



Financial Statements

December 31, 2019

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

To the Board of Directors and Shareholders
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, 2019 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, 2019 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 a summary of significant accounting policies.

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, 2019, 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).

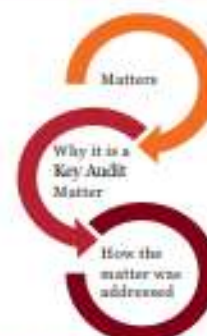
Basis for opinion

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 in the 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.

Vale S.A.

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
<p>Brumadinho's dam failure (Note 3)</p> <p>On January 25, Dam I failed at the Corrêgo do Feijão mine, which belongs to the Paraopeba Complex in the Southern System, located in Brumadinho, Minas Gerais, Brazil ("Brumadinho Dam").</p> <p>The Company incurred in expenses and recorded provisions, related to (i) support and repair measures for those affected and the recovery of affected areas; and (ii) de-characterization of all its tailings dams built using the same method as the Brumadinho Dam (upstream method).</p> <p>The referred provisions involved critical management judgments in determining the assumptions and bases used, which also had the support of specialized external consultants hired for this purpose. Variations in the main assumptions used, such as (i) volume of tailings to be removed; (ii) availability of places to deposit tailings; (iii) approval of the engineering methods and solutions presented to the relevant authorities; and (iv) amounts related to indemnity payments to people affected by the dam failure, among others, may result in significant changes in the amounts recorded at December 31, 2019.</p> <p>Additionally, given the nature and uncertainties inherent in this type of event, the amounts recognized and disclosed will be reassessed by the Company and may be adjusted significantly in future periods, as new facts and circumstances become known.</p>	<p>Our audit procedures included, among others, the understanding and assessment of the significant internal controls established by the Company's management related to the recording and monitoring of the quantitative and qualitative impacts on the financial statements arising from this event.</p> <p>We read the main terms and agreements signed, discussed with management on these terms and agreements and others in progress, as well as read other technical documents used by the Company's management to support the expenses and provisions made.</p> <p>We obtained, on a sample basis, the supporting documentation of the expenses incurred and evaluated the reasonableness of the calculation models and the significant assumptions used, with the support of our engineering specialists.</p> <p>As a result of the procedures described above, we consider that the measurement model and the assumptions adopted by the Company's management to calculate and record these provisions are reasonable, and that the respective disclosures in the financial statements are consistent with the information obtained during our audit.</p>



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Why it is a Key Audit Matter

How the matter was addressed in the audit

Accordingly, due to these aspects, this matter was considered an area of focus in our audit.

Impairment of investments, property, plant and equipment, intangible assets and goodwill based on expected future returns (Note 20)

The Company is required to perform, at least once a year, the impairment test of the goodwill based on expected future returns allocated in the ferrous mineral and nickel segments, and also assess the impairment indicators for the other non-financial assets, including investments in subsidiaries. As part of this assessment, the Company determines an estimate of future cash flows for each Cash-generating unit ("CGU"), considering different factors and internal and external assumptions

According to the reasons described in the corresponding note to the financial statements, during 2019, the Company recognized impairment of assets related to the UGC of Mozambique and New Caledonia.

To assess the recoverable value of these non-financial assets, the Company determines cash flows based on budgets approved by management and projected internal and external information, which are susceptible to the following significant assumptions: (i) discount rate; (ii) future sales prices of products; (iii) mineral reserves and resources; (iv) production volume; and (v) costs and investments. These assumptions may significantly change in relation to those projected by the Company due to adverse economic conditions.

Due to the aforementioned aspects, this matter was considered an area of focus in our audit.

Our audit procedures included, among others, the evaluation of the design and test of the effectiveness of the significant internal controls related to the process of determining the recoverable value of non-financial assets.

We compared the information used in the impairment tests with the Budget Plan approved by the Company's Board of Directors and tested the mathematical accuracy of the calculations, as well as discussed the main assumptions used in the cash flow projections.

We also evaluated, with the support of our valuation and engineering experts, the reasonableness of the calculation models and the significant assumptions used, including the discount rate, as well as conducting a sensitivity test on these assumptions used by the Company.

Finally, we read the disclosures made in the notes to the financial statements.

As a result of the procedures described above, we consider that the measurement model and the assumptions adopted by the Company's management to assess the impairment of the non-financial assets are reasonable, and that the respective disclosures in the financial statements are consistent with the information obtained during our work.



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Provision for tax contingencies (Notes 2 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\$ 2,80.4 million was recorded.

The definition of the amount of the provision and of the contingent liabilities depends on critical judgments by management regarding the settlement term and amount.

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

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 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 their conclusions on the impacts of initial adoption of 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 positions of legal advisers.



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Other matters

Statements of Value Added

The parent company and consolidated Statements of Value Added for the year ended December 31, 2019, 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 - "Statement of Value Added". In our opinion, these Statements of Value Added 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.

Audit of prior-year information

The audit of the financial statements for the year ended December 31, 2018 was conducted by other independent auditors, who issued an unqualified audit report dated March 27, 2019, with an emphasis of matter paragraph related to a subsequent event resulting from the Brumadinho's dam failure occurred on January 25, 2019.

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.



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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.

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.



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- 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 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 20, 2020

PricewaterhouseCoopers
Auditores Independentes
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	
		Year ended December 31			2019	2018
		2019	2018	2017	2019	2018
Continuing operations						
Net operating revenue	4(d)	148,640	134,483	108,532	86,428	81,133
Cost of goods sold and services rendered	5(a)	(83,836)	(81,201)	(67,257)	(37,509)	(39,051)
Gross profit		64,804	53,282	41,275	48,919	42,082
Operating revenues (expenses)						
Selling and administrative expenses	5(b)	(1,924)	(1,917)	(1,697)	(934)	(959)
Research and evaluation expenses		(1,765)	(1,376)	(1,086)	(877)	(839)
Pre-operating and operational stoppage		(4,559)	(984)	(1,317)	(4,389)	(754)
Equity results from subsidiaries	16	-	-	-	(6,670)	4,195
Brumadinho event	3	(28,818)	-	-	(28,818)	-
Other operating expenses, net	5(c)	(2,052)	(1,613)	(1,338)	(1,770)	(1,163)
		(39,118)	(5,890)	(5,438)	(43,458)	480
Impairment and disposals of non-current assets	20	(20,762)	(3,523)	(1,025)	(1,204)	(792)
Operating income		4,924	43,869	34,812	4,257	41,770
Financial income	6	2,092	1,549	1,532	485	282
Financial expenses	6	(14,973)	(8,394)	(10,512)	(13,770)	(7,673)
Other financial items, net	6	(565)	(11,213)	(670)	(205)	(10,059)
Equity results and other results in associates and joint ventures	16 and 22	(2,684)	(693)	(277)	(2,684)	(693)
Income (loss) before income taxes		(11,206)	25,118	24,885	(11,917)	23,627
Income taxes	8					
Current tax		(5,985)	(2,806)	(2,664)	(4,705)	(1,172)
Deferred tax		8,494	3,772	(1,943)	9,950	3,512
		2,509	966	(4,607)	5,245	2,340
Net income (loss) from continuing operations		(8,697)	26,084	20,278	(6,672)	25,967
Net income (loss) attributable to noncontrolling interests		(2,025)	117	65	-	-
Net income (loss) from continuing operations attributable to Vale's stockholders		(6,672)	25,967	20,213	(6,672)	25,967
Discontinued operations	14					
Loss from discontinued operations		-	(310)	(2,608)	-	(310)
Loss attributable to noncontrolling interests		-	-	(22)	-	-
Loss from discontinued operations attributable to Vale's stockholders		-	(310)	(2,586)	-	(310)
Net income (loss)		(8,697)	25,774	17,670	(6,672)	25,657
Net income (loss) attributable to noncontrolling interests		(2,025)	117	43	-	-
Net income (loss) attributable to Vale's stockholders		(6,672)	25,657	17,627	(6,672)	25,657
Earnings (loss) per share attributable to Vale's stockholders:						
Basic and diluted earnings (loss) per share:	9					
Common share (R\$)		(1.30)	4.95	3.39	(1.30)	4.95

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

Statement of Comprehensive Income

In millions of Brazilian reais

	Consolidated			Parent company	
				Year ended December 31	
	2019	2018	2017	2019	2018
Net income (loss)	(8,697)	25,774	17,670	(6,672)	25,657
Other comprehensive income (loss):					
Items that will not be subsequently reclassified to income statement					
Retirement benefit obligations	(486)	142	(164)	(414)	(112)
Fair value adjustment to investment in equity securities	(735)	275	-	(596)	228
Equity results	-	-	-	(211)	301
Transfer to reserve	-	(51)	-	-	(51)
Total items that will not be subsequently reclassified to income statement, net of tax	(1,221)	366	(164)	(1,221)	366
Items that may be subsequently reclassified to income statement					
Translation adjustments	4,812	14,541	3,337	4,626	14,244
Net investments hedge (note 25c)	(324)	(1,958)	(310)	(324)	(1,958)
Cash flow hedge	427	-	-	-	-
Equity results	-	-	-	427	-
Transfer of realized results to net income	-	(257)	(34)	-	(112)
Total of items that may be subsequently reclassified to income statement, net of tax	4,915	12,326	2,993	4,729	12,174
Total comprehensive income (loss)	(5,003)	38,466	20,499	(3,164)	38,197
Comprehensive income (loss) attributable to noncontrolling interests	(1,839)	269	37		
Comprehensive income (loss) attributable to Vale's stockholders	(3,164)	38,197	20,462		
From continuing operations	(3,164)	38,181	20,568		
From discontinued operations	-	16	(106)		
	(3,164)	38,197	20,462		

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	
				Year ended December 31	
	2019	2018	2017	2019	2018
Cash flow from operations (a)	61,163	56,682	49,857	46,455	39,079
Interest on loans and borrowings paid (note 21)	(4,760)	(4,023)	(5,373)	(4,845)	(5,769)
Derivatives received (paid), net	(1,287)	(250)	(763)	(1,485)	(381)
Interest on participative stockholders' debentures paid	(715)	(400)	(428)	(715)	(400)
Income taxes (including settlement program)	(7,119)	(4,089)	(3,322)	(5,557)	(1,932)
Net cash provided by operating activities from continuing operations	47,282	47,920	39,971	33,853	30,597
Cash flow from investing activities:					
Capital expenditures	(14,774)	(13,899)	(12,236)	(7,572)	(8,200)
Additions to investments	(287)	(79)	(292)	(2,852)	(1,515)
Acquisition of subsidiary, net of cash (note 14)	(3,513)	-	-	(3,513)	-
Proceeds from disposal of assets and investments	546	4,959	2,926	90	492
Dividends received from associates and joint ventures	1,423	922	739	3,901	2,836
Judicial deposits and restricted cash (note 3)	(6,169)	-	-	(6,169)	-
Short-term investment (LFTs)	(3,408)	(180)	(256)	(3,502)	(153)
Other investments activities, net (i)	(358)	7,353	(1,571)	(5,505)	5,963
Net cash used in investing activities from continuing operations	(26,540)	(924)	(10,690)	(25,122)	(577)
Cash flow from financing activities:					
Loans and borrowings from third-parties (note 21)	(9,988)	(23,565)	(22,655)	(3,615)	(10,788)
Payments of leasing (note 2d)	(891)	-	-	(354)	-
Dividends and interest on capital paid to stockholders	-	(12,415)	(4,667)	-	(12,415)
Dividends and interest on capital paid to noncontrolling interest	(695)	(635)	(404)	-	-
Share buyback program	-	(3,858)	-	-	(3,858)
Transactions with noncontrolling stockholders (note 14)	(3,310)	(56)	(305)	-	-
Net cash used in financing activities from continuing operations	(14,884)	(40,529)	(28,031)	(3,969)	(27,061)
Net cash used in discontinued operations	-	(157)	(817)	-	-
Increase in cash and cash equivalents	5,858	6,310	433	4,762	2,959
Cash and cash equivalents in the beginning of the year	22,413	14,318	13,891	4,835	1,876
Effect of exchange rate changes on cash and cash equivalents	1,356	2,170	38	-	-
Effects of disposals of subsidiaries and merger, net of cash and cash equivalents	-	(385)	(44)	-	-
Cash and cash equivalents at end of the year	29,627	22,413	14,318	9,597	4,835
Non-cash transactions:					
Additions to property, plant and equipment - capitalized loans and borrowing costs	551	704	1,179	549	700
Cash flow from operating activities:					
Income (loss) before income taxes from continuing operations	(11,206)	25,118	24,885	(11,917)	23,627
Adjusted for:					
Provisions related to Brumadinho (note 3)	25,447	-	-	25,447	-
Equity results from subsidiaries	-	-	-	6,670	(4,195)
Equity results and other results in associates and joint ventures	2,684	693	277	2,684	693
Impairment and disposal of non-current assets	20,762	3,523	1,025	1,204	792
Depreciation, amortization and depletion	14,751	12,240	11,842	7,752	6,059
Financial results, net	13,446	18,058	9,650	13,490	17,450
Changes in assets and liabilities:					
Accounts receivable	(41)	(1,012)	3,983	3,743	(5,762)
Inventories	669	(2,994)	(1,030)	(536)	(174)
Suppliers and contractors (ii)	2,836	(1,414)	691	3,397	(642)
Provision - Payroll, related charges and other remunerations	(318)	349	1,236	131	514
Proceeds from streaming transactions (note 7)	-	2,603	-	-	-
Payments related to Brumadinho (note 3) (iii)	(3,982)	-	-	(3,982)	-
Other assets and liabilities, net	(3,885)	(482)	(2,702)	(1,628)	717
Cash flow from operations (a)	61,163	56,682	49,857	46,455	39,079

(i) Includes loans and advances from/to related parties. For the year ended December 31, 2018, includes proceeds received from Nacala project finance (note 31b) in the amount of R\$8,434.

(ii) Includes variable lease payments.

(iii) Additionally, the Company has incurred in expenses in the amount of R\$2,903 recognized straight to the income statement, totaling the amount of R\$6,885 have already been disbursed by the Company related to the Brumadinho event.

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

Statement of Financial Position

In millions of Brazilian reais

		Consolidated		Parent company	
		December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
	Notes				
Assets					
Current assets					
Cash and cash equivalents		29,627	22,413	9,597	4,835
Short-term investments	21	3,329	125	3,309	4
Accounts receivable	10	10,195	10,261	16,599	17,333
Other financial assets	13	3,062	1,558	1,140	356
Inventories	11	17,228	17,216	5,310	4,775
Prepaid income taxes		1,492	2,104	648	1,938
Recoverable taxes	12	2,227	3,422	929	2,024
Others		1,538	2,157	1,569	2,096
		68,698	59,256	39,101	33,361
Non-current assets					
Judicial deposits	28(c)	12,734	6,649	12,268	6,274
Other financial assets	13	10,969	12,180	3,946	5,276
Prepaid income taxes		2,407	2,107	-	-
Recoverable taxes	12	2,446	2,913	1,471	2,281
Deferred income taxes	8(a)	37,151	26,767	28,770	17,536
Others		1,998	1,015	937	1,163
		67,705	51,631	47,392	32,530
Investments	16	11,278	12,495	144,594	139,510
Intangibles	18	34,257	30,850	16,271	15,622
Property, plant and equipment	19	187,733	187,481	105,875	103,816
		300,973	282,457	314,132	291,478
Total assets		369,671	341,713	353,233	324,839
Liabilities					
Current liabilities					
Suppliers and contractors		16,556	13,610	10,765	7,342
Loans and borrowings	21	4,895	3,889	3,986	2,523
Leases	2(d)	910	-	337	-
Other financial liabilities	13	4,328	6,213	6,672	5,083
Taxes payable		2,065	1,659	1,062	806
Settlement program ("REFIS")	8(d)	1,737	1,673	1,702	1,638
Liabilities related to associates and joint ventures	22	2,079	1,120	2,079	1,120
Provisions	26	4,956	5,278	3,210	3,331
Liabilities related to Brumadinho	3	6,319	-	6,319	-
De-characterization of dams	3	1,247	-	1,247	-
Interest on capital		6,333	-	6,333	-
Others		4,381	1,843	3,187	2,743
		55,806	35,285	46,899	24,586
Non-current liabilities					
Loans and borrowings	21	47,730	56,039	18,713	23,082
Leases	2(d)	6,308	-	1,833	-
Other financial liabilities	13	17,622	11,155	76,365	72,384
Settlement program ("REFIS")	8(d)	14,012	15,179	13,733	14,876
Deferred income taxes	8(a)	7,585	5,936	-	-
Provisions	26	34,233	27,491	11,368	9,758
Liabilities related to Brumadinho	3	5,703	-	5,703	-
De-characterization of dams	3	8,787	-	8,787	-
Liabilities related to associates and joint ventures	22	4,774	3,226	4,774	3,226
Streaming transactions	7	8,313	8,886	-	-
Others		1,649	4,833	3,578	6,524
		156,716	132,745	144,854	129,850
Total liabilities		212,522	168,030	191,753	154,436
Stockholders' equity					
Equity attributable to Vale's stockholders	30	161,480	170,403	161,480	170,403
Equity attributable to noncontrolling interests		(4,331)	3,280	-	-
Total stockholders' equity		157,149	173,683	161,480	170,403
Total liabilities and stockholders' equity		369,671	341,713	353,233	324,839

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, 2016	77,300	-	13,698	(2,746)	(5,559)	44,548	-	127,241	6,461	133,702
Net income	-	-	-	-	-	-	17,627	17,627	43	17,670
Other comprehensive income	-	-	-	-	(173)	3,008	-	2,835	(6)	2,829
Dividends and interest on capital of Vale's stockholders	-	-	(2,065)	-	-	-	(4,721)	(6,786)	-	(6,786)
Dividends of noncontrolling interest	-	-	-	-	-	-	-	-	(627)	(627)
Acquisitions and disposal of noncontrolling interest	-	-	-	-	(793)	-	-	(793)	(1,629)	(2,422)
Capitalization of noncontrolling interest advances	-	-	-	-	-	-	-	-	106	106
Appropriation to undistributed retained earnings	-	-	12,906	-	-	-	(12,906)	-	-	-
Merger of Valepar (note 30)	-	3,634	-	-	-	-	-	3,634	-	3,634
Balance at December 31, 2017	77,300	3,634	24,539	(2,746)	(6,525)	47,556	-	143,758	4,348	148,106
Net income	-	-	-	-	-	-	25,657	25,657	117	25,774
Other comprehensive income	-	-	-	-	613	11,927	-	12,540	152	12,692
Dividends and interest on capital of Vale's stockholders	-	-	-	-	-	-	(7,694)	(7,694)	-	(7,694)
Dividends of noncontrolling interest	-	-	-	-	-	-	-	-	(629)	(629)
Acquisitions and disposal of noncontrolling interest	-	-	-	-	-	-	-	-	(757)	(757)
Capitalization of noncontrolling interest advances	-	-	-	-	-	-	-	-	49	49
Appropriation to undistributed retained earnings	-	-	17,963	-	-	-	(17,963)	-	-	-
Share buyback program	-	-	-	(3,858)	-	-	-	(3,858)	-	(3,858)
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	-	-	-
Assignment and transfer of shares (note 30)	-	-	-	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

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

Value Added Statement

In millions of Brazilian Reals

	Consolidated		Parent company	
			Year ended December 31	
	2019	2018	2019	2018
Generation of value added from continuing operations				
Gross revenue				
Revenue from products and services	149,982	136,005	87,588	82,301
Revenue from the construction of own assets	6,584	12,620	3,448	8,031
Other revenues	725	7,613	436	3,333
Cost of products, goods and services sold	(22,780)	(23,238)	(10,757)	(12,031)
Material, energy, third-party services and other	(36,475)	(39,244)	(11,201)	(14,190)
Impairment of non-current assets and others results	(20,762)	(3,523)	(1,204)	(792)
Brumadinho event	(28,818)	-	(28,818)	-
Other costs and expenses	(11,460)	(10,172)	(7,574)	(7,159)
Gross value added	36,996	80,061	31,918	59,493
Depreciation, amortization and depletion	(14,751)	(12,240)	(7,752)	(6,059)
Net value added	22,245	67,821	24,166	53,434
Received from third parties				
Equity results from entities	(2,684)	(693)	(9,354)	3,502
Financial income	3,505	3,004	2,084	2,524
Total value added from continuing operations to be distributed	23,066	70,132	16,896	59,460
Value added from discontinued operations to be distributed	-	58	-	-
Total value added to be distributed	23,066	70,190	16,896	59,460
Direct compensation	8,044	9,249	3,318	4,876
Benefits	116	98	92	79
F.G.T.S.	23	21	20	20
Federal taxes	4,180	5,388	812	101
State taxes	342	5,144	94	3,404
Municipal taxes	18	45	8	21
Interest (net derivatives and monetary and exchange rate variation)	16,702	20,906	15,350	19,888
Other remunerations of third party funds	2,338	3,508	3,874	5,414
Reinvested net income (absorbed loss)	(6,672)	25,657	(6,672)	25,657
Net income (loss) attributable to noncontrolling interest	(2,025)	117	-	-
Distributed value added from continuing operations	23,066	70,132	16,896	59,460
Distributed value added from discontinued operations	-	58	-	-
Distributed value added	23,066	70,190	16,896	59,460

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

1. Corporate information

Vale S.A. and its direct and indirect subsidiaries ("Vale" or the "Company") are global producers of iron ore and iron ore pellets, key raw materials for steelmaking, and producers of nickel, which is used to produce stainless steel and metal alloys employed in the production of several products. The Company also produces copper, metallurgical and thermal coal, manganese ore, ferroalloys, platinum group metals, gold, silver and cobalt. The information by segment is presented in note 4.

Vale S.A. (the "Parent Company") is a public company headquartered in the city of Rio de Janeiro, Brazil with securities traded on the stock exchanges of São Paulo – B3 S.A. (VALE3), New York - NYSE (VALE) and Madrid – LATIBEX (XVALO).

2. Basis of preparation of the financial statements

a) Statement of compliance

The consolidated and individual financial statements of the Company ("financial statements") have been prepared and are being presented in accordance with International Financial Reporting Standards ("IFRS") 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 being presented and correspond to those used by the Company's Management.

b) Basis of presentation

The financial statements have been prepared on a historical cost basis as adjusted to reflect: (i) the fair value of financial instruments measured at fair value through income statement or at fair value through the statement of comprehensive income; and (ii) impairment of assets.

These financial statements were authorized for issue by the Board of Directors on February 20, 2020.

c) Functional currency and presentation currency

The financial statements of the Company and its associates and joint ventures are measured using the currency of the primary economic environment in which the entity operates ("functional currency"), which in the case of the Parent Company is the Brazilian real ("R\$").

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

	Closing rate			Average rate for the year ended		
	2019	2018	2017	2019	2018	2017
US Dollar ("US\$")	4.0307	3.8748	3.3080	3.9461	3.6558	3.1925
Canadian dollar ("CAD")	3.1034	2.8451	2.6344	2.9746	2.8190	2.4618
Euro ("EUR" or "€")	4.5305	4.4390	3.9693	4.4159	4.3094	3.6088

d) Significant accounting policies

Significant accounting policies used in the preparation of these financial statements are disclosed in the respective notes. The accounting policies have been consistently applied to all years presented, except for the adoption of the new accounting standards described as follows:

– IFRIC 23/ICPC 22 Uncertainty over income tax treatments – IFRIC 23/ICPC 22 became effective for annual periods beginning on or after January 1, 2019 and clarifies the measurement and recognition requirements of IAS 12/CPC 32 Income taxes. It does not apply to taxes or levies outside the scope of IAS 12/CPC 32, nor does it specifically include requirements relating to interest and penalties associated with uncertain tax treatments. The Interpretation specifically addresses the following: (i) whether an entity considers uncertain tax treatments separately, (ii) the assumptions an entity makes about the examination of tax treatments by tax authorities, and (iii) how an entity determines taxable profit (tax loss), tax bases, unused tax losses, unused tax credits, and tax rates.

Upon adoption of the Interpretation, the Company considered whether it has any uncertain tax positions, particularly those relating to the deduction of social security contributions on the net income (“CSLL”) in Brazil, and determined that, although there is an uncertainty that could affect the 2018 year end, it is deemed probable that the Company’s treatments will be accepted by the Brazilian tax authority. Further details in relation to this uncertain tax position is disclosed in note 8.

– IFRS 16/CPC 06 (R2) Leases – The Company applied IFRS 16/CPC 06 (R2) from January 1, 2019 using the retrospective approach with the cumulative effect recognized as at the date of initial application. Accordingly, the comparative information has not been restated and continues to be presented under IAS 17/CPC 06 (R1) and related interpretations. On transitioning to IFRS 16/CPC 06 (R2), the lease agreements were recognized in the statement of financial position and measured discounting the remaining minimum contractual payments at the present value, using the Company’s incremental borrowing rate, depending on the remaining lease term.

The Company used the following practical expedients in applying IFRS 16/CPC 06 (R2): (i) applied a single discount rate to a portfolio of leases with similar characteristics; (ii) applied the exemption not to 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 will be recognized as an expense on a straight-line basis over the lease term; and (iii) used hindsight when determining the lease term, to determine if the contract contains options to extend or terminate the lease.

As a result of IFRS 16/CPC 06 (R2) adoption, the Company has changed its accounting policy for lease contracts, except for its mineral leases, as the standard excludes from its scope leases to explore for or use minerals, oil, natural gas and similar non-regenerative resources. Details of these changes are summarized below.

The ferrous minerals produced in Brazil are mainly shipped to Asia. The Company has leased the Ponta da Madeira and Itaguaí maritime terminals in Brazil, that are primarily for the delivery of iron ore and iron ore pellets to bulk carrier vessels. The remaining lease terms are, respectively, 4 and 7 years for the ports in Brazil. Vale also has a lease agreement for a maritime terminal in Oman, which is used to deliver iron ore pellets produced in that location. The remaining lease term is 24 years for the port in Oman.

Some of the delivery of iron ore from Brazil to the Asian clients are made through five time-charter agreements, which have 11 years remaining lease term on average.

As part of the ferrous minerals segment, the Company also has long-term agreements for the exploration and processing of iron ore with its joint ventures, such as the agreements to lease the pelletizing plants in Brazil. These lease agreements contain variable payment terms based on the pellet production.

In addition, the Company leases an oxygen plant dedicated to the base metals operation, as part of its nickel operation run in Canada. The remaining period of this lease agreement is 11 years.

The Company also has a long-term contract related to the right of use of certain locomotives dedicated to the transportation of coal in Mozambique, which has a remaining lease term of 7 years.

Vale has leased properties for its operational facilities and commercial and administrative offices in the various locations where the Company conducts its business.

Following are the discount rates applied in discounting the lease liabilities at present value:

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

Until December 31, 2018, the lease arrangements were classified as operating leases and were not recognized in the Company's statement of financial position. The contractual payments were recognized in the income statement on a straight-line basis over the term of the lease.

Following are the lease liabilities recognized under IFRS 16/CPC 06 (R2) reconciled to the disclosed operating lease commitments under IAS 17/CPC 06 (R1), as at December 31, 2018:

	Lease commitments disclosed on December 31, 2018	Contracts scoped out	Present value adjustment	Lease liability recognized on January 1, 2019
Ports	4,384	2	(1,415)	2,971
Vessels	2,980	(4)	(633)	2,343
Pellets plants	843	(57)	(201)	585
Properties	628	(2)	(95)	531
Energy plants	362	-	(114)	248
Locomotives	264	(28)	(62)	174
Mining equipment	215	(71)	(18)	126
Total	9,676	(160)	(2,538)	6,978

The lease liability is presented on the statement of financial position as "Leases" and the accounting policy related to leases is disclosed in note 19. 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, 2019 was R\$2,187. The interest accretion recognized in the income statement is disclosed in note 6.

Changes in the recognized right-of-use assets and leases liabilities are as follows:

	January 1, 2019	Additions and contract modifications (i)	Impairment (ii)	Depreciation	Translation adjustment	Assets December 31, 2019
Ports	2,971	57	-	(168)	98	2,958
Vessels	2,343	117	-	(203)	84	2,341
Pellets plants	585	235	-	(144)	-	676
Properties	531	108	(63)	(135)	80	521
Energy plants	248	18	-	(28)	12	250
Locomotives	174	-	(149)	(25)	-	-
Mining equipment	126	-	-	(55)	2	73
Total	6,978	535	(212)	(758)	276	6,819

	January 1, 2019	Additions and contract modifications (i)	Payments	Interest	Translation adjustment	Liabilities December 31, 2019
Ports	2,971	57	(217)	125	87	3,023
Vessels	2,343	117	(295)	89	89	2,343
Pellets plants	585	235	(143)	28	-	705
Properties	531	108	(136)	28	83	614
Energy plants	248	18	(30)	16	30	282
Locomotives	174	-	(32)	12	-	154
Mining equipment	126	-	(38)	4	5	97
Total	6,978	535	(891)	302	294	7,218

(i) Additions mainly relates to new administrative offices lease and to renewal of the contract with Nibrasco, a pelletizing plant, which expires in December 2022.

(ii) Relates to the impairment of coal business assets, which resulted in the provision for loss of properties e and locomotive right of use assets. Further details in relation to the impairment is disclosed in note 20.

The annual minimum payments are presented as follows:

	2020	2021	2022	2023	2024 onwards	Total
Ports	237	236	236	233	3,430	4,372
Vessels	270	261	255	249	1,872	2,907
Pellets plants	144	127	127	46	444	888
Properties	160	147	89	71	256	723
Energy plants	29	28	28	26	256	367
Locomotives	32	31	31	31	91	216
Mining equipment	38	24	24	16	16	118
Total	910	854	790	672	6,365	9,591

The amounts in the table above presents the undiscounted lease obligation by maturity date. The lease liability disclosed as “leases” in the balance sheet is measured at the present value of such obligations.

f) Critical accounting estimates and judgments

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

The significant estimates and judgments applied by the Company in the preparation of these financial statements are as follows:

Note	Significant estimates and judgments
3	Brumadinho dam failure
7	Deferred revenue
8	Deferred income taxes
15	Consolidation
19	Mineral reserves and mine useful life
20	Impairment of non-current assets
22	Liabilities related to associates and joint ventures
24	Fair values estimate
27	Asset retirement obligation
28	Litigation
29	Employee post-retirement obligations

3. 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.

The Córrego do Feijão mine is part of the Paraopeba complex, in the Southern System. Dam I contained approximately 11.7 million cubic meters of iron ore tailings and was inactive since 2016 (that is, without additional tailings disposal). Dam I was raised by building successive layers (“lifts”) above the tailings accumulated in the reservoir, a technique known as the “upstream” method. There are two other raising methods, the “downstream” and “centerline” methods. Each of these methods presents a different risk profile.

The Company has been taking the necessary actions to support the victims and to mitigate and recover the social and environmental damages resulting from the event. Vale has provided support in multiple ways, aiming to ensure the humanitarian assistance to those affected by the dam failure. The Company has been focused on preventing further similar events through the accelerated decommissioning of upstream and some centerline dams.

In addition, Vale has determined the suspension of the Shareholder’s Remuneration Policy and any other resolution related to shares buyback.

As a result of the dam failure, the Company recognized in the income statement a total impact of R\$28,818 for the year ended December 31, 2019 to meet its assumed obligations, including de-characterization of the dams, indemnification and donations to those affected by the event, remediation of the affected areas and compensation to the society.

a) De-characterization of the dams

(a.i) Company’s dams

On January 29, 2019, the Company informed the market and Brazilian authorities the decision to speed up the plan to “de-characterize” all of its tailings dams built under the upstream method (same method as Brumadinho’s dam), located in Brazil. The “de-characterization” means that the structure will be dismantled so the structure is effectively no longer a dam. After the event, the Brazilian National Mining Agency (“*Agência Nacional de Mineração – ANM*”) set new safety criteria for dams, determining the de-characterization of structures built under the upstream and centerline methods.

Before the event, the decommissioning plans of these dams were based on a method which aimed to ensure the physical and chemical stability of the structures, not necessarily, in all cases, removing in full and potentially processing the tailings contained in the dams. Since the event, the Company has been working to develop detailed de-characterization engineering plan for each of these dams.

The updated plans indicate that for certain of these upstream dams, firstly, the Company will have to reinforce the downstream massive structures, and conclude the de-characterization subsequently, according to the geotechnical and geographic conditions of each of them. It was also considered whether additional containment structures should be built, depending on the safety level of the structure.

Following the Company’s decision and new standards set by ANM, the Company has undertaken an assessment of its dam structures since the event and recorded a provision for the de-characterization of upstream, certain “centerline structures” and dikes that have been identified to date.

Vale has developed engineering projects for these structures and the total expected costs to carry out all de-characterization projects resulted in a provision of R\$10,274 recognized in the income statement.

The changes in the provision for the year ended December 31, 2019 are as follows:

	2019
Provision recognized	10,274
Payments	(642)
Interest accretion	402
Balance at December 31	10,034
Current liabilities	1,247
Non-current liabilities	8,787
Liabilities	10,034

The measurement of the costs and recognition of the provision takes into consideration several assumptions and estimates, which rely on factors, for which some are not under the Company's control. The main critical assumptions and estimates applied 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) acceptance by the authorities of the proposed engineering methods and solution; and (iv) updates in the discount rate. Therefore, changes in the critical assumptions and estimates may result in a material change to the amount provided as at December 31, 2019.

(a.ii) Associates and joint ventures upstream dams

Some of our investees also operate similar dam structures and as detailed in the note 22 to these financial statements, the Company recognized a provision of R\$993 during 2019 as "Equity results and other results in associates and joint ventures" in relation to the de-characterization of the Germano tailings dam, owned by Samarco Mineração S.A.

b) Framework Agreements and donations

The Company has been working together with the authorities and society to remediate the environmental and social impacts of the event. Therefore, the Company has started negotiations and entered into agreements with the relevant authorities and affected people. Vale has also signed an instrument committing to donate to Brumadinho city, other institutions, to the families with missing members or affected by fatalities, to business owners of the region and families that resided in the Self-Saving Zone near to the Brumadinho dam.

Vale has also developed studies and projects 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, especially alongside the Paraopeba river. In addition, Vale has set up an exclusive structure for treatment of the rescued animals, enabling emergency care and recovery.

The changes in the provision in the year ended December 31, 2019 are as follows:

	2019
Provision for social and economic compensation	10,582
Provision for environmental remediation and compensation	4,591
Payments	(3,340)
Interest accretion	189
Balance at December 31	12,022
Current liabilities	6,319
Non-current liabilities	5,703
Liabilities	12,022

The total amount of this provision may vary due to the early stage of the ongoing negotiations, timing and scope of the measures currently being discussed, which are subject to the approval and consent by the relevant authorities.

In addition, the Company is under negotiations with the Government of the State of Minas Gerais ("GEMG") and other relevant authorities for an additional agreement for collective damages indemnification and further compensation for the society and environment. The goal of Vale with a potential agreement would be to provide a stable legal framework for the execution of reparation and compensation, with the suspension of the existing civil lawsuits.

The potential agreement is still very uncertain as it is subject to conclusion of the ongoing negotiations and approval by the Company, the Government of the State of Minas Gerais, Public Prosecutors and other Authorities and Intervenient parties.

Therefore, the provisions recorded in these financial statements do not include the potential outcome of the current negotiation as it is not yet possible to reliably estimate an amount or whether the current negotiations will be successful.

The estimate of the economic impact of a potential agreement will depend on (i) final agreement on the list of reparation and compensation projects, (ii) a detailed assessment of the estimates of the amounts to be spent on the reparation and compensation projects being discussed, (iii) an analysis of the detailed scope of such projects to determine their overlap with the initiatives and amounts already provisioned; and (iv) the timing of the execution of projects and disbursements, which will impact the present value of the obligations.

Based on the current terms under discussion, and preliminary estimates subject to the uncertainties listed above, such possible agreement might result in an additional provision ranging from R\$4 billion to R\$8 billion. All accounting impacts, if any, will be recorded in the period an agreement is reached.

(b.i) Public Defendants

On April 5, 2019, Vale and the Public Defendants of the State of Minas Gerais formalized an agreement 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.

(b.ii) Public Ministry of Labor

On July 15, 2019, Vale signed a final agreement with the Public Ministry of Labor to indemnify the direct and third-party employees of the Córrego do Feijão mine who were affected by the termination of this operation.

Under the terms of the final agreement, Vale will either maintain the jobs of its direct employees and third-party employees until January 25, 2023 or convert this benefit into a cash compensation. The agreement also includes indemnification payments to the relatives of the fatal victims of the event, which may vary depending on their relationship with the victims, and a lifelong medical insurance benefit to the widows and widowers and a similar benefit to the dependents of the victims until they are 25 years old.

In addition, the agreement set a collective moral damage indemnification payment in the amount of R\$400, which has been fully paid in 2019.

(b.iii) Brazilian Federal Government, State of Minas Gerais, Public Prosecutors

On February 20, 2019, Vale entered into a judicial preliminary agreement with the State of Minas Gerais, Federal Government, the Public Prosecutors of the State of Minas Gerais, the Federal Public Prosecutors and the Public Defenders of the State of Minas Gerais and representatives of Public Authorities in which the Company commits to make, subject to registration, emergency indemnification payments to the residents of Brumadinho and the communities that are located downstream up to one kilometer from the Paraopeba river bed, from Brumadinho to the city of Pompéu. Due to this agreement, the Company anticipated the indemnities through monthly payments, according to the age of the beneficiary and other factors, during a 12-month period.

On November 28, 2019, the extension of emergency indemnification payments was ratified to those affected by the dam rupture for 10 months, starting from January 25, 2020.

(b.iv) Environmental remediation and compensation

On July 8, 2019, Vale has entered into an agreement with *Companhia de Saneamento de Minas Gerais ("COPASA")* to implement several actions to clean up the affected areas and to upgrade the retention water system alongside the Paraopeba River and some other water collection points nearby the affected area. In addition, the Company mobilized the dredging of part of the material released, including cleaning and de-sanding of the Paraopeba river channel.

c) Incurred expenses

The Company has incurred in expenses, which do not qualify for provision and have been recognized straight to the income statement, in the amount of R\$2,903 for the year ended December 31, 2019. These expenses include communication services, accommodation and humanitarian assistance, equipment, legal services, water, food aid, taxes, among others.

d) Operation stoppages

The Company has suspended some operations due to judicial decisions or technical analysis performed by the Company on its upstream dam structures. The Company recorded a loss of R\$2,997 related to the operational stoppage and idle capacity of the ferrous mineral segment as “Pre-operating and operational stoppage” for the year ended December 31, 2019. During 2019, certain operations have partially returned and the Company is working on legal and technical measures to resume all operations at full capacity.

e) Assets write-off

Following the event and the decision to speed up the de-characterization of the upstream dams, the Company recognized a loss of R\$904 as “Impairment and disposal of non-current assets” for the year ended December 31, 2019 in relation to the assets write-off of the Córrego do Feijão mine and those related to the other upstream dams in Brazil.

f) Contingencies and other legal matters

Vale is subject to significant contingencies due to the Brumadinho dam failure. Vale has already been named on several judicial and administrative proceedings brought by authorities and affected people and is currently under investigations. Vale is evaluating these contingencies and would recognize a provision based on the updates on the stage of these claims.

Following these contingencies, approximately R\$6,480 of the Company's assets are restricted as at December 31, 2019, of which approximately R\$504 of the Company's bank accounts are restricted and R\$5,976 were converted into judicial deposits.

For the Brumadinho event, the Company has additional guarantees in the amount of R\$5,626, which were presented in court and used to release the respective judicial deposit during the year ended December 31, 2019. The expenses related to these additional guarantees in the amount of R\$36 was recorded as financial expense in the Company's income statement for the year ended December 31, 2019.

(f.i) Administrative sanctions

The Company was notified of the imposition of administrative fines by the Brazilian Institute of the Environment and Renewable Natural Resources (“IBAMA”), in the amount of R\$250, which the Company expects to settle through environmental projects. Furthermore, the Secretary for Environment – SEMA Brumadinho imposed administrative fines, in the total amount of R\$181. Both amounts are also recorded as at December 31, 2019.

(f.ii) U.S. Securities class action suits

Vale and certain of its officers and former officers have been named defendants in civil putative class action suits, under U.S. federal securities laws, brought before federal courts in New York by holders of our securities. These complaints were consolidated through an amended complaint brought by the Lead Plaintiff on October 25, 2019 before the United States District Court for the Eastern District of New York. The Lead Plaintiff alleges that we made false and misleading statements or omitted to make disclosures concerning the risks of the operations of Dam I in the Córrego de Feijão mine and the adequacy of the related programs and procedures. The Lead Plaintiff has not specified an amount of alleged damages in these actions. On December 13, 2019, the Company made a motion to dismiss the amended complaint.

Vale intends to defend against this action and mount a full defense against these claims. Based on the assessment of the Company's legal consultants and given its preliminary status, the expectation of loss of this proceeding is classified as possible.

However, given the preliminary status of the action, it is not possible at this time to determine a reliable estimate of the potential exposure.

g) Insurance

The Company is negotiating with insurers under its operational risk and civil liability, but these negotiations are still at a preliminary stage. Any payment of insurance proceeds will depend on the coverage definitions under these policies and assessment of the amount of loss. Due to uncertainties, no indemnification to the Company was recognized in Vale's financial statements.

Accounting policy

Provisions are measured at the present value of management's best estimate of the expenditure required to settle the present obligation at the end of the reporting period. The discount rate used to determine the present value is a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability. The increase in the provision due to the passage of time is recognized as interest expense. Provisions are not recognized for future operating losses.

Critical accounting estimates and judgments

The measurement of the provision requires the use of significant judgements, estimates and assumptions. The provision reflects the estimated costs to comply with Vale's obligation in relation to the event. The provision may be affected by factors including, but not limited to: (i) changes in laws and regulations; (ii) changes in the current estimated market price of the direct and indirect cost related to products and services, (iii) changes in timing for cash outflows, (iv) changes in the technology considered in measuring the provision, (v) number of individuals entitled to the indemnification payments, (vi) resolution of existing and potential legal claims, (vii) demographic assumptions, (viii) actuarial assumptions, and (ix) updates in the discount rate.

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

4. Information by business segment and by geographic area

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

The information presented to the Executive Board on the performance of each segment is derived from the accounting records, adjusted for reallocations between segments.

The main activities of the operating segments are as follows:

Ferrous minerals – comprise of the production and extraction of iron ore, iron ore pellets, manganese, ferroalloys, other ferrous products and its logistic services.

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

Coal – comprise of the production and extraction of metallurgical and thermal coal and its logistic services.

Fertilizers (Discontinued operations) - include the production of potash, phosphate, nitrogen and other fertilizer products (note 14).

In 2019, due to the Brumadinho dam failure, the Company has created the Special Recovery and Development Board, which is in-charge of social, humanitarian, environmental and structural recovery measures that are implemented in Brumadinho and other affected areas. This Board reports to the CEO and assess the costs related to the Brumadinho event. These costs are not directly related to the Company's operating activities and, therefore, were not allocated to any operating segment.

The Company allocate 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.

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, 2019						
	Net operating revenue	Cost of goods sold and services rendered	Sales, administrative and other operating expenses	Research and evaluation	Pre operating and operational stoppage	Dividends received and interest from associates and joint ventures	Adjusted LAJIDA (EBITDA)
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	16,845	(11,305)	(297)	(174)	(111)	-	4,958
Copper	7,506	(3,569)	(22)	(173)	(81)	-	3,661
	24,351	(14,874)	(319)	(347)	(192)	-	8,619
Coal	4,005	(6,462)	3	(121)	-	447	(2,128)
Brumadinho event	-	-	(28,818)	-	-	-	(28,818)
Others	1,517	(1,541)	(2,045)	(728)	(43)	230	(2,610)
Total	148,640	(70,382)	(32,572)	(1,765)	(3,484)	1,870	42,307

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



							Consolidated
							Year ended December 31, 2018
	Net operating revenue	Cost of goods sold and services rendered	Sales, administrative and other operating expenses	Research and evaluation	Pre operating and operational stoppage	Dividends received and interest from associates and joint ventures	Adjusted LAJIDA (EBITDA)
Ferrous minerals							
Iron ore	75,056	(33,356)	(281)	(403)	(418)	108	40,706
Iron ore pellets	24,389	(12,427)	(39)	(98)	(71)	582	12,336
Ferroalloys and manganese	1,660	(1,065)	(11)	(4)	-	-	580
Other ferrous products and services	1,737	(1,147)	(16)	(3)	(3)	28	596
	102,842	(47,995)	(347)	(508)	(492)	718	54,218
Base metals							
Nickel and other products	16,855	(11,213)	(173)	(141)	(120)	-	5,208
Copper	7,672	(3,502)	(14)	(68)	-	-	4,088
	24,527	(14,715)	(187)	(209)	(120)	-	9,296
Coal	6,025	(5,811)	(33)	(75)	-	511	617
Others	1,089	(961)	(2,738)	(584)	(76)	204	(3,066)
Total from continuing operations	134,483	(69,482)	(3,305)	(1,376)	(688)	1,433	61,065
Discontinued operations (Fertilizers)	397	(393)	(15)	-	-	-	(11)
Total	134,880	(69,875)	(3,320)	(1,376)	(688)	1,433	61,054

							Consolidated
							Year ended December 31, 2017
	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	59,206	(25,438)	32	(281)	(576)	100	33,043
Iron ore pellets	18,043	(9,191)	(29)	(62)	(23)	263	9,001
Ferroalloys and manganese	1,501	(890)	(26)	-	(12)	-	573
Other ferrous products and services	1,541	(978)	39	(6)	(2)	63	657
	80,291	(36,497)	16	(349)	(613)	426	43,274
Base metals							
Nickel and other products	14,914	(10,985)	(149)	(155)	(238)	-	3,387
Copper	7,052	(3,126)	(49)	(43)	-	-	3,834
	21,966	(14,111)	(198)	(198)	(238)	-	7,221
Coal	5,003	(4,326)	(39)	(45)	(14)	574	1,153
Others	1,272	(1,197)	(2,522)	(494)	(28)	313	(2,656)
Total of continuing operations	108,532	(56,131)	(2,743)	(1,086)	(893)	1,313	48,992
Discontinued operations (Fertilizers)	5,572	(5,124)	(327)	(39)	(80)	10	12
Total	114,104	(61,255)	(3,070)	(1,125)	(973)	1,323	49,004

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



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

From continuing operations

	Consolidated		
	Year ended December 31		
	2019	2018	2017
Net income (loss) from continuing operations attributable to Vale's stockholders	(6,672)	25,967	20,213
Net income (loss) attributable to noncontrolling interests	(2,025)	117	65
Net income (loss) from continuing operations	(8,697)	26,084	20,278
Depreciation, depletion and amortization	14,751	12,240	11,842
Income taxes	(2,509)	(966)	4,607
Financial results	13,446	18,058	9,650
LAJIDA (EBITDA)	16,991	55,416	46,377
Items to reconciled adjusted LAJIDA (EBITDA)			
Equity results and other results in associates and joint ventures	2,684	693	277
Dividends received and interest from associates and joint ventures (i)	1,870	1,433	1,313
Impairment and disposal of non-current assets	20,762	3,523	1,025
Adjusted LAJIDA (EBITDA) from continuing operations	42,307	61,065	48,992

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

From discontinued operations

	Consolidated	
	Year ended December 31	
	2018	2017
Loss from discontinued operations attributable to Vale's stockholders	(310)	(2,586)
Loss attributable to noncontrolling interests	-	(22)
Loss from discontinued operations	(310)	(2,608)
Depreciation, depletion and amortization	-	4
Income taxes	(134)	(324)
Financial results	18	89
LAJIDA (EBITDA)	(426)	(2,839)
Items to reconciled adjusted LAJIDA (EBITDA)		
Equity results in associates and joint ventures	-	8
Dividends received from associates and joint ventures	-	10
Impairment of non-current assets	415	2,833
Adjusted LAJIDA (EBITDA) from discontinued operations	(11)	12

b) Assets by segment

	December 31, 2019			Consolidated		
	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangibles (i)	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangibles (i)
Ferrous minerals	7,880	6,970	135,143	8,562	7,030	121,572
Base metals	5,457	56	80,181	4,443	54	82,515
Coal	243	-	-	461	1,228	6,157
Others	7	4,252	6,666	45	4,183	8,087
Total	13,587	11,278	221,990	13,511	12,495	218,331

In December 2019, the Company recognize impairment losses for the coal assets from operations in Mozambique and for the base metals assets from operations in New Caledonia. Further details are disclosed in note 20. In September 2019, upon a favorable decision from the Brazilian Supreme Court ("STF"), the Company resumed Onça Puma operation (base metals), which is comprised of mineral extraction and nickel processing activities. The mineral extraction operations had been suspended since September 2017 and nickel processing activities since June 2019.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



	Consolidated								
	Year ended December 31								
	2019			2018			2017		
	Capital expenditures (ii)			Capital expenditures (ii)			Capital expenditures (ii)		
	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	6,726	1,527	8,167	5,793	2,925	6,109	3,821	4,732	5,463
Base metals	4,889	608	5,352	4,442	119	4,934	3,069	162	5,076
Coal	952	-	937	492	82	921	235	141	934
Others	42	30	295	20	26	276	11	65	369
Total	12,609	2,165	14,751	10,747	3,152	12,240	7,136	5,100	11,842

i) Goodwill is allocated mainly to ferrous minerals and base metals segments in the amount of R\$7,133 and R\$7,495 in December 31, 2019 and R\$7,133 and R\$7,022 in December 31, 2018, respectively.

(ii) Cash outflows.

c) Assets by geographic area

Consolidated								
	December 31, 2019				December 31, 2018			
	Investments in associates and joint ventures	Intangible	Property, plant and equipment	Total	Investments in associates and joint ventures	Intangible	Property, plant and equipment	Total
Brazil	10,072	26,181	117,430	153,683	10,089	22,764	113,252	146,105
Canada	-	8,062	43,260	51,322	-	7,578	38,381	45,959
Americas, except Brazil and Canada	975	-	-	975	957	-	-	957
Europe	-	8	3,626	3,634	-	-	1,419	1,419
Indonesia	-	4	11,130	11,134	-	3	10,757	10,760
Asia, except Indonesia	231	-	4,010	4,241	1,449	-	3,972	5,421
New Caledonia	-	-	2,435	2,435	-	-	10,833	10,833
Mozambique	-	-	-	-	-	505	5,653	6,158
Oman	-	2	5,842	5,844	-	-	3,211	3,211
Other regions	-	-	-	-	-	-	3	3
Total	11,278	34,257	187,733	233,268	12,495	30,850	187,481	230,826

d) Net operating revenue by geographic area

Consolidated					
Year ended December 31, 2019					
	Ferrous minerals	Base metals	Coal	Others	Total
Americas, except United States and Brazil	2,048	3,300	-	-	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	1,107	-	13,839
Middle East, Africa and Oceania	8,175	79	293	-	8,547
Japan	8,121	1,690	461	-	10,272
China	69,755	2,650	-	-	72,405
Asia, except Japan and China	8,058	3,226	1,825	-	13,109
Brazil	10,464	896	319	1,517	13,196
Net operating revenue	118,767	24,351	4,005	1,517	148,640

Consolidated					
Year ended December 31, 2018					
	Ferrous minerals	Base metals	Coal	Others	Total
Americas, except United States and Brazil	2,988	2,410	-	-	5,398
United States of America	1,429	3,464	-	44	4,937
Germany	4,091	1,967	-	-	6,058
Europe, except Germany	8,154	6,559	1,603	-	16,316
Middle East, Africa and Oceania	9,450	91	548	-	10,089
Japan	7,597	1,861	608	-	10,066
China	53,120	3,163	-	-	56,283
Asia, except Japan and China	6,648	4,011	2,817	-	13,476
Brazil	9,365	1,001	449	1,045	11,860
Net operating revenue	102,842	24,527	6,025	1,089	134,483

Consolidated					
Year ended December 31, 2017					
	Ferrous minerals	Base metals	Coal	Others	Total
Americas, except United States and Brazil	1,896	3,218	-	221	5,335
United States of America	1,137	2,784	-	262	4,183
Germany	3,481	933	-	-	4,414
Europe, except Germany	5,499	6,347	1,275	35	13,156
Middle East, Africa and Oceania	5,640	41	543	-	6,224
Japan	6,150	1,277	409	-	7,836
China	43,005	1,842	-	-	44,847
Asia, except Japan and China	4,251	4,927	2,268	-	11,446
Brazil	9,232	597	508	754	11,091
Net operating revenue	80,291	21,966	5,003	1,272	108,532

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. The selling price of these products can be measured reliably at each period, since the price is quoted in an active market. The final price of these sales will be determined during the first quarter of 2020.

The sensitivity of the Company's risk on final settlement of its provisionally priced accounts receivables are presented below:

				December 31, 2019
	Thousand metric tons	Provisional price (US\$/tonne)	Change	Effect on Revenue
Iron ore	14,756	90.3	+/-10%	549
Iron ore pellets	537	91.2	+/-10%	20
Copper	99	7,827.0	+/-10%	308

Accounting policy

Revenue is recognized when the control of a good or service transferred to a customer. Since Vale's sales are under different shipping terms, revenue could be recognized when the product is available at the loading port, loaded on the ship, at the port of discharge or at the customer's warehouse.

A relevant proportion of Vale's sales are under Cost and Freight ("CFR") and Cost, Insurance and Freight ("CIF") Incoterms, in which the Company is responsible for providing shipping services after the date that Vale transfers control of the goods to the customers. Shipping services for CFR and CIF contracts are considered as a separate performance obligation in which a proportion of the transaction price is allocated and recognized over time as the shipping services are provided.

Generally, the contract payment terms consider the upfront payments or the use of credit letters. The payment terms do not have a significant financing component. In some cases, the sale price is determined 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	
	2019	2018	2017	2019	2018
Personnel	7,929	8,346	7,332	3,668	4,615
Materials and services	15,297	14,554	12,183	4,970	6,248
Fuel oil and gas	5,498	5,646	4,197	3,329	3,703
Maintenance	11,059	10,253	9,899	7,380	7,250
Energy	3,385	3,301	3,078	1,553	1,688
Acquisition of products	2,403	1,883	1,728	1,990	760
Depreciation and depletion	13,454	11,719	11,126	6,596	5,693
Freight	15,997	15,972	10,717	124	158
Others	8,814	9,527	6,997	7,899	8,936
Total	83,836	81,201	67,257	37,509	39,051
Cost of goods sold	81,115	79,074	65,300	35,538	37,601
Cost of services rendered	2,721	2,127	1,957	1,971	1,450
Total	83,836	81,201	67,257	37,509	39,051

b) Selling and administrative expenses

	Consolidated			Parent company	
				Year ended December 31	
	2019	2018	2017	2019	2018
Selling	363	351	217	69	45
Personnel	714	771	747	468	490
Services	336	338	259	200	180
Depreciation and amortization	221	225	292	104	115
Others	290	232	182	93	129
Total	1,924	1,917	1,697	934	959

c) Other operating expenses, net

	Consolidated			Parent company	
				Year ended December 31	
	2019	2018	2017	2019	2018
Provision for litigations (i)	1,130	681	540	975	464
Profit sharing program (ii)	348	674	476	195	435
Disposals of materials and inventories	189	118	52	169	110
Others	385	140	270	431	154
Total	2,052	1,613	1,338	1,770	1,163

(i) 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, for the year ended December 31, 2019.

(ii) Refers to profit sharing program for eligible employees. The payments related to the profit sharing of the executives are suspended, due to the Brumadinho event described in note 3.

6. Financial result

	Consolidated			Parent company	
				Year ended December 31	
	2019	2018	2017	2019	2018
Financial income					
Short-term investments	982	661	560	273	149
Others	1,110	888	972	212	133
	2,092	1,549	1,532	485	282
Financial expenses					
Loans and borrowings gross interest	(3,894)	(4,301)	(5,418)	(4,951)	(4,953)
Capitalized loans and borrowing costs	551	704	1,179	549	700
Participative stockholders' debentures	(5,687)	(1,871)	(1,982)	(5,687)	(1,871)
Interest on REFIS	(605)	(713)	(1,262)	(593)	(698)
Interest on lease liabilities	(299)	-	-	(102)	-
Financial guarantees (i)	(1,452)	87	(731)	(1,452)	87
Expenses with cash tender offer repurchased	(1,100)	(1,060)	(612)	-	-
Others	(2,487)	(1,240)	(1,686)	(1,534)	(938)
	(14,973)	(8,394)	(10,512)	(13,770)	(7,673)
Other financial items, net					
Net foreign exchange gains (losses) - Loans and borrowings	(491)	(9,721)	(802)	(470)	(9,104)
Derivative financial instruments	926	(1,006)	1,460	573	(589)
Other foreign exchange gains (losses), net	635	1,484	(698)	863	1,177
Indexation losses, net	(1,635)	(1,970)	(630)	(1,171)	(1,543)
	(565)	(11,213)	(670)	(205)	(10,059)
Total	(13,446)	(18,058)	(9,650)	(13,490)	(17,450)

(i) In 2019, the Company reassessed the credit risk of certain associates and joint ventures (note 32).

Net investment of foreign operation

Since January 1, 2019, the Company has considered certain long-term loans payable to Vale International S.A., for which settlement is neither planned nor likely to occur in the foreseeable future, as part of its net investment in that foreign operation. The foreign exchange differences arising on the monetary item are recognized in other comprehensive income, in the "Cumulative translation adjustments", and reclassified from stockholders' equity to income statement at the moment of the disposal or partial disposal of the net investment. The Company recognized a loss of R\$2,085 (R\$1,376 net of taxes) for the year ended December 31, 2019, in the "Cumulative translation adjustments" in stockholders' equity.

Accounting policy

Transactions in foreign currencies are translated into the functional currency using the exchange rate prevailing at the transaction date. The foreign exchange gains and losses resulting from the translation at the exchange rates prevailing at the end of the year are recognized in the income statement as "financial income or expense". The exceptions are transactions related to qualifying net investment hedges or items that are attributable to part of the net investment in a foreign operation, for which gains and losses are recognized in the statement of comprehensive income.

7. Streaming transactions

Cobalt streaming

In June 2018, the Company entered into two different agreements, one with Wheaton Precious Metals Corp (“Wheaton”) and the other with Cobalt 27 Capital Corp. (“Cobalt 27”), to sell a stream equivalent to 75% of the cobalt extracted as a by-product from the Voisey’s Bay mine, in Canada, starting on January 1, 2021. Upon completion of the transaction, the Company received an upfront payment of R\$2,603 (US\$690 million) in cash, R\$1,471 (US\$390 million) from Wheaton and R\$1,132 (US\$300 million) from Cobalt 27, which has been recorded as “streaming transactions” in the non-current liabilities. Vale will receive additional payments of 20%, on average, of the market reference price for cobalt, for each pound of finished cobalt delivered.

Gold streaming

In August 2016, the Company amended the gold transaction entered into in 2013 with Wheaton Precious Metals Corp (“Wheaton”) to include in each contract an additional 25% of the gold extracted as by-product over a lifetime of the Salobo copper mine. Hence, Wheaton holds the rights to 75% of the contained gold in the copper concentrated from the Salobo mine and 70% of the gold extracted as a by-product of the Sudbury nickel mines.

The transactions were bifurcated into two identifiable components (i) the sale of the mineral rights recognized in the income statement under “Other operating income (expenses), net” and, (ii) the contract liability related to the services for gold extraction on the portion in which Vale operates as an agent for Wheaton gold extraction.

Accounting policy

The Company recognizes contract liabilities in the event it receives payments from customers before a sale meets criteria for revenue recognition. Proceeds received under the terms of the streaming transaction are accounted for as “streaming transactions” and included within liabilities.

Contract liability is initially recognized at fair value, net of transaction costs incurred, and is subsequently carried at amortized cost and updated using the effective interest rate method. Contract liability is released in the income statement as the control of the product or service is transferred to the customer.

Critical accounting estimates and judgments

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

8. Income taxes

a) Deferred income tax assets and liabilities

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Taxes losses carryforward	18,778	18,917	10,877	10,654
Temporary differences:				
Employee post retirement obligations	3,387	2,610	1,340	822
Provision for litigation	1,784	1,586	1,735	1,524
Timing differences arising on assets and liabilities (i)	13,084	4,857	12,301	3,671
Fair value of financial instruments	3,485	2,084	3,545	2,084
Allocated goodwill	(10,640)	(9,022)	-	-
Goodwill amortization	(1,928)	(1,527)	(1,928)	(1,527)
Others	1,616	1,326	900	308
	10,788	1,914	17,893	6,882
Total	29,566	20,831	28,770	17,536
Assets	37,151	26,767	28,770	17,536
Liabilities	(7,585)	(5,936)	-	-
	29,566	20,831	28,770	17,536

(i) The changes refer mainly to the recognition of the tax effects of the Brumadinho event in 2019.

Changes in deferred tax are as follows:

	Consolidated		Parent company	
	Assets	Liabilities	Deferred taxes, net	Deferred taxes, net
Balance at December 31, 2017	21,959	5,687	16,272	14,200
Taxes losses carryforward	2,822	-	2,822	3,660
Timing differences arising on assets and liabilities	598	-	598	352
Fair value of financial instruments	538	-	538	538
Allocated goodwill	-	(159)	159	-
Others	(345)	-	(345)	(1,038)
Effect in income statement	3,613	(159)	3,772	3,512
Transfers between asset and liabilities	(253)	(253)	-	-
Translation adjustment	1,011	579	432	-
Other comprehensive income	429	82	347	(191)
Effect of discontinued operations				
Effect in income statement	48	-	48	15
Transfer to net assets held for sale	(40)	-	(40)	-
Balance at December 31, 2018	26,767	5,936	20,831	17,536
Utilization of taxes losses carryforward	(1,467)	-	(1,467)	223
Timing differences arising on assets and liabilities	8,145	-	8,145	8,628
Fair value of financial instruments	1,259	-	1,259	1,258
Allocated goodwill	-	(973)	973	-
Others	(416)	-	(416)	(159)
Effect in income statement	7,521	(973)	8,494	9,950
Transfers between asset and liabilities	1,149	1,149	-	-
Acquisition of subsidiaries (i)	397	952	(555)	-
Translation adjustment	331	478	(147)	-
Other comprehensive income	986	43	943	1,284
Balance at December 31, 2019	37,151	7,585	29,566	28,770

(i) Refers to the acquisition of New Steel and Ferrous Resources Limited (note 14).

The tax loss carryforward does not expire in the Brazilian jurisdiction and their compensation is limited to 30% of the taxable income for the year. The local profits of subsidiaries abroad are also taxed in Brazil and there is no restriction on their offset against tax losses generated previously by the foreign entity or by the Parent Company.

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	
				Year ended December 31	
	2019	2018	2017	2019	2018
Income (loss) before income taxes	(11,206)	25,118	24,885	(11,917)	23,627
Income taxes at statutory rate - 34%	3,810	(8,540)	(8,461)	4,052	(8,033)
Adjustments that affect the basis of taxes:					
Income tax benefit from interest on stockholders' equity	2,470	3,174	2,329	2,470	3,174
Tax incentives	736	2,112	1,175	184	1,529
Equity results	296	389	99	(2,185)	1,811
Additions of tax loss carryforward	99	5,814	315	330	4,189
Unrecognized tax losses of the year	(4,218)	(1,711)	(1,389)	-	-
Nondeductible effect of impairment	-	(92)	(138)	-	-
Others	(684)	(180)	1,463	394	(330)
Income taxes	2,509	966	(4,607)	5,245	2,340

c) Tax incentives

In Brazil, Vale has tax incentives to partially reduce the income tax generated by the operations conducted in the North and Northeast regions that includes iron ore, pellets, manganese, copper and nickel. The incentive is calculated based on the taxable income of the incentive activity (tax operating income) and takes into account the allocation of tax operating income into different incentives applicable to different tranches of production during the periods specified for each product, usually 10 years. Most of the Company's incentives are expected to expire up to 2024 and the last recognized tax incentive will expire in 2027. An amount equal to that obtained with the tax saving must be appropriated in retained earnings reserve account in stockholders' equity, and cannot be distributed as dividends to stockholders.

In addition to those incentives, the amount equivalent to 30% of the income tax due, can be reinvested in the acquisition of new machinery and equipment, subject to subsequent approval by the regulatory agency responsible, Superintendência de Desenvolvimento da Amazônia ("SUDAM") and/or the Superintendência de Desenvolvimento do Nordeste ("SUDENE"). The reinvestment subsidy is accounted in retained earnings reserve account, which restricts the distribution as dividends to stockholders. This tax incentive will expire in 2023.

Vale is subject to the revision of income tax by local tax authorities in a range up to 10 years depending on jurisdiction where the Company operates.

d) Income taxes - Settlement program ("REFIS")

The balance mainly relates to REFIS to settle most of the claims related to the collection of income tax and social contribution on equity gains of foreign subsidiaries and affiliates from 2003 to 2012. At December 31, 2019, the balance of R\$15,749 (R\$1,737 classified as current liabilities and R\$14,012 classified as non-current liabilities) is due in 106 remaining monthly installments, bearing the SELIC interest rate (Special System for Settlement and Custody), which is the Brazilian federal funds rate, while at December 31, 2018, the balance of R\$16,852 (R\$1,673 classified as current liabilities and R\$15,179 classified as non-current liabilities).

As at December 31, 2019, the SELIC rate was 4.50% per annum (6.50% per annum at December 31, 2018).

e) Uncertain tax positions

In 2004, a decision of the Federal Court of Appeals of the 2nd Region (“TRF”) granted to the Company the right to deduct the social security contributions on the net income (“CSLL”) from the taxable corporate income. In 2006, the Brazilian federal tax authorities commenced a rescission action (ação rescisória), seeking the reversal of the 2004 decision. In 2019, “TRF” decided in favour for the rescission action. Following this decision, the Company has filed a motion for clarification and a decision is pending.

Due to the recent developments on this proceeding, the Company has decided to not deduct the “CSLL” from the taxable income prospectively from the 2019 year end. Until December 31, 2018 the uncertainties associated to the deduction of the “CSLL” from the taxable corporate income totaled R\$783 and are not provisioned. The Company determined that, based on its internal and external experts, it is probable that the Company’s treatments will be accepted by the Brazilian tax authority.

The Company did not identify any other uncertain tax treatments that could result in a liability material to the Company, however, Vale remains subject to income tax examinations for its income taxes generally for fiscal the years from 2014 through 2019.

Accounting policy

The Brazilian corporate tax law requires the taxation on the income generated from foreign subsidiaries and, therefore, income tax charge is calculated using the tax rate enacted at the end of the reporting period in Brazil. The effects of the income tax calculation in the consolidated financial statements are calculated by applying the differential between the Brazilian income tax rate and the local income tax rate of each jurisdiction where the Company’s subsidiaries operate and generate taxable income.

Management periodically evaluates positions taken in tax returns with respect to situations in which applicable tax regulation is subject to interpretation and it establishes provisions, where appropriate, on the basis of amounts expected to be paid to the tax authorities. The benefits of uncertain tax positions are recorded only after determining a more-likely-than-not probability that the uncertain tax positions will withstand challenge, if any, from taxing authorities.

Deferred income taxes are recognized based on temporary differences between carrying amount and the tax basis of assets and liabilities as well as tax losses carryforwards. However, deferred tax liabilities are not recognized if they arise from the initial recognition of goodwill. Deferred income tax is also not accounted for if it arises from initial recognition of an asset or liability in a transaction other than a business combination that, at the time of the transaction, affects neither accounting nor taxable profit or loss. Deferred tax assets and liabilities are offset where there is a legally enforceable right to offset current tax assets and liabilities and where the deferred tax balances relate to the same taxation authority.

The deferred tax assets arising from tax losses and temporary differences are not recognized when it is not probable that future taxable profit will be available against which temporary differences and/or tax losses can be utilized.

Current and deferred tax is recognized in profit or loss, except to the extent that it relates to items recognized in other comprehensive income or directly in stockholder’s equity. In this case, the tax is also recognized in other comprehensive income or directly in stockholder’s equity, respectively.

Critical accounting estimates and judgments

Significant judgements, estimates and assumptions are required to determine the amount of deferred tax assets that are recognized based on the likely timing and future taxable profits. Deferred tax assets arising from tax losses carryforwards and temporary differences are recognized considering assumptions and projected cash flows. Deferred tax assets may be affected by factors including, but not limited to: (i) internal assumptions on the projected taxable income, which are based on production and sales planning, commodity prices, operational costs and planned capital costs; (ii) macroeconomic environment; and (iii) trade and tax scenarios.

In addition, the Company applies significant judgement in identifying uncertainties over income tax treatments, which could impact the consolidated financial statements. The Company operates in multiple jurisdictions where uncertainties arise in the application of complex tax regulations. Vale and its subsidiaries are subject to reviews of income tax filings and other tax payments, and disputes can arise with the taxing authorities over the interpretation of the applicable laws and regulations.

9. Basic and diluted earnings (loss) per share

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

	Year ended December 31		
	2019	2018	2017
Net income (loss) attributable to Vale's stockholders:			
Net income (loss) from continuing operations	(6,672)	25,967	20,213
Loss from discontinued operations	-	(310)	(2,586)
Net income (loss)	(6,672)	25,657	17,627
Thousands of shares			
Weighted average number of shares outstanding - common shares	5,127,950	5,178,024	5,197,432
Basic and diluted earnings (loss) per share from continuing operations:			
Common share (R\$)	(1.30)	5.01	3.89
Basic and diluted loss per share from discontinued operations:			
Common share (R\$)	-	(0.06)	(0.50)
Basic and diluted earnings (loss) per share:			
Common share (R\$)	(1.30)	4.95	3.39

The Company does not have potential outstanding shares or other instruments with dilutive effect on the earnings per share computation.

10. Accounts receivable

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Accounts receivable	10,448	10,502	14,295	17,398
Expected credit loss	(253)	(241)	(61)	(65)
	10,195	10,261	14,234	17,333
Revenue related to the steel sector - %	87.33%	85.50%	-	-

	Consolidated			Parent company	
	Year ended December 31			2019	2018
Impairment of accounts receivable recorded in the income statement	2019	2018	2017	2019	2018
	(4)	(26)	(14)	2	(5)

There is no customer that individually represents more than 10% of the Company's accounts receivable or revenues.

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. Inventories

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Finished products	10,505	10,847	3,420	3,169
Work in progress	3,082	2,664	164	183
Consumable inventory	3,641	3,705	1,726	1,423
Total	17,228	17,216	5,310	4,775

	Consolidated			Parent company	
	Year ended December 31			2019	2018
Provision (reversal) for net realizable value	2019	2018	2017	2019	2018
	96	(14)	284	(32)	(77)

Finished and work in progress products inventories by segments are presented in note 4(b).

Accounting policy

Inventories are stated at the lower of cost and the net realizable value. The inventory production cost comprises variable and fixed costs, direct and indirect costs of production and are assigned to individual items of inventory on the basis of weighted average costs method. At the end of the reporting period, net realizable value of inventories are assessed and a provision for losses on obsolete or slow-moving inventory may be recognized. The write-downs and reversals are recognized as "Cost of goods sold and services rendered".

12. Recoverable taxes

Recoverable taxes are presented net of provisions for losses on tax credits.

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Value-added tax	1,950	3,151	2	1,425
Brazilian federal contributions	2,655	3,134	2,352	2,839
Others	68	50	46	41
Total	4,673	6,335	2,400	4,305
Current	2,227	3,422	929	2,024
Non-current	2,446	2,913	1,471	2,281
Total	4,673	6,335	2,400	4,305

The balance of the provision for loss of value-added tax are presented below:

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Provision for loss	4,531	2,713	4,392	2,578

13. Other financial assets and liabilities

	Consolidated		Consolidated	
	Current		Non-Current	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Other financial assets				
Assets held for sale (note 14b)	613	-	-	-
Bank accounts restricted	-	-	504	-
Loans	-	-	350	589
Derivative financial instruments (note 25)	1,160	149	742	1,520
Investments in equity securities (note 14)	-	-	2,925	3,823
Related parties - Loans (note 31)	1,289	1,409	6,448	6,248
	3,062	1,558	10,969	12,180
Other financial liabilities				
Derivative financial instruments (note 25)	377	1,821	1,237	1,335
Related parties - Loans (note 31)	3,951	4,392	3,853	3,722
Financial guarantees (note 32)	-	-	2,116	644
Participative stockholders' debentures	-	-	10,416	5,454
	4,328	6,213	17,622	11,155

	Parent company		Parent company	
	Current		Non-Current	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Other financial assets				
Bank accounts restricted	-	-	504	-
Loans	-	-	18	18
Derivative financial instruments (note 25)	450	116	593	1,471
Investments in equity securities (note 14)	-	-	2,555	3,334
Related parties	690	240	276	453
	1,140	356	3,946	5,276
Other financial liabilities				
Derivative financial instruments (note 25)	280	1,506	972	1,245
Related parties	6,392	3,577	62,861	65,041
Financial guarantees (note 32)	-	-	2,116	644
Participative stockholders' debentures	-	-	10,416	5,454
	6,672	5,083	76,365	72,384

Participative stockholders' debentures

At the time of its privatization in 1997, the Company issued 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. A total of 388,559,056 debentures were issued with a par value of R\$0.01 (one cent of Brazilian Real) and are inflation-indexed to the General Market Price Index ("IGP-M"), as set forth in the Issue Deed.

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, from certain identified mineral resources that the Company owned at the time of the privatization. This obligation will cease when all the relevant mineral resources are exhausted, sold or otherwise disposed of by the Company. The Company made available for withdrawal as remuneration the amount of R\$776 and R\$529, respectively, for the year ended December 31, 2019 and 2018.

14. Acquisitions and divestitures

a) Business combinations

Ferrous Resources Limited - On August 1, 2019 the Company acquired 100% of the share capital of Ferrous Resources Limited ("Ferrous"), a company that currently owns and operates iron ore mines nearby some Company's operations in Minas Gerais, Brazil for cash consideration of R\$1,986 (US\$525 million). Ferrous has been acquired to gain access to additional reserves for the Company.

The fair values of identifiable assets acquired and liabilities assumed as a result of the acquisition are as follows:

	August 1, 2019
Acquired assets	2,660
Cash and cash equivalents	357
Accounts receivable	109
Inventories	38
Intangibles	19
Property, plant and equipment	1,608
Others	529
Assumed liabilities	(814)
Net identifiable assets acquired	1,846
Fair value adjustment on PP&E	211
Deferred tax liability	(71)
Total identifiable net assets at fair value	1,986

	August 1, 2019
Cash consideration transferred	1,986
(-) Balances acquired	
Cash and cash equivalents	357
Net cash outflow	1,629

New Steel - On January 24, 2019 the Company acquired 100% of the share capital of New Steel Global N.V. ("New Steel") and gained its control for the total cash consideration of R\$1,884. 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 and beneficiating iron ore, which is expected to be used on the Company's pelletizing operation. The intangible assets are not subject to amortization until the operational phase is reached. Instead, they are tested for impairment annually, or more frequently when a trigger for impairment has been identified.

The fair values of identifiable assets acquired and liabilities assumed as a result of the acquisition are as follows:

	January 24, 2019
Acquired assets	70
Intangibles (note 18)	9
Other assets	61
Assumed liabilities	(1)
Net identifiable assets acquired	69
Fair value adjustment of intangible research and development asset (note 18)	2,748
Fair value adjustment of property, plant and equipment	2
Deferred tax liability	(935)
Total identifiable net assets at fair value	1,884

b) Other acquisitions and divestitures

Henan Longyu – On December 27, 2019 the Company entered into an agreement to sell its 25% interest in Henan Longyu Energy Resources Co., Ltd, a company that operates two coal mines in the province of Henan, China, for the total consideration of R\$613 (US\$152 million). The closing is expected for the first quarter of 2020 upon completion of conditions precedent. The investment is classified as held for sale as “other financial assets” on current assets.

MBR – On December 20, 2019, the Company purchased an additional 36.4% interest in Minerações Brasileiras Reunidas S.A. (“MBR”) held by its related party, for the total consideration of R\$3,309. 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 arising from the purchase of additional shares was recognized in the Company’s stockholders’ equity, as “Acquisitions and disposal of noncontrolling interest”.

Divestment agreement in compliance with PTVI's Contract of Work - The Company’s subsidiary, PT Vale Indonesia Tbk (“PTVI”), a public company in Indonesia, has an agreement in place dated October 17, 2014 with the government of the Republic of Indonesia to operate its mining licenses which includes a commitment to divest an additional 20% of PTVI’s shares to Indonesian participants (approximately 20% of PTVI’s shares are already registered on the Indonesian Stock Exchange - IDX).

The existing major shareholders, Vale and Sumitomo Metal Mining, Co., Ltd. (“SMM”) hold 58.7% and 20.1%, respectively, of PTVI’s issued shares. Vale and SMM have signed a Heads of Agreement with PT Indonesia Asahan Aluminium (“Inalum”), an Indonesian state-owned company, to satisfy the 20% interest divestment obligation in relation to PTVI, proportionally to their interest. Following the transaction, Vale and SMM will hold together approximately 59% of PTVI’s shares.

The Company expects to set and sign the final terms and conditions in the first quarter of 2020 and complete its divestment within six months from the execution of the divestment agreement.

Fertilizers (discontinued operations) - In January 2018, the Company and The Mosaic Company (“Mosaic”) concluded the transaction entered in December 2016, to sell (i) the phosphate assets located in Brazil, except for those located in Cubatão, Brazil; (ii) the control of Companhia Minera Miski Mayo S.A.C., in Peru; (iii) the potassium assets located in Brazil; and (iv) the potash projects in Canada.

The Company received R\$3,495 (US\$1,080 million) in cash and 34.2 million common shares, corresponding to 8.9% of Mosaic's outstanding common shares after the issuance of these shares totaling R\$2,907 (US\$899 million), based on the Mosaic’s quotation at closing date of the transaction and a loss of R\$184 was recognized in the income statement from discontinued operations. Mosaic’s shares received have been accounted for as a financial investment measured at fair value through other comprehensive income.

In May 2018, the Company concluded the transaction entered with Yara International ASA to sell its assets located in Cubatão, Brazil and received R\$882 (US\$255 million) in cash and a loss of R\$231 was recognized in the income statement from discontinued operations.

The results for the years and the cash flows of discontinued operations are presented as follows:

Income statement

	Consolidated	
	Year ended December 31	
	2018	2017
Discontinued operations		
Net operating revenue	397	5,572
Cost of goods sold and services rendered	(393)	(5,124)
Operating expenses	(15)	(450)
Impairment of non-current assets	(415)	(2,833)
Operating loss	(426)	(2,835)
Financial Results, net	(18)	(89)
Equity results in associates and joint ventures	-	(8)
Loss before income taxes	(444)	(2,932)
Income taxes	134	324
Loss from discontinued operations	(310)	(2,608)
Loss attributable to noncontrolling interests	-	(22)
Loss attributable to Vale's stockholders	(310)	(2,586)

Statement of cash flow

	Consolidated	
	Year ended December 31	
	2018	2017
Discontinued operations		
Net cash provided by (used in) operating activities	(121)	269
Net cash used in investing activities	(36)	(979)
Net cash used in financing activities	-	(107)
Net cash used in discontinued operations	(157)	(817)

Nacala Logistic Corridor - In March 2017, the Company concluded the transaction with Mitsui & Co., Ltd. ("Mitsui") to transfer 50% of its stake of 66.7% in Nacala Logistic Corridor, which comprises entities that holds railroads and port concessions located in Mozambique and Malawi, and sell 15% participation in the holding entity of Vale Moçambique, which holds the Moatize Coal Project, for the amount of R\$2,186 (US\$690 million).

As a consequence of sharing control of Nacala BV, the Company recognized a gain of R\$1,403 (US\$447 million) in the income statement related to the sale and the re-measurement at fair value, of its remaining interest at Nacala BV based on the consideration received. The consideration received was recognized in the statement of cash flows in "Proceeds from disposal of assets and investments" in the amount of R\$1,387 (US\$435 million) and "Transactions with noncontrolling stockholders" in the amount of R\$799 (US\$255 million).

After the conclusion of the transaction, Vale has outstanding loan balances with the related parties Nacala BV and Pangea Emirates Ltd due to the deconsolidation of Nacala Logistic Corridor as disclosed in note 31.

Accounting policy

Business combination - The acquisition method of accounting is used to account for all business combinations, regardless of whether equity instruments or other assets are acquired. The consideration transferred for the acquisition of a subsidiary comprises (i) fair values of the assets transferred; (ii) liabilities assumed of the acquired business; (iii) equity interests issued to the Company; (iv) fair value of any asset or liability resulting from a contingent consideration arrangement, and (v) fair value of any pre-existing equity interest in the subsidiary.

Identifiable assets acquired, and liabilities and contingent liabilities assumed in a business combination are, with limited exceptions, measured initially at their fair values at the acquisition date. The Company recognizes any non-controlling interest in the acquired entity on an acquisition-by-acquisition basis either at fair value or at the non-controlling interest's proportionate share of the acquired entity's net identifiable assets.

Discontinued operation - The classification as a discontinued operation occurs through disposal, or when the operation meets the criteria to be classified as held for sale if this occurs earlier. A discontinued operation is a component of a Company business comprising cash flows and operations that may be clearly distinct from the rest of the Company and that represents an important separate line of business or geographical area of operations.

The result of discontinued operations is presented in a single amount in the income statement, including the results after income tax of these operations less any impairment loss. Cash flows attributable to operating, investing and financing activities of discontinued operations are disclosed in a separate note.

When an operation is classified as a discontinued operation, the income statements of the prior periods are restated as if the operation had been discontinued since the beginning of the comparative period.

Any noncontrolling interest relating to a group disposal held for sale is presented in the stockholders' equity and is not reclassified in the statement of financial position.

15. Subsidiaries

The significant consolidated entities in each business segment are as follows:

	Location	Main activity/Business	% Ownership	% Voting capital	% Noncontrolling interest
Direct and indirect subsidiaries					
Companhia Portuária da Baía de Sepetiba	Brazil	Iron ore	100.0%	100.0%	0.0%
Ferrous Resource Limited	Isle of Man	Iron Ore	100.0%	100.0%	0.0%
Mineração Corumbaense Reunida S.A.	Brazil	Iron ore and manganese	100.0%	100.0%	0.0%
Minerações Brasileiras Reunidas S.A. ("MBR")	Brazil	Iron ore	98.3%	98.3%	1.7%
New Steel Global	Netherlands	Iron ore	100.0%	100.0%	0.0%
Salobo Metais S.A.	Brazil	Copper	100.0%	100.0%	0.0%
PT Vale Indonesia	Indonesia	Nickel	59.2%	59.2%	40.8%
Vale Holdings B.V. (i)	Netherlands	Holding and research	100.0%	100.0%	0.0%
Vale Canada Limited	Canada	Nickel	100.0%	100.0%	0.0%
Vale International S.A.	Switzerland	Trading and holding	100.0%	100.0%	0.0%
Vale Malaysia Minerals Sdn. Bhd.	Malaysia	Iron ore	100.0%	100.0%	0.0%
Vale Manganês S.A.	Brazil	Manganese and ferroalloys	100.0%	100.0%	0.0%
Vale Moçambique S.A.	Mozambique	Coal	80.7%	80.7%	19.3%
Vale Nouvelle Calédonie S.A.S.	New Caledonia	Nickel	95.0%	95.0%	5.0%
Vale Newfoundland & Labrador Ltd	Canada	Nickel	100.0%	100.0%	0.0%
Vale Oman Distribution Center LLC	Oman	Iron ore and pelletizing	100.0%	100.0%	0.0%
Vale Oman Pelletizing Company LLC	Oman	Pelletizing	70.0%	70.0%	30.0%
Vale Shipping Holding Pte. Ltd.	Singapore	Iron ore	100.0%	100.0%	0.0%

(i) Vale International Holdings GmbH was merged into Vale Holdings B.V. on November 01, 2019.

As explained in note 14, the Fertilizer Segment is presented as discontinued operations, which includes the following subsidiaries:

	Location	Main activity/Business	% Ownership	% Voting capital	% Noncontrolling interest
Direct and indirect subsidiaries					
Compañía Minera Miski Mayo S.A.C.	Peru	Fertilizers	40.0%	51.0%	60.0%
Vale Fertilizantes S.A.	Brazil	Fertilizers	100.0%	100.0%	0.0%
Vale Cubatão Fertilizantes Ltda.	Brazil	Fertilizers	100.0%	100.0%	0.0%

Accounting policy

Consolidation and investments in associates and joint ventures - The financial statements reflect the assets, liabilities and transactions of the Parent Company and its direct and indirect controlled entities ("subsidiaries"). The subsidiaries are consolidated when the Company is exposed or has rights to variable returns from its involvement with the investee and has the ability to direct the significant activities of the investee. Intercompany balances and transactions, which include unrealized profits, are eliminated.

The entities over which the Company has joint control ("joint ventures") or significant influence, but not control ("associates") are presented in note 16. Those investments are accounted for using the equity method. For interests in joint arrangements not classified as joint ventures ("joint operations"), the Company recognizes its share of assets, liabilities and net income.

Unrealized gains on downstream or upstream transactions between the Company and its associates and joint ventures are eliminated proportionately to the Company's interest.

Investments held by other investors in Vale's subsidiaries are classified as noncontrolling interests ("NCI"). The Company treats transactions with noncontrolling interests as transactions with equity owners of the Company as described in note 17.

For purchases or disposals from noncontrolling interests, the difference between the consideration paid and the proportion acquired of the carrying value of net assets of the subsidiary is directly recorded in stockholders' equity in "Results from operation with noncontrolling interest".

Translation from the functional currency to the presentation currency - The income statement and statement of financial position of the subsidiaries for which the functional currency is different from the presentation currency are translated into the presentation currency as follows: (i) assets, liabilities and stockholders' equity, except for the components described in item (iii) are translated at the closing rate at the statement of financial position date; (ii) income and expenses are translated at the average exchange rates, except for specific significant transactions that are translated at the rate at the transaction date and; (iii) capital, capital reserves and treasury stock are translated at the rate at each transaction date. All resulting exchange differences are recognized directly in the comprehensive income as "translation adjustments". When a foreign operation is disposed of or sold, foreign exchange differences that were recognized in equity are recognized in the income of statement.

16. Investments

a) Changes during the year

Changes in investments as follows:

	Consolidated		Parent company	
	2019	2018	2019	2018
Balance at January 1st,	12,495	11,802	139,510	117,387
Additions	287	79	2,495	1,514
Acquisitions (i)	-	-	3,870	-
Translation adjustment	73	266	5,920	13,929
Equity results in income statement	871	1,145	(5,799)	5,340
Equity results in statement of comprehensive income	(15)	-	279	348
Fair value adjustment (ii)	(630)	-	(630)	-
Dividends declared	(1,296)	(1,057)	(3,723)	(3,144)
Transfer to assets held for sale (ii)	(613)	-	-	-
Change in interest percentage	-	-	2,241	-
Others	106	260	432	4,136
Balance at December 31,	11,278	12,495	144,594	139,510

(i) Refers to the acquisition of New Steel Global N.V. and Ferrous Resources Limited (note 14).

(ii) Refers to fair value adjustment of the investment in Henan Longyu Energy Resources Co., Ltd., which was transferred later to assets held for sale (note 14).

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

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



Investments (continued)

	% ownership	% voting capital	Investments		Equity results in the income statement			Dividends received (i)		
			December 31, 2019	December 31, 2018	Year ended December 31			Year ended December 31		
					2019	2018	2017	2019	2018	2017
Subsidiaries										
Aços Laminados do Pará S.A.	100.00	100.00	96	91	(4)	(6)	(247)	-	-	-
Biopalma da Amazônia S.A.	99.67	99.67	20	761	(1,300)	(562)	(173)	-	-	-
Companhia Portuária da Baía de Sepetiba	100.00	100.00	222	276	(54)	161	142	-	143	318
Ferrous Resource Limited (iii)	100.00	100.00	1,965	-	(87)	-	-	-	-	-
Mineração Corumbaense Reunida S.A.	100.00	100.00	-	-	(784)	(73)	(682)	-	-	-
Minerações Brasileiras Reunidas S.A.	98.31	98.31	8,302	5,760	1,112	752	731	901	866	542
Minerações Brasileiras Reunidas S.A. - Goodwill	-	-	4,060	4,060	-	-	-	-	-	-
New Steel Global	100.00	100.00	1,865	-	(73)	-	-	-	-	-
Salobo Metais S.A.	100.00	100.00	11,213	10,716	2,186	2,384	1,564	1,718	1,094	417
Tecnored Desenvolvimento Tecnológico S.A.	100.00	100.00	114	76	(113)	(60)	(24)	-	-	-
Vale International Holdings GmbH (i)	-	-	-	7,372	(36)	(1,808)	(609)	-	-	-
Vale Holdings B.V (i)	100.00	100.00	10,448	-	68	-	-	-	-	-
Vale Canada Limited	100.00	100.00	11,236	20,260	(11,515)	(569)	(2,988)	-	-	-
Vale International S.A.	100.00	100.00	71,797	65,927	4,901	4,054	7,649	-	-	-
Vale Malaysia Minerals Sdn. Bhd.	100.00	100.00	5,476	5,210	174	226	273	-	-	-
Vale Manganês S.A.	100.00	100.00	679	711	(66)	32	84	-	-	-
Vale Shipping Holding Pte. Ltd.	100.00	100.00	1,561	1,476	23	301	29	-	-	-
Valepar - Goodwill	-	-	3,073	3,073	-	-	-	-	-	-
Others	-	-	1,189	1,246	(1,102)	(637)	(472)	72	7	791
			133,316	127,015	(6,670)	4,195	5,277	2,691	2,110	2,068
Associates and joint ventures										
Aliança Geração de Energia S.A. (ii)	55.00	55.00	1,894	1,882	122	81	86	111	88	93
Aliança Norte Energia Participações S.A. (ii)	51.00	51.00	646	628	17	54	(7)	-	-	-
California Steel Industries, Inc.	50.00	50.00	975	958	88	289	135	117	114	88
Companhia Coreano-Brasileira de Pelotização	50.00	50.00	354	404	186	253	161	253	121	62
Companhia Hispano-Brasileira de Pelotização (ii)	50.89	50.89	284	323	144	200	132	200	86	53
Companhia Ítalo-Brasileira de Pelotização (ii)	50.90	51.00	262	312	119	219	128	219	122	54
Companhia Nipo-Brasileira de Pelotização (ii)	51.00	51.11	605	575	328	460	295	365	255	96
Companhia Siderúrgica do Pecém	50.00	50.00	-	-	(282)	(867)	(849)	-	-	-
MRS Logística S.A.	48.16	46.75	1,999	1,922	196	264	219	120	106	95
Henan Longyu Energy Resources Co., Ltd. (note 14)	25.00	25.00	-	1,228	(6)	58	63	-	-	-
Mineração Rio do Norte S.A.	40.00	40.00	393	360	58	6	43	-	-	136
VLI S.A.	37.60	37.60	3,273	3,319	1	119	94	37	28	62
Zhuhai YPM Pellet Co.	25.00	25.00	91	87	1	2	-	-	-	-
Outros	-	-	502	497	(101)	7	(198)	1	2	-
Total of joint ventures and associates			11,278	12,495	871	1,145	302	1,423	922	739
Total			144,594	139,510	(5,799)	5,340	5,579	4,114	3,032	2,807

(i) Vale International Holdings GmbH was merged into Vale Holdings B.V on November 01, 2019.

(ii) Although the Company held a majority of the voting capital, the entities are accounted under the equity method due to the stockholders' agreement where relevant decisions are shared with other parties.

(iii) On February 20, 2020 (subsequent event), the Board of Directors decided and sent for approval by the General Shareholders' Meeting, the incorporation of the wholly owned subsidiary Ferrous Resources do Brasil S.A.

The significant associates and joint ventures of the Company are located in Brazil and refer mainly to ferrous minerals segment.

b) 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.

December 31, 2019								
	Aliança Geração de Energia	Aliança Norte Energia	CSI	CSP (i)	Pelletizing (ii)	MRS Logística	Nacala Corridor Holding Netherlands B.V.	VLI S.A.
Current assets	867	1	1,938	1,765	2,900	1,976	1,548	3,245
Non-current assets	3,546	1,266	1,387	11,931	1,270	8,851	18,158	18,169
Total assets	4,413	1,267	3,325	13,696	4,170	10,827	19,706	21,414
Current liabilities	398	1	750	3,972	1,194	1,670	2,080	3,116
Non-current liabilities	571	-	625	10,778	8	5,006	18,827	9,594
Total liabilities	969	1	1,375	14,750	1,202	6,676	20,907	12,710
Stockholders'equity	3,444	1,266	1,950	(1,054)	2,968	4,151	(1,201)	8,704
Net revenue	1,016	-	3,934	5,495	2,299	2,994	3,086	4,886
Net income (loss)	222	33	176	(1,624)	1,532	408	(198)	3

December 31, 2018								
	Aliança Geração de Energia	Aliança Norte Energia	CSI	CSP (i)	Pelletizing (ii)	MRS Logística	Nacala Corridor Holding Netherlands B.V.	VLI S.A.
Current assets	720	-	1,894	2,684	3,736	1,017	1,472	2,632
Non-current assets	3,635	1,232	1,398	11,875	1,147	7,074	17,897	15,257
Total assets	4,355	1,232	3,292	14,559	4,883	8,091	19,369	17,889
Current liabilities	321	-	721	3,764	1,693	1,392	1,073	2,109
Non-current liabilities	612	-	655	10,795	6	2,709	19,262	6,954
Total liabilities	933	-	1,376	14,559	1,699	4,101	20,335	9,063
Stockholders'equity	3,422	1,232	1,916	-	3,184	3,990	(966)	8,826
Net revenue	907	-	5,071	6,149	3,331	3,389	3,016	4,579
Net income (loss)	148	106	578	(1,734)	2,229	549	39	317

(i) Companhia Siderúrgica do Pecém ("CSP") is a joint venture 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 further losses nor liabilities associated with the investee.

(ii) Aggregate entity information: Companhia Coreano-Brasileira de Pelotização, Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização, Companhia Nipo-Brasileira de Pelotização.

Accounting policy

Joint arrangements investments - Joint arrangements are all entities over which the Company has shared control with one or more parties. Joint arrangement investments are classified as either joint operations or joint ventures depending on the contractual rights and obligations of each investor.

The joint operations are recorded in the financial statements to represent the Company's contractual rights and obligations.

Interests in joint ventures are accounted for using the equity method, after initially being recognized at cost. The Company's investment in joint ventures includes the goodwill identified in the acquisition, net of any impairment loss.

The Company's 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 have concluded that the Company does not have a sufficiently dominant voting interest to have the power to direct the activities of the entity. As a result, these entities are accounted under equity method due to shareholder's agreements where relevant decisions are shared with other parties.

17. Noncontrolling interest

a) 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, 2019				
	PTVI	VNC	Vale Moçambique S.A.	Others	Total
Current assets	1,862	682	758		
Non-current assets	6,571	2,436	802		
Related parties - Stockholders	337	136	116		
Total assets	8,770	3,254	1,676		
Current liabilities	564	804	1,287		
Non-current liabilities	246	950	592		
Related parties - Stockholders	-	1,388	41,200		
Total liabilities	810	3,142	43,079		
Stockholders' equity	7,960	112	(41,403)		
Equity attributable to noncontrolling interests	3,248	6	(7,991)	406	(4,331)
Net income (loss)	286	(8,353)	(12,852)		
Net income (loss) attributable to noncontrolling interests	117	(418)	(2,474)	750	(2,025)
Dividends paid to noncontrolling interests (i)	-	-	-	695	695

(i) Dividends paid to noncontrolling interests relates to R\$611 to Minerações Brasileiras Reunidas and R\$84 to Vale Oman Pelletizing.

	December 31, 2018					
	MBR	PTVI	VNC	Vale Moçambique S.A.	Others	Total
Current assets	2,252	1,802	785	1,174		
Non-current assets	9,684	6,074	7,447	6,620		
Related parties - Stockholders	2,794	429	217	85		
Total assets	14,730	8,305	8,449	7,879		
Current liabilities	723	639	546	1,211		
Non-current liabilities	1,092	594	990	308		
Related parties - Stockholders	765	-	2,967	33,829		
Total liabilities	2,580	1,233	4,503	35,348		
Stockholders' equity	12,150	7,072	3,946	(27,469)		
Equity attributable to noncontrolling interests	4,860	2,953	196	(4,998)	269	3,280
Net income (loss)	1,587	218	1,460	(3,731)		
Net income (loss) attributable to noncontrolling interests	635	89	73	(718)	38	117
Dividends paid to noncontrolling interests (i)	587	-	-	-	48	635

(i) Dividends paid to others noncontrolling interests relates to Vale Oman Pelletizing

	December 31, 2017					
	MBR	PTVI	VNC	Vale Moçambique S.A.	Compañía Minera Miski Mayo S.A.C. (i)	Others
Net income (loss)	1,385	(49)	(1,827)	(2,110)	(37)	
Net income (loss) attributable to noncontrolling interests	554	(20)	(91)	(332)	(22)	(46)
Dividends paid to noncontrolling interests (ii)	361	-	-	-	-	43

(i) Discontinued operations

(ii) Dividends paid to others noncontrolling interests relates to Vale Oman Pelletizing

18. Intangibles

Changes in intangibles are as follows:

	Consolidated				
	Goodwill	Concessions (i)	Contract right	Software	Research and development project and patents
Balance at December 31, 2017	13,593	13,236	506	759	-
Additions	-	3,046	-	22	-
Disposals	-	(99)	-	(8)	-
Amortization	-	(494)	(6)	(356)	-
Translation adjustment	562	48	30	11	-
Balance at December 31, 2018	14,155	15,737	530	428	-
Cost	14,155	19,539	778	3,574	-
Accumulated amortization	-	(3,802)	(248)	(3,146)	-
Balance at December 31, 2018	14,155	15,737	530	428	-
Additions	-	1,724	-	151	-
Disposals	-	(65)	-	(1)	-
Amortization	-	(930)	(6)	(257)	-
Impairment (note 20)	-	(463)	-	(43)	-
Acquisition of subsidiary	-	12	-	6	2,757
Translation adjustment	473	(10)	39	20	-
Balance at December 31, 2019	14,628	16,005	563	304	2,757
Cost	14,628	20,517	1,000	3,575	2,757
Accumulated amortization	-	(4,512)	(437)	(3,271)	-
Balance at December 31, 2019	14,628	16,005	563	304	2,757

	Parent company			
	Concessions (i)	Contract right	Software	Total
Balance at December 31, 2017	12,773	111	587	13,471
Additions	3,031	-	8	3,039
Disposals	(96)	-	(8)	(104)
Amortization	(468)	(6)	(310)	(784)
Balance at December 31, 2018	15,240	105	277	15,622
Cost	18,945	223	2,431	21,599
Accumulated amortization	(3,705)	(118)	(2,154)	(5,977)
Balance at December 31, 2018	15,240	105	277	15,622
Additions	1,724	-	101	1,825
Disposals	(65)	-	-	(65)
Amortization	(906)	(6)	(199)	(1,111)
Balance at December 31, 2019	15,993	99	179	16,271
Cost	20,505	223	2,505	23,233
Accumulated amortization	(4,512)	(124)	(2,326)	(6,962)
Balance at December 31, 2019	15,993	99	179	16,271

(i) Based on technical studies carried out by an independent company and after approval by the regulatory agency (ANTT), the Company reduced the useful life of its railroad tracks in 2019.

a) Goodwill - The goodwill arose from the acquisition of iron ore and nickel businesses. In 2017, the goodwill was recognized on the acquisition of Vale controlling interest by Valepar, based on the expected future returns on the ferrous segment. As the fundamentals are still valid on the date of the merger of Valepar by Vale, the goodwill was fully recognized. The Company has not recognized the deferred taxes over the goodwill, since there are no differences between the tax basis and accounting basis. The Company assesses annually the recoverable amount of the goodwill.

b) Concessions - The concessions refer to the agreements with governments for the exploration and the development of ports and railways. The Company holds railway concessions which are valid over a certain period of time. Those assets are classified as intangible assets and amortized over the shorter of their useful lives and the concession term at the end of which they will be returned to the government.

The technical studies and legal documents on early extension of the Vitória Minas Railroad (EFVM) and Carajás Railroad (EFC) concessions are currently under review by the Federal Court of Audit. Vale awaits the end of the process in the public sphere to submit the proposal, with the required counterparts, to its Board of Directors.

c) Contract right - Refers to intangible identified in the business combination of Vale Canada Limited ("Vale Canada") and to the usufruct contract between the Company and noncontrolling stockholders to use the shares of Empreendimentos Brasileiros de Mineração S.A. (owner of Minerações Brasileiras Reunidas S.A. shares). The amortization of the right of use will expire in 2037 and Vale Canada's intangible will end in September of 2046.

d) Research and development project and patents – Refers to in-process research and development projects and patents identified in the business combination of New Steel Global N.V. (note 14). The intangible assets of research and development are not subject to amortization until the operational phase is reached.

Accounting policy

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

The estimated useful lives are as follows:

	Useful life
Railways concessions	3 to 50 years
Usufruct	22 to 31 years
Software	5 years

19. Property, plant and equipment

Changes in property, plant and equipment are as follows:

	Consolidated								
	Land	Building	Facilities	Equipment	Mineral properties	Right of use assets	Others	Constructions in progress	Total
Balance at December 31, 2017	2,375	40,028	38,986	22,803	29,999	-	27,104	20,240	181,535
Additions (i)	-	-	-	-	-	-	-	10,451	10,451
Disposals	(43)	(177)	(338)	(917)	(28)	-	(291)	(340)	(2,134)
Assets retirement obligation	-	-	-	-	1,686	-	-	-	1,686
Depreciation, amortization and depletion	-	(1,922)	(2,378)	(3,080)	(1,904)	-	(2,370)	-	(11,654)
Impairment (note 20)	-	(39)	(70)	(82)	-	-	(119)	(403)	(713)
Translation adjustment	85	1,531	1,241	1,754	1,848	-	883	968	8,310
Transfers	42	3,013	6,095	4,348	1,330	-	2,968	(17,796)	-
Balance at December 31, 2018	2,459	42,434	43,536	24,826	32,931	-	28,175	13,120	187,481
Cost	2,459	70,779	68,238	48,140	64,773	-	45,331	13,120	312,840
Accumulated depreciation	-	(28,345)	(24,702)	(23,314)	(31,842)	-	(17,156)	-	(125,359)
Balance at December 31, 2018	2,459	42,434	43,536	24,826	32,931	-	28,175	13,120	187,481
Effects of IFRS 16/CPC 06 (R2) adoption (ii)	-	-	-	-	-	6,978	-	-	6,978
Additions (i)	-	-	-	-	-	558	-	17,075	17,633
Disposals	(98)	(322)	(305)	(279)	(656)	(29)	(704)	(87)	(2,480)
Assets retirement obligation	-	-	-	-	1,767	-	-	-	1,767
Depreciation, amortization and depletion	-	(2,027)	(2,628)	(3,417)	(2,378)	(758)	(2,637)	-	(13,845)
Impairment (note 20)	-	(2,373)	(4,581)	(2,914)	(2,439)	(212)	(3,278)	(1,452)	(17,249)
Acquisition of subsidiary (iii)	233	56	156	173	1,044	6	2	186	1,856
Translation adjustment	211	811	702	688	1,759	276	522	623	5,592
Transfers	76	1,677	1,833	3,844	1,274	-	3,121	(11,825)	-
Balance at December 31, 2019	2,881	40,256	38,713	22,921	33,302	6,819	25,201	17,640	187,733
Cost	2,881	73,581	69,208	47,387	71,854	7,577	46,433	17,640	336,561
Accumulated depreciation	-	(33,325)	(30,495)	(24,466)	(38,552)	(758)	(21,232)	-	(148,828)
Balance at December 31, 2019	2,881	40,256	38,713	22,921	33,302	6,819	25,201	17,640	187,733

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	Parent company								
	Land	Building	Facilities	Equipment	Mineral properties	Right of use assets	Others	Constructions in progress	Total
Balance at December 31, 2017	1,739	25,315	27,204	9,716	5,367	-	18,205	15,432	102,978
Additions (i)	-	-	-	-	-	-	-	5,062	5,062
Disposals	(41)	(20)	(280)	(141)	(7)	-	(90)	(173)	(752)
Assets retirement obligation	-	-	-	-	1,966	-	-	-	1,966
Depreciation, amortization and depletion	-	(854)	(1,274)	(1,269)	(292)	-	(1,749)	-	(5,438)
Transfers	37	2,118	4,943	1,698	655	-	2,874	(12,325)	-
Balance at December 31, 2018	1,735	26,559	30,593	10,004	7,689	-	19,240	7,996	103,816
Cost	1,735	33,136	38,554	17,307	9,731	-	30,883	7,996	139,342
Accumulated depreciation	-	(6,577)	(7,961)	(7,303)	(2,042)	-	(11,643)	-	(35,526)
Balance at December 31, 2018	1,735	26,559	30,593	10,004	7,689	-	19,240	7,996	103,816
Effects of IFRS 16/CPC 06 (R2) adoption (ii)	-	-	-	-	-	2,415	-	-	2,415
Additions (i)	-	-	-	-	-	7	-	6,904	6,911
Disposals	(17)	(310)	(201)	(213)	(202)	-	(674)	(57)	(1,674)
Assets retirement obligation	-	-	-	-	1,234	-	-	-	1,234
Depreciation, amortization and depletion	-	(1,024)	(1,497)	(1,394)	(578)	(308)	(2,024)	-	(6,825)
Transfers	79	1,330	1,325	1,816	(990)	-	3,065	(6,625)	-
Balance at December 31, 2019	1,797	26,555	30,220	10,213	7,153	2,114	19,607	8,218	105,877
Cost	1,797	34,535	39,296	18,564	9,598	2,422	33,056	8,218	147,486
Accumulated depreciation	-	(7,980)	(9,076)	(8,351)	(2,445)	(308)	(13,449)	-	(41,609)
Balance at December 31, 2019	1,797	26,555	30,220	10,213	7,153	2,114	19,607	8,218	105,877

(i) Includes capitalized borrowing costs.

(ii) Refers to the recognition of right-of-use assets related to lease agreements in accordance with IFRS 16/CPC 06 (R2). Changes in leases by asset class are disclosed in note 2(c).

(iii) Refers mainly to the acquisition of Ferrous Resources Limited (note 14).

Accounting policy

Property, plant and equipment are recorded at the cost of acquisition or construction, net of accumulated depreciation and impairment charges.

Mineral properties developed internally are determined by (i) direct and indirect costs attributed to build the mining facilities, (ii) financial charges incurred during the construction period, (iii) depreciation of other fixed assets used during construction, (iv) estimated decommissioning and site restoration expenses, and (v) other capitalized expenditures during the development phase (phase when the project demonstrates its economic benefit to the Company, and the Company has ability and intention to complete the project).

The depletion of mineral properties is determined based on the ratio between production and total proven and probable mineral reserves.

Property, plant and equipment, other than mineral properties are depreciated using the straight-line method based on the estimated useful lives, from the date on which the assets become available for their intended use and are capitalized, except for land which is not depreciated.

The estimated useful lives are as follows:

	Useful life
Buildings	3 to 50 years
Facilities	3 to 50 years
Equipment	3 to 40 years
Others:	
Locomotives	12 to 25 years
Wagon	30 to 44 years
Railway equipment	5 to 33 years
Ships	20 years
Others	2 to 50 years

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 deposits. 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 - At inception of a contract, the Company assesses whether a contract is, or contains, a lease. A contract is, or contains a lease, if the contract conveys the right to control the use of an identified asset for a period of time in exchange for consideration.

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 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.

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.

20. Impairment and onerous contracts

The impairment losses recognized in the year are presented below:

	Income statement		
	Impairment		
Segments by class of assets	2019	2018	2017
Property, plant and equipment and intangibles			
Base metals – nickel	10,319	-	428
Coal	6,949	-	-
Other assets	487	713	455
Impairment of non-current assets	17,755	713	883
Onerous contracts	987	1,527	-
Disposals of non-current assets	2,020	1,283	142
Impairment and disposals of non-current assets	20,762	3,523	1,025

a) Impairment of non-financial assets

The Company has carried out an impairment test for the assets that a triggering event was identified and for goodwill. The recoverable amount of each Cash Generating Unit (“CGU”) under the impairment testing was assessed using fair value less costs of disposal model (“FVLCD”), through discounted cash flow techniques, which is classified as “level 3” in the fair value hierarchy.

The cash flows were discounted using a post-tax discount rate, which represents an estimate of the rate that a market participant would apply having regard to the time value of money and the risks specific to the asset. 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.

Iron ore and Pellets - During 2019, the Company did not identify any changes in the circumstances or indicators that would indicate an impairment trigger of the Iron ore and Pellets CGU. However, Management undertook an impairment testing for the goodwill and, based on the net present value of post-tax cash flows discounted at 6.3%, no impairment loss was identified as well. Of the total goodwill (note 18), R\$7,135 is allocated to the group of ferrous minerals.

Coal - In 2019, the Company identified that the expected yield of metallurgical coal and thermal coal will not be achieved, mostly due to technical issues on the project and operation of the assets related to this CGU. Management also conducted a detailed review of the mining plan, leading to a significant reduction on the proven and probable reserves. In addition, Management has lowered its long-term price assumption for both metallurgical and thermal coal, based on the current market outlook for coal.

Therefore, the Company has carried out an impairment test for the coal CGU and the assets related to the coal business were impaired in full. As a result, the Company recognized an impairment charge of R\$6,949 as at December 31, 2019, based on the net present value of post-tax cash flows discounted at 9.2%.

Base metals, Nickel – The New Caledonian operation has experienced challenging issues throughout 2019, mainly in relation to production and processing. Thus, the Company has revised the business plan of this CGU, reducing the expected production levels of its refined nickel product for remaining useful life of the mine. The new business strategy for this CGU led to an impairment charge of R\$10,319 recorded as at December 31, 2019 based on the net present value of post-tax cash flows discounted at 5.2%. The CGU’s carrying amount after the impairment charge is R\$1,628 as at December 31, 2019.

The individual assumptions subject to the most estimation uncertainty for the FVLCD calculation are the nickel price and the discount rate. To illustrate these sensitivities, the carrying value would be fully impaired by an increase to the discount rate of 5.6%, or a reduction of US\$1,150 per ton to the nickel long-term price, if all other inputs remained constant.

In 2017, an underground mine in Sudbury (Stobie) that was affected by seismic activities and the cost to repair the asset is deemed not recoverable in the current market conditions. Therefore, the Company has placed this asset on “care and maintenance” and an impairment of R\$428 was recognized in the income statement.

Of the total goodwill (note 18), R\$7,493 is allocated to the group of nickel CGUs. Although, an impairment loss was recognized in relation to the New Caledonia CGU, the impairment testing over the goodwill demonstrates that there would be no impairment loss in relation to that goodwill allocated to the nickel business, based on the net present value of post-tax cash flows discounted using rates ranging from 5% to 6%.

Other assets – The Company has undertaken a review on the business plan of its biological assets leading to a reduction in the expected operational capacity of these assets. Management has also reviewed its long-term price assumption based on the current market condition. Thus, the Company carried out an impairment test and an impairment loss of R\$487 (2018: R\$713) was recognized in the income statement.

b) Onerous contract

In 2019, the Company reviewed its expectation of iron ore production and sales volumes of the Midwest system. Following the revised plan for the upcoming years, the Company has recognized an additional provision of R\$987 (2018: R\$1,527) in relation to the costs of certain long-term contracts, with minimum guaranteed volume for fluvial transportation and port structure.

c) Disposals of assets

Refers to non-viable projects and operating assets written off through sale or obsolescence. Additionally, includes assets write-off of the Córrego do Feijão mine and those related to the other upstream dams in Brazil, as described in note 3e.

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.

21. Loans, borrowings, 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, 2019	December 31, 2018
Debt contracts in the international markets	42,298	45,656
Debt contracts in Brazil	10,327	14,272
Total of loans and borrowings	52,625	59,928
(-) Cash and cash equivalents	29,627	22,413
(-) Short-term investments	3,329	125
Net debt	19,669	37,390

b) Cash and cash equivalents

Cash and cash equivalents includes cash, immediately redeemable deposits and short-term investments with an insignificant risk of change in value. They are readily convertible to cash, part in R\$, indexed to the Brazilian Interbank Interest rate ("DI Rate" or "CDI") and part denominated in US\$, mainly time deposits.

c) Short-term investments

At December 31, 2019, the balance of R\$3,329 is mainly comprised by investments in Financial Treasury Bills ("LFTs"), which are Brazilian government bonds, issued by the National Treasury. LFTs are floating-rate securities, liquid in the secondary markets and subject to a low risk of changes in value.

d) Loans and borrowings

As at December 31, 2019 and 2018, loans and borrowings are secured by property, plant and equipment in the amount of R\$887 and R\$857, respectively.

The securities issued through Vale's wholly-owned finance subsidiary Vale Overseas Limited are fully and unconditionally guaranteed by Vale.

i) Total debt

	Consolidated			
	Current liabilities		Non-current liabilities	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Debt contracts in the international markets				
Floating rates in:				
US\$	456	547	11,294	7,099
EUR	-	-	907	887
Fixed rates in:				
US\$	593	55	24,506	32,423
EUR	-	-	3,398	3,328
Other currencies	56	97	427	492
Accrued charges	645	728	16	-
	1,750	1,427	40,548	44,229
Debt contracts in Brazil				
Floating rates in:				
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	2,620	1,687	6,759	11,039
Basket of currencies and US\$ indexed to LIBOR	177	391	226	387
Fixed rates in:				
R\$	174	221	181	353
Accrued charges	174	163	16	31
	3,145	2,462	7,182	11,810
Total	4,895	3,889	47,730	56,039

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Expressed in millions of Brazilian reais, unless otherwise stated



	Current liabilities		Parent company Non-current liabilities	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Debt contracts in the international markets				
Floating rates in:				
US\$	445	166	6,419	6,599
Fixed rates in:				
US\$	536	-	2,098	2,016
EUR	-	-	3,398	3,329
Accrued charges	238	219	-	-
	1,219	385	11,915	11,944
Debt contracts in Brazil				
Floating rates in:				
R\$, indexed to TJLP, TR, IPCA, IGP-M and CDI	2,279	1,391	6,418	10,444
Basket of currencies and US\$ indexed to LIBOR	180	391	225	389
Fixed rates in:				
R\$	151	190	155	305
Accrued charges	157	166	-	-
	2,767	2,138	6,798	11,138
Total	3,986	2,523	18,713	23,082

The future flows of debt payments, principal and interest, are as follows:

	Consolidated		Parent company
	Principal	Estimated future interest payments (i)	Principal
2020	4,079	2,830	3,590
2021	3,176	2,584	2,654
2022	4,135	2,451	3,005
2023	4,805	2,289	4,699
Between 2024 and 2028	18,070	8,202	6,171
2029 onwards	17,508	10,907	2,182
Total	51,773	29,263	22,301

(i) Based on interest rate curves and foreign exchange rates applicable as at December 31, 2019 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.

At December 31, 2019, the average annual interest rates by currency are as follows:

		Consolidated		Parent company
	Average interest rate (i)	Total debt	Average interest rate (i)	Total debt
Loans and borrowings				
US\$	5.57%	37,767	3.84%	10,002
R\$ (ii)	9.38%	9,920	9.00%	9,157
EUR (iii)	3.77%	4,447	4.29%	3,540
Other currencies	3.58%	491	0.00%	-
		52,625		22,699

(i) In order to determine the average interest rate for debt contracts with floating rates, the Company used the rate applicable at December 31, 2019.

(ii) R\$ denominated debt that bears interest at IPCA, CDI, TR or TJLP, plus spread. For a total of R\$9.816 the Company entered into derivative transactions to mitigate the exposure to the cash flow variations of the floating rate debt denominated in R\$, resulting in an average cost of 3.09% per year in US\$.

(iii) Eurobonds, for which the Company entered into derivatives to mitigate the exposure to the cash flow variations of the debt denominated in EUR, resulting in an average cost of 4.29% per year in US\$.

ii) Reconciliation of debt to cash flows arising from financing activities

	Consolidated
	Loans and borrowings
December 31, 2018	59,928
Additions	11,886
Repayments (i)	(21,874)
Interest paid	(3,660)
Cash flow from financing activities	(13,648)
Effect of exchange rate	2,634
Interest accretion	3,711
Non-cash changes	6,345
December 31, 2019	52,625

(i) The Company conducted a repurchase of certain guaranteed notes issued by Vale a total of R\$9,150 (US\$2,270 million). Additionally, the Company paid of R\$1,100 as expenses with cash tender offer repurchased.

iii) Credit and financing lines

The revolving credit facilities available today were provided by a syndicate of several global commercial banks. To mitigate liquidity risk, Vale has two revolving credit facilities, which will mature in 2022 and 2024, in the available amount of R\$20,154 (US\$5,000 million) to assist the short term liquidity management and to enable more efficiency in cash management, being consistent with the strategic focus on cost of capital reduction. As of December 31, 2019 these lines are undrawn.

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.

Loans and borrowing costs are capitalized as part of property, plants and equipment if those costs are directly related to a qualified asset. The capitalization occurs until the qualified asset is ready for its intended use. The average capitalization rate is 14%. Borrowing costs that are not capitalized are recognized in the income statement in the period in which they are incurred.

Some of the Company's debt agreements with lenders contain financial covenants. The primary financial covenants in those agreements require maintaining certain ratios, such as debt to EBITDA and interest coverage. The Company has not identified any instances of noncompliance as at December 31, 2019 and 2018.

22. Liabilities related to associates and joint ventures

On November 5, 2015, a rupture has occurred in the Fundão tailings dam, in Mariana (State of Minas Gerais), operated by Samarco Mineração S.A. ("Samarco"), a joint venture controlled by Vale S.A. and BHP Billiton Brasil Ltda. ("BHP"). In March 2016, Samarco and its shareholders entered into a Framework Agreement with governmental authorities, in which Samarco, Vale S.A. and BHP agreed to establish the Fundação Renova, an entity responsible to develop and implement 42 long-term mitigation and compensation programs.

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.

On October 25, 2019, Samarco obtained the Corrective Operation License for its operating activities in the Germano Complex. Following this authorization, Samarco has obtained all environmental licenses required to restart its operations. Samarco currently expects to restart its operations by the end of 2020.

Fundação Renova

During 2019, Fundação Renova reviewed the estimates of the costs required to mitigate and compensate the impacts from the rupture of Fundão dam. As a result, Vale recognized an additional provision of R\$1,963, which is the present value of the revised estimate in relation to Vale's responsibility to support Fundação Renova and is equivalent to 50% of Samarco's additional obligations over the next 11 years.

Overall, the programs rely on future actions, which indicates a broad range of possible estimates. Estimates of mitigation and compensation actions may vary according to the progress of the ongoing programs developed by the Fundação Renova and changes in scope. The amounts disclosed in these interim financial statements have been determined based on Management's best estimates and consider the facts and circumstances known to date.

The contingencies related to the Fundão dam rupture are disclosed in note 28.

Germano dam

Due to the new safety requirements set by ANM, Samarco prepared a project for the de-characterization of this dam. During May 2019, the concept of a project for the de-characterization of the Germano dam was filed. The conceptual project was concluded in August 2019 and is subject to further review and eventual approval by the competent authorities. Accordingly, based on the information available on the preparation of these financial statements, the estimated amount based on the expected cash outflows resulted in an additional provision of R\$993 recognized during 2019.

The changes in the provision to meet the obligations under the agreement related to the Fundão dam rupture and to the de-characterization of Germano dam in the year ended December 31, 2019 and 2018 are as follows:

	Consolidated	
	2019	2018
Balance at January 1	4,346	3,296
Payments	(1,253)	(1,065)
Interest accretion	804	592
Provision increase	2,956	1,523
Balance at December 31	6,853	4,346
Current liabilities	2,079	1,120
Non-current liabilities	4,774	3,226
Liabilities	6,853	4,346

Samarco's working capital

In addition to the provision, Vale S.A. made available in the year ended December 31, 2019 and 2018, the amount of R\$402 (US\$102 million) and R\$315 (US\$84 million), respectively, which was fully used to fund Samarco's working capital. This amount was recognized in Vale's income statement as an expense in "Equity results and other results in associates and joint ventures".

During 2020, Vale S.A. may provide a short-term credit facility up to R\$1,076 (US\$267 million) to support the Samarco's cash needs, without any binding obligation to Samarco. The availability of funds by the shareholders – Vale S.A. and BHP – is subject to the fulfillment of certain conditions, being deliberated by the shareholders, in the same bases and concomitantly, if required.

Under Brazilian legislation and the terms of the joint venture agreement, Vale does not have an obligation to provide funding to Samarco. Accordingly, Vale's investment in Samarco was fully impaired and no provision was recognized in relation to the Samarco's negative equity.

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, 2019	December 31, 2018
Current assets	136	210
Non-current assets	15,878	22,770
Total assets	16,014	22,980
Current liabilities	28,171	23,503
Non-current liabilities	22,273	16,594
Total liabilities	50,444	40,097
Negative reserves	(34,430)	(17,117)
Loss for the year ended	(16,625)	(2,477)

Insurance

Since the Fundão dam rupture, the Company has been negotiating with insurers the indemnification payments based on its general liability policies. During the 2019, the Company received payments in the amount of R\$412 (US\$109 million) and recognized a gain in the income statement as "Equity results and other results in associates and joint ventures".

Critical accounting estimates and judgments

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) resolution of uncertainty in respect of the resumption of Samarco's operations; (iii) updates of the discount rate; and (iv) resolution of existing and potential legal claims.

Moreover, the main critical assumptions and estimates applied in the Germano dam provision considers, among others: (i) volume of the waste to be removed based on historical data available and interpretation of the enacted laws and regulations; (ii) location availability for the tailings disposal; and (iii) acceptance by the authorities of the proposed engineering methods and solution.

As a result, future expenditures may differ from the amounts currently provided and changes to key assumptions could result in a material impact to the amount of the provision in future reporting periods. At each reporting period, the Company reassess the key assumptions used by Samarco in the preparation of the projected cash flows and adjust the provision, if required.

23. Financial instruments classification

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, 2019				December 31, 2018			
	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	29,627	-	-	29,627	22,413	-	-	22,413
Short-term investments	-	-	3,329	3,329	-	-	125	125
Derivative financial instruments	-	-	1,160	1,160	-	-	149	149
Accounts receivable	9,885	-	310	10,195	10,679	-	(418)	10,261
Related parties	1,289	-	-	1,289	1,409	-	-	1,409
	40,801	-	4,799	45,600	34,501	-	(144)	34,357
Non-current								
Judicial deposits	12,734	-	-	12,734	6,649	-	-	6,649
Bank accounts restricted	504	-	-	504	-	-	-	-
Derivative financial instruments	-	-	742	742	-	-	1,520	1,520
Investments in equity securities	-	2,925	-	2,925	-	3,823	-	3,823
Loans	350	-	-	350	589	-	-	589
Related parties	6,448	-	-	6,448	6,248	-	-	6,248
	20,036	2,925	742	23,703	13,486	3,823	1,520	18,829
Total of financial assets	60,837	2,925	5,541	69,303	47,987	3,823	1,376	53,186
Financial liabilities								
Current								
Suppliers and contractors	16,556	-	-	16,556	13,610	-	-	13,610
Leases	910	-	-	910	-	-	-	-
Derivative financial instruments	-	-	377	377	-	-	1,821	1,821
Loans and borrowings	4,895	-	-	4,895	3,889	-	-	3,889
Interest on capital	6,333	-	-	6,333	-	-	-	-
Related parties	3,951	-	-	3,951	4,392	-	-	4,392
	32,645	-	377	33,022	21,891	-	1,821	23,712
Non-current								
Leases	6,308	-	-	6,308	-	-	-	-
Derivative financial instruments	-	-	1,237	1,237	-	-	1,335	1,335
Loans and borrowings	47,730	-	-	47,730	56,039	-	-	56,039
Related parties	3,853	-	-	3,853	3,722	-	-	3,722
Participative stockholders' debentures	-	-	10,416	10,416	-	-	5,454	5,454
Financial guarantees	-	-	2,116	2,116	-	-	644	644
	57,891	-	13,769	71,660	59,761	-	7,433	67,194
Total of financial liabilities	90,536	-	14,146	104,682	81,652	-	9,254	90,906

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Expressed in millions of Brazilian reais, unless otherwise stated



	December 31, 2019				December 31, 2018			
	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	9,597	-	-	9,597	4,835	-	-	4,835
Short-term investments	-	-	3,309	3,309	-	-	4	4
Derivative financial instruments	-	-	450	450	-	-	116	116
Accounts receivable	16,461	-	138	16,599	17,344	-	(11)	17,333
Related parties	690	-	-	690	240	-	-	240
	26,748	-	3,897	30,645	22,419	-	109	22,528
Non-current								
Judicial deposits	12,268	-	-	12,268	6,274	-	-	6,274
Bank accounts restricted	504	-	-	504	-	-	-	-
Derivative financial instruments	-	-	593	593	-	-	1,471	1,471
Investments in equity securities	-	2,555	-	2,555	-	3,334	-	3,334
Loans	18	-	-	18	18	-	-	18
Related parties	276	-	-	276	453	-	-	453
	13,066	2,555	593	16,214	6,745	3,334	1,471	11,550
Total of financial assets	39,814	2,555	4,490	46,859	29,164	3,334	1,580	34,078
Financial liabilities								
Current								
Suppliers and contractors	10,765	-	-	10,765	7,342	-	-	7,342
Leases	337	-	-	337	-	-	-	-
Derivative financial instruments	-	-	280	280	-	-	1,506	1,506
Loans and borrowings	3,986	-	-	3,986	2,523	-	-	2,523
Interest on capital	6,333	-	-	6,333	-	-	-	-
Related parties	6,392	-	-	6,392	3,577	-	-	3,577
	27,813	-	280	28,093	13,442	-	1,506	14,948
Non-current								
Leases	1,833	-	-	1,833	-	-	-	-
Derivative financial instruments	-	-	972	972	-	-	1,245	1,245
Loans and borrowings	18,713	-	-	18,713	23,082	-	-	23,082
Related parties	62,861	-	-	62,861	65,041	-	-	65,041
Participative stockholders' debentures	-	-	10,416	10,416	-	-	5,454	5,454
Financial guarantees	-	-	2,116	2,116	-	-	644	644
	83,407	-	13,504	96,911	88,123	-	7,343	95,466
Total of financial liabilities	111,220	-	13,784	125,004	101,565	-	8,849	110,414

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



The classification of financial assets and liabilities by currencies are as follows:

Consolidated						
December 31, 2019						
Financial assets	R\$	US\$	CAD	EUR	Other currencies	Total
Current						
Cash and cash equivalents	11,376	17,578	165	44	464	29,627
Short-term investments	3,329	-	-	-	-	3,329
Derivative financial instruments	447	713	-	-	-	1,160
Accounts receivable	1,569	8,549	20	-	57	10,195
Related parties	-	1,289	-	-	-	1,289
	16,721	28,129	185	44	521	45,600
Non-current						
Judicial deposits	12,734	-	-	-	-	12,734
Bank accounts restricted	504	-	-	-	-	504
Derivative financial instruments	593	149	-	-	-	742
Investments in equity securities	-	2,925	-	-	-	2,925
Loans	16	334	-	-	-	350
Related parties	-	6,448	-	-	-	6,448
	13,847	9,856	-	-	-	23,703
Total of financial assets	30,568	37,985	185	44	521	69,303
Financial liabilities						
Current						
Suppliers and contractors	9,340	3,988	2,112	713	403	16,556
Leases	347	443	64	-	56	910
Derivative financial instruments	276	101	-	-	-	377
Loans and borrowings	2,960	1,729	63	143	-	4,895
Interest on capital	6,333	-	-	-	-	6,333
Related parties	2,294	1,657	-	-	-	3,951
	21,550	7,918	2,239	856	459	33,022
Non-current						
Leases	1,326	4,578	359	-	45	6,308
Derivative financial instruments	971	266	-	-	-	1,237
Loans and borrowings	6,959	36,038	429	4,304	-	47,730
Related parties	-	3,853	-	-	-	3,853
Participative stockholders' debentures	10,416	-	-	-	-	10,416
Financial guarantees	2,116	-	-	-	-	2,116
	21,788	44,735	788	4,304	45	71,660
Total of financial liabilities	43,338	52,653	3,027	5,160	504	104,682

Consolidated						
December 31, 2018						
Financial assets	R\$	US\$	CAD	EUR	Other currencies	Total
Current						
Cash and cash equivalents	10,715	11,172	89	46	391	22,413
Short-term investments	4	121	-	-	-	125
Derivative financial instruments	116	33	-	-	-	149
Accounts receivable	1,731	8,517	13	-	-	10,261
Related parties	-	1,409	-	-	-	1,409
	12,566	21,252	102	46	391	34,357
Non-current						
Judicial deposits	6,649	-	-	-	-	6,649
Derivative financial instruments	1,471	49	-	-	-	1,520
Investments in equity securities	-	3,823	-	-	-	3,823
Loans	18	571	-	-	-	589
Related parties	-	6,248	-	-	-	6,248
	8,138	10,691	-	-	-	18,829
Total of financial assets	20,704	31,943	102	46	391	53,186
Financial liabilities						
Current						
Suppliers and contractors	6,939	4,580	1,133	548	410	13,610
Derivative financial instruments	1,506	315	-	-	-	1,821
Loans and borrowings	2,062	1,589	98	140	-	3,889
Related parties	2,981	1,411	-	-	-	4,392
	13,488	7,895	1,231	688	410	23,712
Non-current						
Derivative financial instruments	1,246	89	-	-	-	1,335
Loans and borrowings	11,423	39,909	491	4,216	-	56,039
Related parties	253	3,469	-	-	-	3,722
Participative stockholders' debentures	5,454	-	-	-	-	5,454
Financial guarantees	644	-	-	-	-	644
	19,020	43,467	491	4,216	-	67,194
Total of financial liabilities	32,508	51,362	1,722	4,904	410	90,906

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



					Parent company
					December 31, 2019
Financial assets	R\$	US\$	EUR	Other currencies	Total
Current					
Cash and cash equivalents	9,387	210	-	-	9,597
Short-term investments	3,309	-	-	-	3,309
Derivative financial instruments	450	-	-	-	450
Accounts receivable	2,900	13,699	-	-	16,599
Related parties	-	690	-	-	690
	16,046	14,599	-	-	30,645
Non-current					
Judicial deposits	12,268	-	-	-	12,268
Bank accounts restricted	504	-	-	-	504
Derivative financial instruments	593	-	-	-	593
Investments in equity securities	-	2,555	-	-	2,555
Loans	18	-	-	-	18
Related parties	40	236	-	-	276
	13,423	2,791	-	-	16,214
Total of financial assets	29,469	17,390	-	-	46,859
Financial liabilities					
Current					
Suppliers and contractors	10,470	25	252	18	10,765
Leases	337	-	-	-	337
Derivative financial instruments	280	-	-	-	280
Loans and borrowings	2,583	1,262	141	-	3,986
Interest on capital	6,333	-	-	-	6,333
Related parties	2,364	4,028	-	-	6,392
	22,367	5,315	393	18	28,093
Non-current					
Leases	1,833	-	-	-	1,833
Derivative financial instruments	972	-	-	-	972
Loans and borrowings	6,574	8,742	3,397	-	18,713
Related parties	243	62,618	-	-	62,861
Participative stockholders' debentures	10,416	-	-	-	10,416
Financial guarantees	2,116	-	-	-	2,116
	22,154	71,360	3,397	-	96,911
Total of financial liabilities	44,521	76,675	3,790	18	125,004

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



					Parent company
					December 31, 2018
Financial assets	R\$	US\$	EUR	Other currencies	Total
Current					
Cash and cash equivalents	4,773	62	-	-	4,835
Short-term investments	4	-	-	-	4
Derivative financial instruments	116	-	-	-	116
Accounts receivable	570	16,756	7	-	17,333
Related parties	-	240	-	-	240
	5,463	17,058	7	-	22,528
Non-current					
Judicial deposits	6,274	-	-	-	6,274
Derivative financial instruments	1,471	-	-	-	1,471
Investments in equity securities	-	3,334	-	-	3,334
Loans	18	-	-	-	18
Related parties	-	453	-	-	453
	7,763	3,787	-	-	11,550
Total of financial assets	13,226	20,845	7	-	34,078
Financial liabilities					
Current					
Suppliers and contractors	6,953	130	236	23	7,342
Derivative financial instruments	1,506	-	-	-	1,506
Loans and borrowings	1,722	662	139	-	2,523
Related parties	796	2,781	-	-	3,577
	10,977	3,573	375	23	14,948
Non-current					
Derivative financial instruments	1,245	-	-	-	1,245
Loans and borrowings	10,749	9,004	3,329	-	23,082
Related parties	1,750	63,291	-	-	65,041
Participative stockholders' debentures	5,454	-	-	-	5,454
Financial guarantees	644	-	-	-	644
	19,842	72,295	3,329	-	95,466
Total of financial liabilities	30,819	75,868	3,704	23	110,414

Accounting policy

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.

Information about the Company's exposure to credit risk is set out in note 33.

All financial liabilities are initially measured at fair value, net of transaction costs incurred and are subsequently carried at amortized cost and updated using the effective interest rate method. Excepts for Participative stockholders' debentures and Derivative financial instruments that are measured at fair value through profit or loss.

24. Fair value estimate

Due to the short-term cycle, it is assumed that the fair value of cash and cash equivalents balances, financial investments, accounts receivable and accounts payable approximate their book values. For the measurement and determination of fair value, the Company uses various methods including market, income or cost approaches, in order to estimate the value that market participants would use when pricing the asset or liability. The financial assets and liabilities recorded at fair value are classified and disclosed in accordance with the following levels:

Level 1 – Unadjusted quoted prices on an active, liquid and visible market for identical assets or liabilities that are accessible at the measurement date;

Level 2 - Quoted prices (adjusted or unadjusted) for identical or similar assets or liabilities on active markets; and

Level 3 - Assets and liabilities, for which quoted prices, do not exist, or where prices or valuation techniques are supported by little or no market activity, unobservable or illiquid.

a) Assets and liabilities measured and recognized at fair value:

	Consolidated							
	December 31, 2019				December 31, 2018			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Financial assets								
Short-term investments	3,329	-	-	3,329	125	-	-	125
Derivative financial instruments	-	1,806	96	1,902	-	525	1,144	1,669
Accounts receivable	-	310	-	310	-	(418)	-	(418)
Investments in equity securities	2,925	-	-	2,925	3,823	-	-	3,823
Total	6,254	2,116	96	8,466	3,948	107	1,144	5,199

Financial liabilities								
Derivative financial instruments	-	1,130	484	1,614	-	2,466	690	3,156
Participative stockholders' debentures	-	10,416	-	10,416	-	5,454	-	5,454
Financial guarantees	-	2,116	-	2,116	-	644	-	644
Total	-	13,662	484	14,146	-	8,564	690	9,254

	Parent company							
	December 31, 2019				December 31, 2018			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Financial assets								
Financial investments	3,309	-	-	3,309	4	-	-	4
Derivative financial instruments	-	947	96	1,043	-	443	1,144	1,587
Accounts receivable	-	138	-	138	-	(11)	-	(11)
Investments in equity securities	2,555	-	-	2,555	3,334	-	-	3,334
Total	5,864	1,085	96	7,045	3,338	432	1,144	4,914

Financial liabilities								
Derivative financial instruments	-	768	484	1,252	-	2,061	690	2,751
Participative stockholders' debentures	-	10,416	-	10,416	-	5,454	-	5,454
Financial guarantees	-	2,116	-	2,116	-	644	-	644
Total	-	13,300	484	13,784	-	8,159	690	8,849

There were no transfers between Level 1 and Level 2, or between Level 2 and Level 3 for the year ended in December 31, 2019.

The following table presents the changes in Level 3 assets and liabilities for the year ended in December 31, 2019:

	Consolidated		Parent company	
			Derivative financial instruments	
	Financial assets	Financial liabilities	Financial assets	Financial liabilities
Balance at December 31, 2018	1,144	690	1,144	690
Gain and losses recognized in income statement	127	(133)	127	(133)
Settlements	(1,175)	(73)	(1,175)	(73)
Balance at December 31, 2019	96	484	96	484

Methods and techniques of evaluation

i) Derivative financial instruments

Derivative financial instruments are evaluated through the use of market curves and prices impacting each instrument at the closing dates, detailed in the item "market curves" (note 34).

For the pricing of options, the Company often uses the Black & Scholes model. In this model, the fair value of the derivative is determined basically as a function of the volatility and the price of the underlying asset, the strike price of the option, the risk-free interest rate and the option maturity. In the case of options where payoff is a function of the average price of the underlying asset over a certain period during the life of the option, the Company uses Turnbull & Wakeman model. In this model, in addition to the factors that influence the option price in the Black-Scholes model, the formation period of the average price is also considered.

In the case of swaps, both the present value of the long and short positions are estimated by discounting their cash flows by the interest rate in the related currency. The fair value is determined by the difference between the present value of the long and short positions of the swap in the reference currency.

For the swaps indexed to TJLP, the calculation of the fair value assumes that TJLP is constant, that is, the projections of future cash flows in Brazilian Reais are made considering the last TJLP disclosed.

Forward and future contracts are priced using the future curves of their corresponding underlying assets. Typically, these curves are obtained on the stock exchanges where these assets are traded, such as the London Metals Exchange ("LME"), the Commodity Exchange ("COMEX") or other providers of market prices. When there is no price for the desired maturity, Vale uses an interpolation between the available maturities.

The fair value of derivatives within level 3 is estimated using discounted cash flows and option model valuation techniques with unobservable inputs of discount rates, stock prices and commodities prices.

ii) Participative stockholders' debentures - Consist of the debentures issued during the privatization process (note 13), for which fair values are measured based on the market approach. Reference prices are available on the secondary market.

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 on note 34 (sensitivity analysis).

b) Fair value of financial instruments not measured at fair value

The fair value estimate for level 1 is based on market approach considering the secondary market contracts. For loans allocated to level 2, the income approach is adopted and the fair value for both fixed-indexed rate debt and floating rate debt is determined on a discounted cash flow basis using LIBOR future values and Vale's bonds curve.

The fair values and carrying amounts of loans and borrowings are as follows:

Financial liabilities	Consolidated				Parent company			
	Balance	Fair value	Level 1	Level 2	Balance	Fair value	Level 1	Level 2
December 31, 2019								
Debt principal	51,773	58,784	36,208	22,576	22,301	23,245	8,509	14,736
December 31, 2018								
Debt principal	59,006	63,013	41,408	21,605	25,220	25,586	8,049	17,537

Libor discontinuation

In July 2017, the UK Financial Conduct Authority ("FCA"), which regulates the London Interbank Offered Rate ("LIBOR"), announced the effective discontinuation of that rate from the end of 2021, as banks will no longer be required to contribute rate quotations. The Company is currently evaluating the potential impact of the eventual replacement of the LIBOR interest rate.

25. Derivative financial instruments

a) Derivatives effects on statement of financial position

	Consolidated			
	December 31, 2019		December 31, 2018	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	53	-	35	-
IPCA swap	337	474	27	324
Eurobonds swap	-	-	-	17
Pre-dollar swap	84	31	73	3
	474	505	135	344
Commodities price risk				
Nickel	606	36	8	-
Bunker oil, Gasoil and Brent	76	-	3	-
	682	36	11	-
Options - MBR	-	-	-	1,144
Others	4	201	3	32
	4	201	3	1,176
Total	1,160	742	149	1,520

	Consolidated			
	December 31, 2019		December 31, 2018	
	Current	Non-current	Current	Non-current
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	196	322	1,481	380
IPCA swap	52	150	136	181
Eurobonds swap	24	117	19	-
Pre-dollar swap	32	148	40	72
	304	737	1,676	633
Commodities price risk				
Nickel	13	16	31	8
Bunker oil, Gasoil and Brent	29	-	114	-
	42	16	145	8
Options - MBR	-	-	-	62
Conversion options - VLI	-	484	-	628
Others	31	-	-	4
	31	484	-	694
Total	377	1,237	1,821	1,335

	Parent company			
	December 31, 2019		December 31, 2018	
	Current	Non-current	Current	Non-current
Derivatives not designated as hedge accounting				
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	29	-	16	-
IPCA swap	337	474	27	324
Pré-dólar swap	84	23	73	3
	450	497	116	327
Others	-	96	-	1,144
	-	96	-	1,144
Total	450	593	116	1,471

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



	Parent company			
	Liabilities			
	December 31, 2019		December 31, 2018	
	Current	Non-current	Current	Non-current
Derivatives not designated as hedge accounting				
Foreign exchange and interest rate risk				
CDI & TJLP vs. US\$ fixed and floating rate swap	196	230	1,447	341
IPCA swap	52	110	19	143
Pré-dólar swap	32	148	40	72
	280	488	1,506	556
Others	-	484	-	689
	-	484	-	689
Total	280	972	1,506	1,245

b) Effects of derivatives on the income statement, cash flow and other comprehensive income

	Gain (loss) recognized in the income statement				
	Consolidated			Parent company	
				Year ended December 31	
	2019	2018	2017	2019	2018
Foreign exchange and interest rate risk					
CDI & TJLP vs. US\$ fixed and floating rate swap	(168)	(750)	483	(139)	(711)
IPCA swap	469	(105)	132	454	(46)
Eurobonds swap	(153)	(117)	122	-	-
Euro forward	-	-	144	-	-
Pre-dollar swap	6	(82)	116	(2)	(82)
	154	(1,054)	997	313	(839)
Commodities price risk					
Nickel	222	(99)	97	-	-
Bunker oil, Gasoil and Brent	158	16	(258)	-	-
	380	(83)	(161)	-	-
Options - MBR	20	251	438	20	251
Conversion options - VLI	144	(1)	202	144	(1)
Others	228	(119)	(16)	96	-
	392	131	624	260	250
Total	926	(1,006)	1,460	573	(589)

	Financial settlement inflows (outflows)				
	Consolidated			Parent company	
				Year ended December 31	
	2019	2018	2017	2019	2018
Foreign exchange and interest rate risk					
CDI & TJLP vs. US\$ fixed and floating rate swap	(1,536)	(478)	(572)	(1,514)	(415)
IPCA swap	(101)	11	(65)	(6)	-
Eurobonds swap	(19)	(14)	(121)	-	-
Pre-dollar swap	35	34	(6)	35	34
	(1,621)	(447)	(764)	(1,485)	(381)
Commodities price risk					
Nickel	195	23	11	-	-
Bunker oil, Gasoil and Brent	12	187	(10)	-	-
	207	210	1	-	-
Others	79	(13)	-	-	-
Derivatives designated as cash flow hedge accounting					
Nickel (i)	48	-	-	-	-
Total	(1,287)	(250)	(763)	(1,485)	(381)

(i) Refers to the effect of the nickel cash flow hedge transaction recorded as operating revenue.

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



	Gain recognized in other comprehensive income				
	Consolidated			Parent company	
	Year ended December 31				
	2019	2018	2017	2019	2018
Derivatives designated as cash flow hedge accounting					
Nickel	593	-	-	-	-
Total	593	-	-	-	-

The maturity dates of the derivative financial instruments are as follows:

	Last maturity dates
Currencies and interest rates	September 2029
Nickel	December 2021
Brent	December 2020
Gasoil	December 2020
VLI	December 2027
Others	December 2023

c) Hedge in foreign operations

In January 2017, the Company implemented hedge accounting for the foreign currency risk arising from Vale S.A.'s net investments in Vale International S.A. and Vale Holding B.V. Under the hedge accounting program, the Company's debt denominated in U.S. dollars and Euros serves as a hedge instrument for these investments. With the program, the impact of exchange rate variations on debt denominated in U.S. dollars and Euros has been partially recorded in other comprehensive income, in the "Cumulative translation adjustments". As at December 31, 2019, the carrying value of the debts designated as instrument hedge of these investments are R\$9,903 (US\$2,457 million) and R\$3,398 (EUR750 million).

	Loss recognized in the other comprehensive income				
	Consolidated			Parent company	
	Year ended December 31				
	2019	2018	2017	2019	2018
Hedge in foreign operation, net of tax	(324)	(1,958)	(310)	(324)	(1,958)

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.

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.

26. Provisions

	Consolidated			
	Current liabilities		Non-current liabilities	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Payroll, related charges and other remunerations	3,183	4,054	-	-
Onerous contracts (note 20)	229	235	3,489	2,486
Environmental obligations	587	382	980	784
Asset retirement obligations (note 27)	638	331	15,323	11,738
Provisions for litigation (note 28)	-	-	5,895	5,258
Employee postretirement obligations (note 29)	319	276	8,546	7,225
Provisions	4,956	5,278	34,233	27,491

	Parent company			
	Current liabilities		Non-current liabilities	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Payroll, related charges and other remunerations	2,124	2,808	-	-
Environmental obligations	490	277	585	514
Asset retirement obligations (note 27)	488	158	3,567	3,217
Provisions for litigation (note 28)	-	-	5,102	4,483
Employee postretirement obligations (note 29)	108	88	2,114	1,544
Provisions	3,210	3,331	11,368	9,758

27. Asset retirement obligations

Provision is made for expected costs for the closure of the mines and deactivation of the related mining assets. Changes in the provision for asset retirement obligations and long-term interest rates (per annum, used to discount these obligations to present value and to update the provisions) are as follows:

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Balance at beginning of the year	12,069	10,480	3,375	2,003
Present value valuation	144	53	-	25
Settlements	(186)	(102)	(63)	(52)
Revisions on cash flows estimates (i)	3,221	840	743	1,399
Translation adjustment	713	798	-	-
Balance at end of the year	15,961	12,069	4,055	3,375
Current	638	331	488	158
Non-current	15,323	11,738	3,567	3,217
	15,961	12,069	4,055	3,375
Long-term interest rates (per annum)				
Brazil	3.36%	4.94%	3.36%	4.94%
Canada	0.40%	0.77%		
Mozambique	5.20%	8.53%		
Other regions	0.60% - 4.78%	1.33% - 5.73%		

(i) In 2019, includes changes in discount rates and updating plans for mine closure, that also considers new legal requirements related to the decommissioning.

Accounting policy

When the provision is recognized, the corresponding cost is capitalized as part of property, plant and equipment and it is depreciated over the useful life of the related mining asset, resulting in an expense recognized in the income statement.

The long-term liability is discounted at presented value using a pre-tax rate that reflects current market assessments of the time value of money and the risks specific to the liability and the unwinds are recorded in the income statement and is reduced by payments for mine closure and decommissioning of mining assets. The accrued amounts of these obligations are not deducted from the potential costs covered by insurance or indemnities.

Critical accounting estimates and judgments

Judgment is required to determine key assumptions used on the asset retirement obligation measurement such as, interest rate, cost of closure, useful life of the mining asset considering the current conditions of closure and the projected date of depletion of each mine. Any changes in these assumptions may significant impact the recorded provision. Therefore, the estimated costs for closure of the mining assets is deemed to be a critical accounting estimate and annually reviewed.

28. Litigations

a) Provision for litigations

Vale is party to labor, civil, tax and other ongoing lawsuits, at administrative and court levels. Provisions for losses resulting from lawsuits are estimated and updated by the Company, based on analysis from the Company's legal consultants.

Changes in provision for litigations are as follows:

	Consolidated				
	Tax litigation (i)	Civil litigation	Labor litigation	Environmental litigation	Total of litigation provision
Balance at December 31, 2017	2,698	432	1,709	34	4,873
Additions and reversals, net	63	248	383	(13)	681
Payments	(24)	(87)	(426)	(6)	(543)
Additions - discontinued operations	76	3	39	1	119
Indexation and interest	(3)	61	72	(3)	127
Translation adjustment	14	(13)	-	-	1
Balance at December 31, 2018	2,824	644	1,777	13	5,258
Additions and reversals, net	39	650	417	24	1,130
Payments	(126)	(233)	(436)	(1)	(796)
Indexation and interest	35	165	70	7	277
Translation adjustment	32	(13)	7	-	26
Balance at December 31, 2019	2,804	1,213	1,835	43	5,895

	Parent company				
	Tax litigation (i)	Civil litigation	Labor litigation	Environmental litigation	Total of litigation provision
Balance at December 31, 2017	2,286	308	1,601	24	4,219
Additions and reversals, net	(6)	161	322	(13)	464
Payments	(11)	(32)	(352)	-	(395)
Indexation and interest	1	27	51	(3)	76
Additions of disposals of subsidiaries	76	3	39	1	119
Balance at December 31, 2018	2,346	467	1,661	9	4,483
Additions and reversals, net	38	518	395	24	975
Payments	(95)	(113)	(394)	(1)	(602)
Indexation and interest	36	132	72	7	246
Balance at December 31, 2019	2,325	1,004	1,734	39	5,102

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

b) Contingent liabilities

The Company has contingent liabilities where claims are debated in both administrative and judicial claims and whose expected loss is classified as possible, and for which the recognition of a provision is not considered necessary by the Company.

Based in the legal opinions, the presentation of the litigations classified with expected loss as possible are presented as follow:

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Tax litigations (i)	33,839	34,302	30,905	31,575
Civil litigations	6,116	7,583	4,589	5,371
Labor litigations	3,116	4,896	3,025	4,631
Environmental litigations	4,410	4,070	4,239	3,897
Brumadinho event (note 3)	635	-	635	-
Total	48,116	50,851	43,393	45,474

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

i - Tax litigations - The most relevant contingent tax liabilities are associated with proceedings related to the (i) collection of IRPJ and CSLL, (ii) challenges of PIS and COFINS tax credits, (iii) assessments related to mining royalties (CFEM), and (iv) collection of ICMS, in particular related to credits claimed in connection with the sale and transmission of electricity; collection of ICMS in connection with goods that enter into the State of Pará and collection of ICMS and penalties over the transportation of iron ore by Vale itself.

Off the total amount of tax litigations, R\$4,459 relates to income taxes contingencies, which have been assessed by Management to determine whether the tax treatment related to the contingency is probable of being accepted by the tax authority. Further details on the assessment performed by the Company relation to uncertain tax positions is disclosed in note 8.

ii - Civil litigations - Most of those claims have been filed by suppliers for indemnification under construction contracts, primarily relating to certain alleged damages, payments and contractual penalties. A number of other claims related to contractual disputes regarding inflation index.

iii - Labor litigations - Represents individual claims by employees and service providers, primarily involving demands for additional compensation for overtime work, time spent commuting or health and safety conditions.

iv - Environmental litigations - The most significant claims concern alleged procedural deficiencies in licensing processes, non-compliance with existing environmental licenses or damage to the environment.

c) Judicial deposits

In addition to the provisions and contingent liabilities, the Company is required, by law, to make judicial deposits to secure a potential adverse outcome of certain lawsuits. These court-ordered deposits are monetarily adjusted and reported as non-current assets until a judicial decision to draw the deposit occurs.

	Consolidated		Parent company	
	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2018
Tax litigations (i)	5,152	5,094	4,946	4,912
Civil litigations	451	231	249	117
Labor litigations	992	1,199	935	1,119
Environmental litigations	163	125	162	125
Brumadinho event (note 3)	5,976	-	5,976	-
Total	12,734	6,649	12,268	6,273

(i) Includes amounts regarding to judicial deposits of a social security claims that were previously classified as labor claims.

In addition to the above-mentioned tax, civil, labor and environmental judicial deposits, the Company contracted R\$10.4 billion in guarantees for its lawsuits, as an alternative to judicial deposits. For the Brumadinho event, the Company contracted guarantees in the amount of R\$5.6 billion which were presented in court according agreement with Treasury Court of Minas Gerais and Public Prosecutor's Office.

d) Contingencies related to Samarco accident

(i) Public civil claim filed by the Federal Government and others and Public civil claim filed by Federal Prosecution Office ("MPF")

In 2016, the federal government, the Brazilian states of Espírito Santo and Minas Gerais and other governmental authorities have initiated a public civil lawsuit against Samarco and its shareholders, with an estimated value indicated by the plaintiffs of R\$20.2 billion. In the same year, MPF filed a public civil action against Samarco and its shareholders and presented several claims, including: (i) the adoption of measures for mitigating the social, economic and environmental impacts resulting from the dam failure and other emergency measures; (ii) the payment of compensation to the community; and (iii) payments for the collective moral damage. The action value indicated by MPF is R\$155 billion.

In June 2018, the parties entered into an agreement ("Term of Adjustment of Conduct"), which extinguishes (i) the public civil claim of R\$20.2 billion filed by the Federal Government and others; and (ii) part of the claims included in the public civil claim of R\$155 billion filed by MPF. The agreement also establishes a possible renegotiation of Fundação Renova's repair programs after the conclusion of the specialist's studies hired to advise the Public Prosecutor's Office in this process. These negotiations are expected to occur during 2020.

In September 2019, the Court approved the list of entities selected by the community to provide it with technical assistance to assure its participation on the debates regarding the measures to be adopted for mitigate the impacts, accordingly to the referred agreement.

In January 2020, the Court issued an order for the Brazilian Mining Authority (ANM) ratifying the revocation of the decision issued on the public civil actions filed by the Brazilian Federal Government and others, determine the immediate revocation of the restrictions on Vale's mining concessions.

(ii) United States class action lawsuits

In March 2017, holders of bonds issued by Samarco Mineração S.A., filed a class action suit in the Federal Court in New York against Samarco Mineração S.A., Vale S.A., BHP Billiton Limited, BHP Billiton PLC and BHP Brasil Ltda. under U.S. federal securities laws. The plaintiffs allege that Vale S.A. made false and misleading statements or not made disclosures concerning the risks and dangers of the operations of Samarco's Fundão dam and the adequacy of related programs and procedures.

In June 2019, the Court issued a decision and order dismissing with prejudice the putative federal securities class action. In December 2019 the plaintiffs filed a Notice of Appeal to the Court of Appeals, plaintiff's legal deadline to file the brief of the appeal should expire in March 2020. Based on the assessment of the Company's legal consultants, the defendants would have better arguments to oppose the appeal to be filed by plaintiffs.

(iii) Class action lawsuits related to Vale's American Depositary Receipts

With respect to litigation in the United States concerning Samarco's Fundão dam, Vale and certain of our officers have been named as defendants in securities class action suits in the Federal Court in New York brought by holders of Vale's American Depositary Receipts under U.S. federal securities laws. The suit was brought as a putative class action on behalf of holders of Vale's American Depositary Receipts ("ADRs"), alleging violations of the U.S. Federal Securities laws on the basis of alleged false and misleading statements or omissions concerning the risks of operations of Samarco's Fundão dam and the adequacy of the related programs and procedures.

On March 23, 2017 the judge issued a decision rejecting a significant portion of the claims against Vale S.A. and the individual defendants, determining the prosecution of the action with respect to more limited claims. The portion of plaintiffs' case that remains is related to certain statements about procedures, policies and risk mitigation plans contained in Vale S.A.'s sustainability reports in 2013 and 2014, and certain statements regarding to the responsibility of Vale S.A. for the Fundão dam failure made in a conference call in November 2015.

Fact and Expert discovery was totally concluded in October 2019. On September 27, 2019, the Court denied class certification. On December 26, 2019, the Court issued an Order stating that the parties had informed the Court that the parties had reached a settlement in principle. The Court directed the parties to submit a motion to approve a proposed settlement no later than February 07, 2020. On February 07, 2020, the parties have filed to the Court an "Stipulation and Agreement of Settlement" by means of the defendants agreed to pay R\$101 (US\$25 million) to settle the case, which is yet subject to some Court approvals and other conditions to be fulfilled before the settlement can be considered as final and binding. These approvals and conditions are expected to occur in 2020.

(iv) Criminal lawsuit

In 2016, the MPF brought a criminal lawsuit against Samarco and its shareholders, VogBr Recursos Hídricos e Geotecnia Ltda. and 22 individuals for the consequences related to Fundão dam failure. Currently, the progress of the criminal action is paralyzed due to the judgment of Habeas Corpus, with no decision.

On April 23, 2019, the Federal Court from the 1st Region ("TRF1") issued an Habeas Corpus writ and granted it to dismiss the criminal charges of homicide and physical injuries committed by oblique intent held against one of the defendants on the criminal action. At the same opportunity, the Court extended the writ's issuance to all other defendants on the case as the criminal information does not describe the crimes of homicide and physical injury, but the crime of flooding qualified by the result of death and physical injury as a consequence of the Fundão dam's failure. Therefore, the Court dismissed the homicide and physical injuries charges held against all defendants.

After acknowledging the Court's decisions, the Ponte Nova Court changed the process, withdrawing the case from the grand jury and putting it in the ordinary processing. In the same opportunity, the judge ruled to determine the parties to manifest themselves about this process alteration and, after the Federal Prosecution and the defenses presented their petitions, the judge withdrew the charges against Vale and BHP executives and the accusation withheld for trial for the two companies together with Samarco and its representatives. The accusation of crimes committed against the Environmental Public Administration by Vale and one of its executives also remained unaltered. Additionally, the judge determined precatory letters to be sent to collect the defense witnesses testimonies and opened a 60 day term for the defenses to present a list of questions to be put together with the international cooperation for the testimony of the accusation witnesses residing in Canada.

(v) Tax proceedings

In 2018, the Office of the Attorney General for the National Treasury (PGFN) requested a judicial order to secure the payment of alleged federal tax and social security debts regarding Samarco. In May 2019, a favorable decision was issued dismissing the claim without prejudice, due to lack of procedural interest. The PGFN filed an appeal to the Local Court. The Company is waiting for the Court ruling.

e) Contingent Assets

(i) Compulsory loan

In 2015, the Company requested for the enforcement of the judicial decision in the amount of R\$524 related to a favorable unappealable decision which partially recognized its right to refund the differences of monetary adjustments and interests due over to the third convertible bonds issued by Eletrobrás shares in the period within 1987 to 1993. In November 2019, the Company requested for the payment of the amount of R\$297 recognized by Eletrobrás as due and awaits judicial analysis of the surplus amount. Therefore, it has not possible yet to determine the amount to be refunded and, consequently, the asset has not been registered in the Company's financial statements.

(ii) ICMS included in PIS and COFINS tax base

Vale had been discussing the issue regarding the exclusion of ICMS in PIS and COFINS tax basis in two judicial proceedings, related to taxable events after December 2001. In one of the proceedings, the company has obtained a definitive favorable decision (res judicata). In the second proceeding the current decision is also favorable to the Company, but this proceeding did not reach the res judicata. Vale is waiting for a final decision on the leading that will be issued by Supreme Court in order to calculate the amount to be refunded arising from both proceedings. The Company did not record this asset in its financial statement.

(iii) Arbitral award related to Simandou

In 2010, Vale acquired a 51% stake in VBG - Vale BSGR Limited ("VBG") (formerly BSG Resources (Guinea) Limited), which had iron ore concession rights in Simandou South ("Zogota") and iron ore exploration permits over the areas known as Simandou Blocks 1 & 2 in Guinea. In 2014, the Republic of Guinea revoked those rights after a finding 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 Vale's part.

Vale commenced arbitration proceedings against BSG Resources Limited ("BSGR") in April 2014, and in April 2019, the arbitral tribunal in London ruled in Vale's favor and ordered BSGR to pay to Vale the amount of R\$4,837 (US\$1.2 billion) plus costs and interest (with interest and costs, the award exceeds R\$8,061 (US\$2.0 billion)). The arbitral tribunal ruled that BSGR had defrauded Vale by inducing Vale to enter into the joint venture. On September 20, 2019, the English High Court ruled that Vale can proceed with enforcement of its R\$8,061 (US\$2.0 billion) arbitration award.

BSGR went into administration in March 2018, and Vale 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.

BSGR challenged the award before the English High Court, and its challenge was dismissed on November 29, 2019. BSGR has also applied to the United States Bankruptcy Court to have its administration recognized in the United States.

On December 3, 2019, Vale and two of its affiliates filed new litigation proceedings in the English High Court, claiming damages of approximately R\$7,457 (US\$1.85 billion), against certain individuals and related parties to BSGR.

Vale intends to pursue the enforcement of the award and collection of the amounts due by all legally available means, but since there can be no assurance as to the timing and amount of any collections, the asset was not recognized in its financial statements.

(iv) Canadian Tax Litigation Matter

Vale Canada Limited ("VCL") and the Canadian Department of Justice - Canada Revenue Agency signed an agreement regarding a tax litigation matter related to the appropriate tax treatment of certain receipts received and expenditures incurred by VCL in respect of merger and acquisition transactions in 2006. In 2019, the Company recognized a contingent asset in amount of R\$685 (CAD221 million), related an income tax refund, included estimated interest. On January 28, 2020 (subsequent event), the Company received a portion of this asset in the amount of R\$584 (CAD189 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.

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, 2019 and 2018.

Defined benefit plan (“Plano BD”) - The Plano BD has been closed to new entrants since the year 2000, when the Vale Mais plan was implemented. It is a plan that has defined benefit characteristics, covering almost exclusively retirees and their beneficiaries. It was overfunded as of December 31, 2019 and 2018 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, 2019 and 2018.

Other benefits - The Company sponsors medical plans for employees that meet specific criteria and for employees who use the “abono complementação” benefit. Although those benefits are not specific retirement plans, actuarial calculations are used to calculate future commitments. As those benefits are related to health care plans they have the nature of underfunded benefits, and are presented as underfunded plans as at December 31, 2019 and 2018.

The Foreign plans are managed in accordance with their region. They are divided between plans in Canada, United States of America, United Kingdom, Indonesia, New Caledonia, Japan and Taiwan. Pension plans in Canada are composed of a defined benefit and defined contribution component. Currently the defined benefit plans do not allow new entrants. The foreign defined benefit plans are underfunded as at December 31, 2019 and 2018.

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

i. Change in benefit 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, 2017	11,239	14,789	4,661	11,239	-	855
Acquisition	-	-	-	-	1,328	-
Service costs	19	379	139	19	1	51
Interest costs	1,052	596	220	1,052	126	81
Benefits paid	(1,095)	(1,026)	(226)	(1,095)	(107)	(69)
Participant contributions	6	(43)	-	6	1	-
Effect of changes in the actuarial assumptions	2,417	(619)	(117)	2,417	(53)	47
Translation adjustment	-	1,150	279	-	-	-
Others	-	-	-	-	-	(2)
Benefit obligation as at December 31, 2018	13,638	15,226	4,956	13,638	1,296	963
Service costs	26	218	38	26	-	-
Interest costs	1,203	606	234	1,203	113	85
Benefits paid	(1,684)	(990)	(244)	(1,684)	(105)	(77)
Participant contributions	-	4	-	-	5	-
Effect of changes in the actuarial assumptions	2,965	1,440	690	2,965	352	249
Translation adjustment	-	1,314	392	-	-	-
Benefit obligation as at December 31, 2019	16,148	17,818	6,066	16,148	1,661	1,220

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, 2017	15,972	12,492	-	15,972	-	-
Acquisition	-	-	-	-	792	-
Interest income	1,519	481	-	1,519	73	-
Employer contributions	131	184	226	131	14	69
Participant contributions	6	1	-	6	1	-
Benefits paid	(1,095)	(935)	(226)	(1,095)	(107)	(69)
Return on plan assets (excluding interest income)	1,831	(540)	-	1,831	(146)	-
Translation adjustment	-	998	-	-	-	-
Others	(9)	-	-	(9)	-	-
Fair value of plan assets as at December 31, 2018	18,355	12,681	-	18,355	627	-
Interest income	1,640	487	-	1,640	53	-
Employer contributions	107	223	244	107	26	77
Participant contributions	-	3	-	-	4	-
Benefits paid	(1,684)	(981)	(244)	(1,684)	(105)	(77)
Return on plan assets (excluding interest income)	2,965	1,493	-	2,965	53	-
Translation adjustment	-	1,113	-	-	-	-
Others	(3)	-	-	(3)	-	-
Fair value of plan assets as at December 31, 2019	21,380	15,019	-	21,380	658	-

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

	Consolidated Plans in Brazil					
	December 31, 2019			December 31, 2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	4,717	-	-	4,733	-	-
Interest income	432	-	-	462	-	-
Changes on asset ceiling	83	-	-	(478)	-	-
Balance at end of the year	5,232	-	-	4,717	-	-
Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(16,148)	(1,661)	(1,219)	(13,638)	(1,296)	(963)
Fair value of assets	21,380	658	-	18,355	627	-
Effect of the asset ceiling	(5,232)	-	-	(4,717)	-	-
Liabilities	-	(1,003)	(1,219)	-	(669)	(963)
Current liabilities	-	(26)	(82)	-	(14)	(74)
Non-current liabilities	-	(977)	(1,137)	-	(655)	(889)
Liabilities	-	(1,003)	(1,219)	-	(669)	(963)

	Consolidated Foreign plan					
	December 31, 2019			December 31, 2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Amount recognized in the statement of financial position						
Present value of actuarial liabilities	-	(16,157)	(4,846)	-	(13,930)	(3,993)
Fair value of assets	-	14,360	-	-	12,053	-
Liabilities	-	(1,797)	(4,846)	-	(1,877)	(3,993)
Current liabilities	-	(24)	(185)	-	(60)	(128)
Non-current liabilities	-	(1,773)	(4,661)	-	(1,817)	(3,865)
Liabilities	-	(1,797)	(4,846)	-	(1,877)	(3,993)

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



Consolidated						
Total						
	December 31, 2019			December 31, 2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	4,717	-	-	4,733	-	-
Interest income	432	-	-	462	-	-
Changes on asset ceiling	83	-	-	(478)	-	-
Balance at end of the year	5,232	-	-	4,717	-	-
Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(16,148)	(17,818)	(6,066)	(13,638)	(15,226)	(4,956)
Fair value of assets	21,380	15,019	-	18,355	12,681	-
Effect of the asset ceiling	(5,232)	-	-	(4,717)	-	-
Liabilities	-	(2,799)	(6,066)	-	(2,545)	(4,956)
Current liabilities	-	(50)	(306)	-	(74)	(202)
Non-current liabilities	-	(2,749)	(5,760)	-	(2,471)	(4,754)
Liabilities	-	(2,799)	(6,066)	-	(2,545)	(4,956)

Parent company						
Plans in Brazil						
	December 31, 2019			December 31, 2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Balance at beginning of the year	4,717	-	-	4,733	-	-
Interest income	432	-	-	462	-	-
Changes on asset ceiling	83	-	-	(478)	-	-
Balance at end of the year	5,232	-	-	4,717	-	-
Amount recognized in the statement of financial position						
Present value of actuarial liabilities	(16,148)	(1,661)	(1,219)	(13,638)	(1,296)	(963)
Fair value of assets	21,380	658	-	18,355	627	-
Effect of the asset ceiling	(5,232)	-	-	(4,717)	-	-
Liabilities	-	(1,003)	(1,219)	-	(669)	(963)
Current liabilities	-	(26)	(82)	-	(14)	(74)
Non-current liabilities	-	(977)	(1,137)	-	(655)	(889)
Liabilities	-	(1,003)	(1,219)	-	(669)	(963)

iv. Costs recognized in the income statement

Consolidated									
Year ended December 31									
	2019			2018			2017		
	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	25	218	38	19	379	139	23	275	95
Interest on expense on liabilities	1,203	606	223	1,052	596	220	1,149	587	215
Interest income on plan assets	(1,640)	(487)	-	(1,519)	(481)	-	(1,639)	(482)	-
Interest expense on effect of (asset ceiling)/ onerous liability	432	-	-	462	-	-	485	-	-
Total of cost, net	20	337	261	14	494	359	18	380	310

Parent company						
Year ended December 31						
	2019			2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Service cost	25	-	-	19	1	51
Interest on expense on liabilities	1,203	113	74	1,052	126	81
Interest income on plan assets	(1,640)	(53)	-	(1,519)	(73)	-
Interest expense on effect of (asset ceiling)/ onerous liability	432	-	-	462	-	-
Total of cost, net	20	60	74	14	54	132

v. Costs recognized in the statement of comprehensive income

	Consolidated								
	Year ended December 31								
	2019			2018			2017		
	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	(640)	(1,812)	(494)	(545)	(1,642)	(626)	(500)	(1,616)	(523)
Effect of changes actuarial assumptions	(2,965)	(1,389)	(694)	(2,417)	643	100	(212)	(560)	(94)
Return on plan assets (excluding interest income)	2,965	1,452	-	1,831	(540)	17	(4)	545	-
Change of asset ceiling	(83)	-	-	478	-	-	159	-	-
Others	-	-	-	-	-	-	(11)	1	(47)
	(83)	63	(694)	(108)	103	117	(68)	(14)	(141)
Deferred income tax	28	(32)	251	37	(27)	(31)	23	(6)	42
Others comprehensive income	(55)	31	(443)	(71)	76	86	(45)	(20)	(99)
Translation adjustments	-	(71)	(23)	-	(230)	(45)	-	(8)	(2)
Transfers/ disposal	-	-	-	(24)	(16)	91	-	2	(2)
Accumulated other comprehensive income	(695)	(1,852)	(960)	(640)	(1,812)	(494)	(545)	(1,642)	(626)

	Parent company						
	Year ended December 31						
	2019			2018			
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits	
Balance at beginning of the year	(640)	(358)	(278)	(569)	-	(247)	
Effect of changes actuarial assumptions	(2,965)	(352)	(249)	(2,417)	53	(47)	
Return on plan assets (excluding interest income)	2,965	65	-	1,831	(146)	-	
Change of asset ceiling	(83)	-	-	478	-	-	
Others	-	-	-	-	-	(1)	
	(83)	(287)	(249)	(108)	(93)	(48)	
Deferred income tax	28	98	85	37	32	17	
Others comprehensive income	(55)	(189)	(164)	(71)	(61)	(31)	
Transfers/ disposal	-	-	-	-	(297)	-	
Accumulated other comprehensive income	(695)	(547)	(442)	(640)	(358)	(278)	

vi. Risks related to plans

The Administrators of the plans have committed to strategic planning to strengthen internal controls and risk management. This commitment is achieved by conducting audits and assessments of internal controls, which aim to mitigate operational market and credit risks. Risks are presented as follow:

Legal - lawsuits: issuing periodic reports to internal audit and directors contemplating the analysis of lawyers about the possibility of loss (remote, probable or possible), aiming to support the administrative decision regarding provisions. Analysis and ongoing monitoring of developments in the legal scenario and its dissemination within the institution in order to subsidize the administrative plans, considering the impact of regulatory changes.

Actuarial - the annual actuarial valuation of the benefit plans comprises the assessment of costs, revenues and adequacy of plan funding. It also considers the monitoring of biometric, economic and financial assumptions (asset volatility, changes in interest rates, inflation, life expectancy, salaries and other).

Market - profitability projections are performed for the various plans and profiles of investments for 10 years in the management study of assets and liabilities. These projections include the risks of investments in various market segments. Furthermore, the risks for short-term market of the plans are monitored monthly through metrics of VaR (Value at Risk) and stress testing. For exclusive investment funds of Valia, the market risk is measured daily by the custodian asset bank.

Credit - assessment of the credit quality of issuers by hiring expert consultants to evaluate financial institutions and internal assessment of payment ability of non-financial companies. For assets of non-financial companies, the assessment is conducted a monitoring of the company until the maturity of the security.

vii. Actuarial and economic assumptions and sensitivity analysis

All calculations involve future actuarial projections about some parameters, such as: salaries, interest, inflation, the trend of social security in Brazil ("INSS") benefits, mortality and disability.

The economic and actuarial assumptions adopted have been formulated considering the long-term period for maturity and should therefore be analyzed accordingly. In the short term they may not be realized.

The following assumptions were adopted in the assessment:

	December 31, 2019			December 31, 2018		
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Underfunded pension plans	Other benefits
Discount rate to determine benefit obligation	6.99% - 7.32%	7.10%	6.99% - 7.39%	8.86% - 9.10%	9.10%	9.05% - 9.29%
Nominal average rate to determine expense/ income	6.99% - 7.32%	7.10%	N/A	8.86% - 9.10%	9.10%	N/A
Nominal average rate of salary increase	5.88%	6.00%	N/A	4.00% - 6.08%	6.08%	N/A
Nominal average rate of benefit increase	3.80%	6.00%	N/A	4.00%	6.08%	N/A
Immediate health care cost trend rate	N/A	N/A	6.91%	N/A	N/A	7.12%
Ultimate health care cost trend rate	N/A	N/A	6.91%	N/A	N/A	7.12%
Nominal average rate of price inflation	3.80%	4.00%	3.80%	4.00%	4.00%	4.00%

	December 31, 2019		December 31, 2018	
	Underfunded pension plans	Other benefits	Underfunded pension plans	Other benefits
Discount rate to determine benefit obligation	2.96%	3.04%	3.56%	3.66%
Nominal average rate to determine expense/ income	3.57%	3.66%	3.26%	3.44%
Nominal average rate of salary increase	3.17%	N/A	3.20%	N/A
Nominal average rate of benefit increase	3.00%	N/A	3.00%	N/A
Immediate health care cost trend rate	N/A	5.58%	N/A	5.90%
Ultimate health care cost trend rate	N/A	4.55%	N/A	4.56%
Nominal average rate of price inflation	2.10%	N/A	2.10%	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:

	Consolidated			Parent company	
	Overfunded pension plans	Underfunded pension plans	Other benefits	Overfunded pension plans	Other benefits
Nominal discount rate - 1% increase					
Effect on actuarial liability balance	14,777	15,723	5,304	14,777	1,148
Assumptions made	8.18%	4.35%	4.87%	8.18%	8.16%
Nominal discount rate - 1% reduction					
Effect on actuarial liability balance	17,782	20,258	7,040	17,782	1,302
Assumptions made	6.18%	2.35%	2.87%	6.18%	6.16%

viii. Assets of pension plans

Brazilian plan assets as at December 31, 2019 and 2018 includes respectively (i) investments in a portfolio of Vale's stock and other instruments in the amount of R\$107 and R\$52, which are presented as "Investments funds – Equity" and (ii) Brazilian Federal Government securities in the amount of R\$18,231 and R\$16,271, which are presented as "Debt securities governments" and "Investments funds – Fixed"

Foreign plan assets as at December 31, 2019 and 2018 includes Canadian Government securities in the amount of R\$2,551 and R\$2,612, respectively.

ix. Overfunded pension plans

Assets by category are as follows:

	Consolidated and Parent Company							
	December 31, 2019				December 31, 2018			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Debt securities - Corporate	-	192	-	192	-	180	-	180
Debt securities - Government	10,947	-	-	10,947	9,481	-	-	9,481
Investments funds - Fixed Income	10,755	-	-	10,755	9,459	-	-	9,459
Investments funds - Equity	2,241	-	-	2,241	1,744	-	-	1,744
International investments	111	-	-	111	96	-	-	96
Structured investments - Private Equity funds	-	-	632	632	-	-	615	615
Structured investments - Real estate funds	643	-	70	713	-	-	57	57
Real estate	-	-	1,301	1,301	-	-	1,314	1,314
Loans to participants	-	-	567	567	-	-	622	622
Total	24,697	192	2,570	27,459	20,780	180	2,608	23,568
Funds not related to risk plans (i)				(6,079)				(5,213)
Fair value of plan assets at end of year				21,380				18,355

(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:

	Consolidated				
	Private equity funds	Real estate funds	Real estate	Loans to participants	Total
Balance as at December 31, 2017	648	50	1,206	744	2,648
Return on plan assets	55	-	141	92	288
Assets purchases	6	7	26	853	892
Assets sold during the year	(94)	-	(59)	(1,067)	(1,220)
Balance as at December 31, 2018	615	57	1,314	622	2,608
Return on plan assets	32	-	31	78	141
Assets purchases	3	13	16	185	217
Assets sold during the year	(18)	-	(60)	(318)	(396)
Balance as at December 31, 2019	632	70	1,301	567	2,570

x. Underfunded pension plans

Assets by category are as follows:

	Consolidated							
	December 31, 2019				December 31, 2018			
	Level 1	Level 2	Level 3	Total	Level 1	Level 2	Level 3	Total
Cash and cash equivalents	-	226	-	226	12	70	-	82
Equity securities	5,681	8	-	5,689	4,596	8	-	4,604
Debt securities - Corporate	-	2,044	-	2,044	-	1,450	-	1,450
Debt securities - Government	628	2,555	-	3,183	448	2,635	-	3,083
Investments funds - Fixed Income	196	1,366	-	1,562	159	1,147	-	1,306
Investments funds - Equity	7	544	-	551	-	480	-	480
Structured investments - Private Equity funds	-	-	855	855	-	-	825	825
Real estate	-	-	221	221	-	-	196	196
Loans to participants	-	-	12	12	-	-	13	13
Others	9	-	667	676	4	-	638	642
Total	6,521	6,743	1,755	15,019	5,219	5,790	1,672	12,681

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

	Consolidated				
	Private equity funds	Real estate	Loans to participants	Others	Total
Balance as at December 31, 2017	651	147	17	643	1,458
Return on plan assets	117	11	-	(55)	73
Assets purchases	80	66	-	-	146
Assets sold during the year	(81)	(37)	(4)	-	(122)
Translation adjustment	58	9	-	50	117
Balance as at December 31, 2018	825	196	13	638	1,672
Return on plan assets	44	16	-	20	80
Assets purchases	73	-	(2)	-	71
Assets sold during the year	(129)	(1)	-	(16)	(146)
Translation adjustment	42	10	1	25	78
Balance as at December 31, 2019	855	221	12	667	1,755

xi. Disbursement of future cash flow

Vale expects to disburse R\$426 in 2020 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, 2019		
	Overfunded pension plans	Underfunded pension plans	Other benefits
2020	1,043	947	262
2021	1,073	951	266
2022	1,101	959	274
2023	1,127	967	282
2024	1,150	975	294
2025 and thereafter	6,023	4,861	1,536

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\$1,135, R\$1,860 and R\$2,490 for the years ended on December 31, 2019, 2018 and 2017, respectively.

c) Long-term compensation plan

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

For the Matching program, the participants can acquire Vale's common shares in the market without any benefits being provided by Vale. If the shares acquired are held for a period of three years and the participants keep it employment relationship with Vale, the participant is entitled to receive from Vale an award in shares, equivalent to the number of shares originally acquired by the executive. It should be noted that, although a specific custodian of the shares is defined by Vale, the share initially purchased by the executives have no restriction and can be sold at any time. However, if it's done before the end of the three-year-vesting period, they lose the entitlement of receiving the related award paid by Vale.

For PSU program, the eligible executives have the opportunity to receive during a four year-vesting cycle, an award equivalent to the market value of a determined number of common shares and conditioned to Vale's performance factor measured as an indicator of total return to the shareholders (TSR). This award is paid in cash and can occur in cumulative installments of 20% (at the end of 2nd year), 30% (at the end of 3rd year) and 50% (at the end of 4th year), conditioned to the performance factor of each year.

Liabilities of the plans are measured at fair value at every reporting period, based on market rates. Compensation costs incurred are recognized by the defined vesting period of three or four years. For the years ended December 31, 2019, 2018 and 2017 the Company recognized in the income statement the amounts of R\$152, R\$351 and R\$207, respectively, related to long-term compensation plan.

Accounting policy

Employee benefits**i. Current benefits – wages, vacations and related taxes**

Payments of benefits such as wages or accrued vacation, as well the related social security taxes over those benefits are recognized monthly in income, on an accruals basis.

ii. Current benefits – profit sharing program

The Company has the Annual Incentive Program (AIP) based on Team and business unit's contribution and Company-wide performance through operational cash generation. The Company makes an accrual based on evaluation periodic of goals achieved and Company result, using the accrual basis and recognition of present obligation arising from past events in the estimated outflow of resources in the future. The accrual is recorded as cost of goods sold and services rendered or operating expenses in accordance with the activity of each employee.

iii. Non-current benefits – long-term incentive programs

The Company has established a procedure for awarding certain eligible executives (Matching and Virtual Shares Programs) with the goal of encouraging employee retention and optimum performance. Plan liabilities are measured at each reporting date, at their fair values, based on market prices. Obligations are measured at each reporting date, at fair values based on market prices. The compensation costs incurred are recognized in income during the vesting period as defined.

iv. Non-current benefits – pension costs and other post-retirement benefits

The Company has several retirement plans for its employees.

For defined contribution plans, the Company's obligations are limited to a monthly contribution linked to a pre-defined percentage of the remuneration of employees enrolled in to 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 remeasurement 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 a number of 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, 2019, the share capital was R\$77,300 corresponding to 5,284,474,782 shares issued and fully paid without par value.

	December 31, 2019		
Stockholders	Common shares	Golden shares	Total
Litel Participações S.A. and Litela Participações S.A.	980,605,889	-	980,605,889
BNDES Participações S.A.	323,496,276	-	323,496,276
Bradespar S.A.	293,907,266	-	293,907,266
Mitsui & Co., Ltd	286,347,055	-	286,347,055
Foreign investors - ADRs	1,150,143,671	-	1,150,143,671
Foreign institutional investors in local market	1,164,475,058	-	1,164,475,058
FMP - FGTS	46,807,292	-	46,807,292
PIBB - Fund	2,473,749	-	2,473,749
Institutional investors	567,027,304	-	567,027,304
Retail investors in Brazil	312,998,897	-	312,998,897
Brazilian Government (Golden Share)	-	12	12
Shares outstanding	5,128,282,457	12	5,128,282,469
Shares in treasury	156,192,313	-	156,192,313
Total issued shares	5,284,474,770	12	5,284,474,782
Share capital per class of shares (in millions)	77,300	-	77,300
Total authorized shares	7,000,000,000	-	7,000,000,000

The Company used 2,024,059 of its treasury shares to pay the Matching program of its eligible executives, except for those whose variable remuneration was suspended as described in note 5, in the amount of R\$84. It was recognized as "assignment and transfer of shares".

The Board of Directors may, regardless of changes to by-laws, issue new common shares (up to the total authorized shares), including the capitalization of profits and reserves to the extent authorized.

The Company holds shares in treasury for future sale or cancellation. These shares are recorded in a specific account as a reduction of stockholders' equity at their acquisition value and carried at cost. These programs are approved by the Board of Directors with a determined terms and numbers of shares.

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.

b) Remuneration to the Company's stockholders

The Company's by-laws determine the minimum remuneration to stockholders of 25% of net income, after appropriations to legal reserve and tax incentive reserve, as follows:

	2019
Loss	(6,672)
Minimum mandatory remuneration	-
	(6,672)
Profit reserves as at December 31, 2018	42,502
Allocation of loss	(6,672)
Remuneration - Interest on capital	(7,253)
Profit reserves as at December 31, 2019	28,577

In December 2019, the Board of Directors approved the declaration of interest on capital in the total gross amount of R\$7,253, equivalent to (R\$1.414364369 per share), based on profit reserves. The payment will be decided later, after the return of the Shareholder Remuneration Policy, which has been suspended since the Brumadinho dam failure (as described on note 3).

The remuneration paid to stockholders based on the on interest on capital and dividends during 2018 was amounted of R\$12,415 (R\$2.388785772 per share).

c) Profit reserves

The amount of profit reserves is distributed as follows:

	Legal reserve	Tax incentive reserve	Investments reserve	Total of profit reserves
Balance as at December 31, 2017	5,392	1,921	17,226	24,539
Allocation of income	1,283	1,497	15,183	17,963
Balance as at December 31, 2018	6,675	3,418	32,409	42,502
Allocation of loss	-	-	(6,672)	(6,672)
Dividends and interest on capital of Vale's stockholders	-	-	(7,253)	(7,253)
Balance as at December 31, 2019	6,675	3,418	18,484	28,577

Legal reserve - Is a legal requirement for Brazilian public companies to retain 5% of the annual net income up to 20% of the capital. The reserve can only be used to compensate losses or to increase capital.

Tax incentive reserve - Results from the option to designate a portion of the income tax for investments in projects approved by the Brazilian Government as well as tax incentives.

Investment reserve - Aims to ensure the maintenance and development of the main activities that comprise the Company's operations and to retain budgeted capital for investments. Based on the Company's by-laws, this reserve is capped to 50% of the annual distributable net income, up to the amount of the share capital. The remaining balance over than 50% of the annual distributable net income is retained based on the capital investments budget submitted for approval in the Stockholder's Meeting, pursuant to article 196 of the Law 6,404.

d) Others reserves

	Retirement benefit obligations	Fair value adjustment to investment in equity securities	Results on conversion of shares	Net ownership changes in subsidiaries	Total of other reserves
Balance as at December 31, 2017	(2,811)	-	(1,051)	(2,663)	(6,525)
Other comprehensive income	142	275	-	(51)	366
Translation adjustment	(276)	523	-	-	247
Balance as at December 31, 2018	(2,945)	798	(1,051)	(2,714)	(5,912)
Other comprehensive income	(486)	(735)	-	-	(1,221)
Translation adjustment	(94)	144	-	-	50
Acquisitions and disposal of noncontrolling interest	-	-	-	1,410	1,410
Balance as at December 31, 2019	(3,525)	207	(1,051)	(1,304)	(5,673)

e) Share buyback program

The Company concluded in November 2018, share buyback program for Vale's common shares and their respective ADSs approved by the Board of Directors on July 25, 2018, and repurchased a total of 71,173,683 common shares, at an average price of R\$54.21 per share, for a total aggregate purchase price of R\$3,858 (US\$1 billion). The shares were acquired in the stock market based on regular trading conditions. The shares acquired are held in treasury for future sale or cancellation.

f) Vale's corporate governance restructuring in 2017

At the General Extraordinary Stockholders' Meeting, held on June 27, 2017, stockholders approved the corporate restructuring of the Company proposed by Valepar S.A. (former controlling stockholder). The corporate restructuring was based on (i) conversion of Vale class "A" preferred shares into common shares; (ii) amendment of Vale's by-laws, so as to adjust to Novo Mercado rules; and (iii) the merger of Valepar S.A. into Vale.

g) Shareholders Agreement

On the date of the merger of Valepar into Vale, August 14, 2017, the former Controlling Shareholders of Valepar executed a new shareholders' agreement ("Vale Agreement") that binds only 20% of the totality of Vale's common shares issued by Vale, and will be in force until November 9, 2020, with no provision for renewal.

Accounting policy

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. Transactions between the parent company and its subsidiaries are eliminated on consolidation and are not disclosed in this note.

Related party transactions were made by the Company on terms equivalent to those that prevail in arm's-length transactions, with respect to price and market conditions that are no less favorable to the Company than those arranged with third parties.

Purchases, accounts receivable and other assets, and accounts payable and other liabilities relate largely to amounts charged by joint ventures and associates related to the pelletizing plants operational lease and railway transportation services.

Information about related party transactions and effects on the financial statements is set out below:

a) Transactions with related parties

	Consolidated			
	Year ended December 31			
	2019			
	Joint Ventures	Associates	Major stockholders	Total
Net operating revenue	1,480	1,164	809	3,453
Cost and operating expenses	(6,883)	(127)	-	(7,010)
Financial result	207	(3)	(126)	78

	Consolidated			
	Year ended December 31			
	2018			
	Joint Ventures	Associates	Major stockholders	Total
Net operating revenue	1,275	1,128	759	3,162
Cost and operating expenses	(8,365)	(136)	-	(8,501)
Financial result	406	-	(428)	(22)

	Consolidated			
	Year ended December 31			
	2017			
	Joint Ventures	Associates	Major stockholders	Total
Net operating revenue	1,265	1,079	467	2,811
Cost and operating expenses	(6,211)	(98)	(92)	(6,401)
Financial result	376	(66)	(2,648)	(2,338)

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 leases of the pelletizing plants.

b) Outstanding balances with related parties

	December 31, 2019				December 31, 2018			
	Joint Ventures	Associates	Major stockholders (i)	Total	Joint Ventures	Associates	Major stockholders (i)	Total
Assets								
Cash and cash equivalents	-	-	5,578	5,578	-	-	4,867	4,867
Accounts receivable	367	88	19	474	426	163	12	601
Dividends receivable	335	25	-	360	511	-	-	511
Loans	7,737	-	-	7,737	7,657	-	-	7,657
Derivatives financial instruments	-	-	169	169	-	-	1,151	1,151
Other assets	262	-	-	262	96	-	-	96
Liabilities								
Supplier and contractors	1,218	113	149	1,480	854	80	94	1,028
Loans	-	5,511	6,804	12,315	-	5,136	10,268	15,404
Derivatives financial instruments	-	-	259	259	-	-	433	433
Other liabilities	2,293	-	-	2,293	2,978	-	-	2,978

(i) Refers to regular financial instruments with large financial institutions of which the stockholders are part of the controlling "shareholders' agreement".

Loans

In March 2018, Nacala BV, a joint venture between Vale and Mitsui on the Nacala's logistic corridor, closed the project financing and repaid a portion of the shareholders loans from Vale, in the amount of R\$8,434 (US\$2,572 million). The outstanding receivable of R\$7,737 carries interest at 7.44% p.a.

The loan from associates mainly relates to the loan from Pangea Emirates Ltd, part of the group of shareholders which owns 15% interest on Vale Moçambique, which carries interest at 6.54% p.a.

Major stockholders

Refers to regular financial instruments with large financial institutions of which the stockholders are part of the controlling "shareholders' agreement".

c) The key management personnel remuneration

	Year ended December 31		
	2019	2018	2017
Short-term benefits			
Wages	30	28	29
Direct and indirect benefits	41	36	33
Profit sharing program ("PLR")	3	31	24
	74	95	86
Long-term benefits			
Shares based	-	10	16
Severance	18	68	64
	92	173	166

The amounts described above include the Board of Directors and the Executive Officers and are presented on a cash basis.

32. Commitments

a) Contractual obligations

The required and non-cancelable minimum payments related to contractual obligations as at December 31, 2019 are as follows:

	Purchase obligations (i)	
	December 31, 2019	December 31, 2018
2020	15,945	10,373
2021	4,147	5,597
2022	2,862	2,125
2023	2,226	1,796
2024 and thereafter	11,407	8,502
Total minimum payments required	36,587	28,393

(i) Mainly relates to agreements for the acquisition of fuel, energy and the acquisition of raw materials and services.

b) Guarantees provided

As at December 31, 2019 and 2018, corporate financial guarantees provided by Vale (within the limit of its direct or indirect interest) for certain associates and joint ventures were R\$6,671 and R\$6,723, respectively. The fair value of this financial guarantees in December 31, 2019 and 2018 totaled R\$2,116 and R\$644, respectively, and is recorded in the balance sheet as "Others non-current liabilities".

33. Financial and capital risk management

Vale considers that an effective risk management is key to support the achievement of the company objectives and to ensure the financial strength and flexibility of the company and the business continuity.

Therefore, Vale has developed its risk management strategy in order to provide an integrated approach of the risks that the company is exposed to, considering not only the risks generated by variables traded in financial markets (market risk) and those arising from liquidity risk, but also risk from counterparties obligations (credit risk), among others.

The Company's Board of Directors oversees the management of financial risks and it is supported by a Finance Committee that advises on financial risks and the appropriate financial risk governance framework for the Company. The Finance Committee provides assurance to the Company's Board of Directors that Vale'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.

a) Liquidity risk management

The liquidity risk arises from the possibility that Vale might not perform its obligations on due dates, as well as face difficulties to meet its cash requirements due to market liquidity constraints.

The revolving credit facilities available today were provided by a syndicate of several global commercial banks. To mitigate liquidity risk, Vale has two revolving credit facilities, which will mature in 2022 and 2024, in the available amount of R\$20,154 (US\$5,000 million) to assist the short term liquidity management and to enable more efficiency in cash management, being consistent with the strategic focus on cost of capital reduction. As of December 31, 2019 these lines are undrawn.

b) Credit risk management

Vale's exposure 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.

(i) Commercial credit risk management

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.

Vale has a diversified accounts receivable portfolio from a geographical standpoint, with Asia, Europe and Brazil the regions with more significant exposures. According to each region, different guarantees can be used to enhance the credit quality of the receivables. In 2019 and 2018, the expected credit loss on the Company's accounts receivable portfolio is insignificant (see note 10).

(ii) Treasury credit risk management

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.

c) Market risk management

Vale is exposed to several market risk factors that can impact its cash flow. The assessment of this potential impact arising from the volatility of market risk factors and their correlations is performed periodically to support the decision-making process regarding the risk management strategy, that may incorporate financial instruments, including derivatives.

The portfolio of these financial instruments is monitored on a monthly basis, enabling financial results surveillance and its impact on cash flow.

Vale currently applies hedge accounting in the following programs: (i) net investment (see notes 6 and 25), and (ii) nickel revenue hedging program (see note 34).

Considering the nature of Vale's business and operations, the main market risk factors which the Company is exposed to are:

- Foreign exchange and interest rates;
- Product prices and input costs.

Foreign exchange and interest rate risk

Vale'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. We also may have debt instruments and other assets and liabilities denominated in currencies other than U.S. dollars, mainly in Brazilian real and euros.

In order to reduce the potential impact that arises from currencies mismatches, derivatives instruments may be used as a risk mitigation strategy.

Vale implements hedge transactions to protect its cash flow against the market risks that arises from its debt obligations – mainly currency volatility. The hedges cover most of the debt denominated in Brazilian real and euros. The Company uses swap and forward transactions to convert debt linked to Brazilian real and Euros into US dollar, with volumes, flows and settlement dates similar to those of the debt instruments - or sometimes lower, subject to market liquidity conditions.

Hedging instruments with shorter settlement dates are renegotiated through time so that their final maturity matches - or becomes closer - to the debts' final maturity. At each settlement date, the results of the swap and forward transactions partially offset the impact of the foreign exchange rate in Vale's obligations, contributing to stabilize the cash disbursements in US dollar.

Vale 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 (London Interbank Offer Rate) in US dollar.

Risk of product and input prices

Vale is also exposed to market risks associated with the price volatility of commodities and inputs. We may enact risk mitigation programs in situations such as the following: (i) where there is a risk of financial distress; (ii) to support commercial activities and specific needs of our business segments; (iii) to ensure a minimum cash and/or value generation for certain businesses; and (iv) to protect from the increase of certain cost items, such as fuel oil used on ships and freight chartering. These programs may incorporate derivative instruments, predominantly forwards, futures and options.

d) Capital structure management

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.

34. Additional information about derivatives financial instruments

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 day time horizon.

The following tables detail the derivatives positions for Vale and its controlled companies as of December 31, 2019, with the following information: notional amount, fair value including credit risk, gains or losses in the period, value at risk and the fair value breakdown by year of maturity.

a) Foreign exchange and interest rates derivative positions

(i) Protection programs for the R\$ denominated debt instruments

To reduce cash flow volatility, swap and forward transactions were implemented to convert into US\$ the cash flows from certain debt instruments denominated in R\$ with interest rates linked mainly to CDI, TJLP and IPCA. In those swaps, Vale pays fixed or floating rates in US\$ and receives payments in R\$ linked to the interest rates of the protected debt instruments.

The swap and forward transactions were negotiated over-the-counter and the protected items are the cash flows from debt instruments linked to R\$. These programs transform into US\$ the obligations linked to R\$ to achieve a currency offset in the Company's cash flows, by matching its receivables - mainly linked to US\$ - with its payables.

							Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year		
	Notional			Average	Fair value						
Flow	December 31, 2019	December 31, 2018	Index	rate	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020	2021	2022+
CDI vs. US\$ fixed rate swap					(155)	(178)	(71)	30	(89)	9	(75)
Receivable	R\$ 2,115	R\$ 1,581	CDI	100.54%							
Payable	US\$ 558	US\$ 456	Fix	3.31%							
TJLP vs. US\$ fixed rate swap					(304)	(1,433)	(1,259)	36	(48)	(74)	(182)
Receivable	R\$ 2,111	R\$ 2,303	TJLP +	1.15%							
Payable	US\$ 601	US\$ 994	Fix	2.97%							
TJLP vs. US\$ floating rate swap					-	(215)	(239)	-	-	-	-
Receivable	-	R\$ 181	TJLP +	0.00%							
Payable	-	US\$ 107	Libor +	0.00%							
R\$ fixed rate vs. US\$ fixed rate swap					(73)	(36)	35	32	54	(28)	(99)
Receivable	R\$ 2,173	R\$ 1,078	Fix	6.25%							
Payable	US\$ 604	US\$ 351	Fix	0.73%							
IPCA vs. US\$ fixed rate swap					185	(310)	(93)	55	49	(72)	209
Receivable	R\$ 2,826	R\$ 1,315	IPCA +	5.18%							
Payable	US\$ 759	US\$ 434	Fix	4.02%							
IPCA vs. CDI swap					424	344	22	-	234	16	174
Receivable	R\$ 1,634	R\$ 1,350	IPCA +	6.62%							
Payable	R\$ 1,350	R\$ 1,350	CDI	98.58%							

Flow	Notional		Bought / Sold	Average rate	Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020+
Forward	R\$ 121	-	B	4.20	6	-	-	2	6

(ii) Protection program for EUR denominated debt instruments

To reduce the cash flow volatility, swap transactions were implemented to convert into US\$ the cash flows from certain debt instruments issued in Euros by Vale. In those swaps, Vale receives fixed rates in EUR and pays fixed rates in US\$.

The swap transactions were negotiated over-the-counter and the protected items are the cash flows from debt instruments linked to EUR. The financial settlement inflows/outflows are offset by the protected items' losses/gains due to EUR/US\$ exchange rate.

Flow	Notional			Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year		
	December 31, 2019	December 31, 2018	Index	Average rate	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020	2021 2022+
EUR fixed rate vs. US\$ fixed rate swap					(141)	(2)	(19)	17	(22)	(21) (98)
Receivable	€ 500	€ 500	Fix	3.75%						
Payable	US\$ 613	US\$ 613	Fix	4.29%						

(iii) Protection for treasury volatility related to tender offer transaction

To reduce the volatility of the premium to be paid to investors for the tender offer transaction issued on December 2019, treasury lock transactions were implemented and already settled.

Flow	Notional			Average rate	Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018	Bought / Sold		December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Forwards	-	-	B	-	-	-	66	-	-

b) Commodities derivative positions

(i) Protection program for the purchase of fuel oil used on ships

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 Bunker Oil, Gasoil (10ppm) and Brent oil for different portions of the exposure.

The derivative transactions were negotiated over-the-counter and the protected item is part of the Vale's costs linked to the price of fuel oil used on ships. The financial settlement inflows/outflows are offset by the protected items' losses/gains.

Bunker Oil Options

Flow	Notional (ton)			Average strike (US\$/ton)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018	Bought / Sold		December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Call options	-	2,100,000	B	-	-	4	12	-	-
Put options	-	2,100,000	S	-	-	(115)	-	-	-
Total					-	(111)	12	-	-

Brent Crude Oil Options

Flow	Notional (bbl.)				Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018	Bought / Sold	Average strike (US\$/bbl.)	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Call options	1,110,000	-	B	75	45	-	-	11	45
Put options	1,110,000	-	S	49	(14)	-	-	4	(14)
Total					31	-	-	15	31

Gasoil Options

Flow	Notional (bbl.)				Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018	Bought / Sold	Average strike (US\$/bbl.)	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Call options	1,035,000	-	B	96	26	-	-	6	26
Put options	1,035,000	-	S	61	(10)	-	-	2	(10)
Total					16	-	-	8	16

(ii) Protection programs for base metals raw materials and products

Operational Hedging Programs

In the operational hedging program for nickel sales at fixed prices, derivatives transactions were implemented to convert into floating prices the contracts with clients that required a fixed price.

In the operational protection program for the purchase of raw materials and products, derivatives transactions were implemented in order to reduce the mismatch between the pricing period of purchases (concentrate, cathode, sinter, scrap and others) and the pricing period of the final product sales to the clients.

All these transactions have already been settled.

Flow	Notional (ton)				Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018	Bought / Sold	Average strike (US\$/ton)	December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Fixed price sales protection									
Nickel forwards	-	7,244	S	-	-	(39)	197	-	-
Raw material purchase protection									
Nickel forwards	-	120	S	-	-	1	(3)	-	-
Copper forwards	-	81	S	-	-	-	-	-	-
Total					-	(38)	194	-	-

Nickel Revenue Hedging Program

To reduce the volatility of its future cash flows arising from changes in nickel prices, the company implemented a Nickel Revenue Hedging Program. Under this program, hedge operations were executed using option contracts to protect a portion of the company highly probable forecast sales at floating prices, thus establishing a cushion to guarantee prices above our Nickel Average Unit Cash Cost and investments for the hedged volumes. 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 nickel prices changes.

Flow	Notional (ton)		Bought / Sold	Average strike (US\$/ton)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year	
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020	2021+
Call options	75,984	-	S	18,739	(49)	-	(9)	12	(39)	(10)
Put options	75,984	-	B	15,714	652	-	57	87	615	37
Total					603	-	48	99	576	27

c) Freight derivative positions

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 Vale's 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 prices changes.

The FFAs are contracts traded over the counter and can be cleared through a Clearing House, in this case subject to margin requirements.

Flow	Notional (days)		Bought / Sold	Average strike (US\$/day)	Fair value		Financial Settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Freight forwards	1,050	480	B	13,286	1	3	13	3	1

d) Wheaton Precious Metals Corp. warrants

The Company owns warrants issued by Wheaton Precious Metals Corp. (WPM), a Canadian company with stocks negotiated in Toronto Stock Exchange and New York Stock Exchange. Such warrants have payoff similar to that of an American call option and were received as part of the payment regarding the sale of part of gold payable flows produced as a sub product from Salobo copper mine and some nickel mines in Sudbury.

Flow	Notional (quantity of warranties)		Bought / Sold	Average strike (US\$/share)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2023
Call options	10,000,000	10,000,000	B	44	105	32	-	12	105

e) Debentures convertible into shares of Valor da Logística Integrada ("VLI")

The Company has debentures which lenders have the option to convert the outstanding debt into a specified quantity of VLI's shares, owned by the Company. This option may be fully, or part exercised, upon payment to the Company of the strike price, considering the terms, conditions and other limitations existing in the agreement, at any time and at the discretion of the creditor, as of December 2017 until the maturity date of the debentures, December 2027.

Flow	Notional (quantity)		Bought / Sold	Average strike (R\$/share)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2027
Conversion options	140,239	140,239	S	7,136	(206)	(228)	-	12	(206)

f) Options related to Minerações Brasileiras Reunidas S.A. ("MBR") shares

In 2019, in connection to the acquisition of additional 36.4% MBR's shares disclosed in note 14, the options were elapsed.

Flow	Notional (quantity, in millions)		Bought / Sold	Average strike (R\$/share)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020+
Options	-	2,139	B/S	-	-	1,082	-	-	-

g) Option related to SPCs Casa dos Ventos

The Company acquired in January 2019 a call option related to shares of the special purpose companies Ventos de São Bento Energias Renováveis, Ventos São Galvão Energias Renováveis and Ventos de Santo Eloy Energias Renováveis (SPCs Casa dos Ventos), which are part of the wind farm of Folha Larga Sul project, in Campo Formoso, Bahia, with commercial operation scheduled for the first half of 2020. This option was acquired in the context of the Company's signing of electric power purchase and sale agreements with Casa dos Ventos, supplied by this wind farm.

Flow	Notional (quantity)		Bought / Sold	Average strike (R\$/share)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2022
Call option	137,751,623	-	B	2.77	96	-	-	7	96

h) Embedded derivatives in contracts

In August 2014 the Company sold part of its stake in Valor da Logística Integrada ("VLI") to an investment fund managed by Brookfield Asset Management ("Brookfield"). The sales contract includes a clause that establishes, under certain conditions, a minimum return guarantee on Brookfield's investment until August 2020. This clause is considered an embedded derivative, with payoff equivalent to that of a put option.

Flow	Notional (quantity)		Bought / Sold	Average strike (R\$/share)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020+
Put option	1,105,070,863	1,105,070,863	S	4.04	(278)	(400)	-	45	(278)

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.

Flow	Notional (ton)		Bought / Sold	Average strike (US\$/ton)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020
Nickel forwards	1,497	3,763	S	15,363	9	6	-	2	9
Copper forwards	1,009	2,035	S	5,910	(1)	1	-	1	(1)
Total					8	7	-	3	8

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.

Flow	Notional (volume/month)		Bought / Sold	Average strike (US\$/ton)	Fair value		Financial settlement Inflows (Outflows)	Value at Risk	Fair value by year	
	December 31, 2019	December 31, 2018			December 31, 2019	December 31, 2018	December 31, 2019	December 31, 2019	2020	2021+
Call options	746,667	746,667	S	233	(3)	(4)	-	3	(2)	(1)

i) 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, 2019
- *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	(155)	(731)	(1,306)
	US\$ interest rate inside Brazil decrease	(155)	(170)	(185)
	Brazilian interest rate increase	(155)	(156)	(156)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
TJLP vs. US\$ fixed rate swap	R\$ depreciation	(304)	(921)	(1,538)
	US\$ interest rate inside Brazil decrease	(304)	(343)	(384)
	Brazilian interest rate increase	(304)	(384)	(457)
	TJLP interest rate decrease	(304)	(382)	(461)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
R\$ fixed rate vs. US\$ fixed rate swap	R\$ depreciation	(73)	(662)	(1,251)
	US\$ interest rate inside Brazil decrease	(73)	(93)	(115)
	Brazilian interest rate increase	(73)	(104)	(134)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
IPCA vs. US\$ fixed rate swap	R\$ depreciation	185	(618)	(1,420)
	US\$ interest rate inside Brazil decrease	185	125	61
	Brazilian interest rate increase	185	47	(79)
	IPCA index decrease	185	94	6
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-
IPCA vs. CDI swap	Brazilian interest rate increase	424	391	361
	IPCA index decrease	424	398	374
Protected item: R\$ denominated debt linked to IPCA	IPCA index decrease	n.a.	(398)	(374)
EUR fixed rate vs. US\$ fixed rate swap	EUR depreciation	(141)	(797)	(1,453)
	Euribor increase	(141)	(146)	(150)
	US\$ Libor decrease	(141)	(175)	(208)
Protected item: EUR denominated debt	EUR depreciation	n.a.	797	1,453
NDF BRL/USD	R\$ depreciation	6	(27)	(59)
	US\$ interest rate inside Brazil decrease	6	3	-
	Brazilian interest rate increase	6	(1)	(8)
Protected item: R\$ denominated debt	R\$ depreciation	n.a.	-	-

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated



Instrument	Instrument's main risk events	Probable	Scenario I	Scenario II
Fuel Oil protection				
Options	Price input decrease	47	(278)	(464)
Protected item: Part of costs linked to fuel oil prices	Price input decrease	n.a.	278	464
Maritime Freight protection				
Forwards	Freight price decrease	1	(13)	(28)
Protected item: Part of costs linked to maritime freight prices	Freight price decrease	n.a.	13	28
Nickel Revenue Hedging Program				
Options	Nickel price increase	603	(126)	(902)
Protected item: Part of nickel future revenues	Nickel price increase	n.a.	126	902
Wheaton Precious Metals Corp. warrants				
	WPM stock price decrease	105	32	4
Conversion options - VLI				
	VLI stock value increase	(206)	(340)	(514)
Option - SPCs Casa dos Ventos				
	SPCs Casa dos Ventos stock value decrease	96	32	3
Instrument	Main risks	Probable	Scenario I	Scenario II
Embedded derivatives - Raw material purchase (nickel)	Nickel price increase	9	(11)	(32)
Embedded derivatives - Raw material purchase (copper)	Copper price increase	(1)	(7)	(13)
Embedded derivatives - Gas purchase	Pellet price increase	(3)	(9)	(19)
Embedded derivatives - Guaranteed minimum return (VLI)	VLI stock value decrease	(278)	(1,020)	(2,095)

j) Financial counterparties' ratings

The transactions of derivative instruments, cash and cash equivalents as well as short-term investments are held with financial institutions whose exposure limits are periodically reviewed and approved by the delegated authority. The financial institutions credit risk is performed through a methodology that considers, among other information, ratings provided by international rating agencies.

The table below presents the ratings published by agencies Moody's and S&P regarding the main financial institutions that we hire derivative instruments, cash and cash equivalents transactions

Long term ratings by counterparty	Moody's	S&P
ABN Amro	A1	A
Agricultural Bank of China	A1	A
ANZ Australia and New Zealand Banking	Aa3	AA-
Banco ABC	Ba3	BB-
Banco Bradesco	Ba3	BB-
Banco do Brasil	Ba3	BB-
Banco Itaú Unibanco	Ba3	BB-
Banco Safra	Ba3	BB-
Banco Santander	A2	A
Banco Votorantim	Ba3	BB-
Bank Mandiri	Baa2	BBB-
Bank of America	A2	A-
Bank of China	A1	A
Bank of Montreal	Aa2	A+
Bank of Nova Scotia	A2	A+
Bank of Shanghai	Baa2	-
Bank of Tokyo Mitsubishi UFJ	A1	A-
Bank Rakyat Indonesia (BRI)	Baa2	BBB-
Barclays	Baa3	BBB
BBVA Banco Bilbao Vizcaya Argentaria	A3	A-
BNP Paribas	Aa3	A+
BTG Pactual	Ba3	BB-
Caixa Econômica Federal	Ba3	BB-
Calyon	Aa3	A+
China Construction Bank	A1	A
CIBC Canadian Imperial Bank	Aa2	A+
CIMB Bank	Baa1	A-
Citigroup	A3	BBB+

Long term ratings by counterparty	Moody's	S&P
Credit Suisse	Baa2	BBB+
Deutsche Bank	A3	BBB+
Goldman Sachs	A3	BBB+
HSBC	A2	A
Industrial and Commercial Bank of China	A1	A
Intesa Sanpaolo Spa	Baa1	BBB
Banco Itaú Unibanco	Ba3	BB-
JP Morgan Chase & Co	A2	A-
Macquarie Group Ltd	A3	BBB+
Mega International Commercial Bank	A1	A
Millenium BIM	A1	A-
Mitsui & Co	A1	A-
Mizuho Financial	A1	A-
Morgan Stanley	A3	BBB+
Muscat Bank	Ba2	BB
National Australia Bank	Aa3	AA-
National Bank of Canada	Aa3	A
National Bank of Oman	Ba2	-
Natixis	A1	A+
Royal Bank of Canada	Aa2	AA-
Rabobank	Aa3	A+
Societe Generale	A1	A
Standard Bank Group	Ba1	-
Standard Chartered	A2	BBB+
Sumitomo Mitsui Financial	A1	A-
Toronto Dominion Bank	Aa3	AA-
UBS	Aa3	A-
Unicredit	Baa1	BBB