282	

(i) Aggregated entities: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, and Companhia Nipo-Brasileira de Pelotização.

(ii) Refers to regular financial instruments with the stockholders were part of the controlling “shareholders’ agreement”, which has expired on November 10, 2020.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



	December 31, 2021			Parent Company December 31, 2020		
	Liabilities		Financial instruments and other liabilities	Liabilities		Financial instruments and other liabilities
	Supplier and contractors	Loans		Supplier and contractors	Loans	
Subsidiaries	135	88,360	-	2,121	91,392	-
Vale International S.A. (i)	-	86,125	-	-	90,115	-
Minerações Brasileiras Reunidas S.A.	-	-	-	1,957	-	-
Others	135	2,235	-	164	1,277	-
Joint Ventures	387	-	-	622	-	-
Pelletizing companies (ii)	73	-	-	190	-	-
MRS Logística S.A.	228	-	-	249	-	-
Others	86	-	-	183	-	-
Associates	250	-	262	192	-	248
VLI	32	-	262	34	-	248
Others	218	-	-	158	-	-
Major stockholders (iii)	5	-	1,479	1	-	6,189
Bradesco	-	-	1,479	-	-	1,282
BNDES (iv)	-	-	-	-	-	4,907
Others	5	-	-	1	-	-
Pension plan	54	-	-	55	-	-
Total	831	88,360	1,741	2,991	91,392	6,437

(i) Refers mainly to long-term loans to Vale International, of which R\$74,645 (US\$13,376 million) are allocated as Vale's net investment in foreign operations (note 15).

(ii) Aggregated entities: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, and Companhia Nipo-Brasileira de Pelotização.

(iii) Refers to regular financial instruments with the stockholders were part of the controlling "shareholders' agreement", which has expired on November 10, 2020.

(iv) *Banco Nacional de Desenvolvimento* ("BNDES") is no longer considered a Company's related party, and therefore, balances with BNDES as at December 31, 2021 are not presented in this note.

c) The key management personnel remuneration

	Year ended December 31,		
	2021	2020	2019
Short-term benefits			
Wages	49	48	49
Direct and indirect benefits	7	7	8
Profit sharing program ("PLR")	56	39	34
	112	94	91
Long-term benefits			
Shares based	67	63	32
Severance	8	34	12
	187	191	135

The amounts presented in the table above are on an accrual basis and include the compensation of the Executive Directors and members of the Company's Board of Directors, however, the amount effectively paid in the years 2021, 2020 and 2019 was R\$207 (US\$38 million), R\$176 (US\$34 million) and R\$103 (US\$26 million), respectively.

32. Commitments

The commitments mainly relate 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, 2021 are as follows:

	Consolidated	
	December 31, 2021	December 31, 2020
Purchase obligations	27,984	36,328
Purchase of energy	15,322	15,306
Total minimum payments required	43,306	51,634