United States

Securities and Exchange Commission

Washington, D.C. 20549

FORM 6-K

Report of Foreign Private Issuer

Pursuant to Rule 13a-16 or 15d-16

of the

Securities Exchange Act of 1934

For the month of

March 2018

Vale S.A.

Praia de Botafogo, No 186
Botafogo, 22250-145 - Rio de Janeiro RJ - Brasil

(Address of principal executive office)

(Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F.)

(Check One) Form 20-F x Form 40-F o

(Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1))

(Check One) Yes o No x

(Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(7))

(Check One) Yes o No x

(Indicate by check mark whether the registrant by furnishing the information contained in this Form is also thereby furnishing information to the Commission pursuant to Rule 12g3-2(b) under the Securities Exchange Act of 1934.)

(Check One) Yes o No x

(If Yes is marked, indicate below the file number assigned to the registrant in connection with Rule 12g3-2(b). 82- .)

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Financial Statements

December 31, 2018

BRGAAP in R$ (English)

Vale S.A. Financial Statements

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KPMG Auditores Independentes

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Independent auditor s report on the financial statements

(A free translation of the original report in Portuguese as published in Brazil containing financial statement prepared in accordance with accounting practices adopted in Brazil and rules of the International Financial Reporting Standards - IFRS)

To The Stockholders, Board Members and Management of

Vale S.A.

Rio de Janeiro - RJ

Opinion

We have audited the individual and consolidated financial statements of Vale S.A. (the Company), identified as Parent Company and Consolidated, respectively, which comprise the individual and consolidated balance sheet as of December 31, 2018, and the related statements of income, comprehensive income, changes in equity and cash flows for the year then ended, as well as the related notes, comprising significant accounting policies and other explanatory information.

In our opinion, the aforementioned financial statements present fairly, in all material respects, the individual and consolidated financial position of Vale S.A. as of December 31, 2018, its individual and consolidated financial performance and its individual and consolidated cash flows for the year then ended in accordance with accounting practices adopted in Brazil and in accordance with 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 Auditors Responsibilities for the Audit of the individual and consolidated Financial Statements section of our report. We are independent of the Company and its subsidiaries in accordance with the ethical requirements of Ethics Standards Boards for Accountants and Professional Standard issued by 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 opinion.

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Emphasis - Subsequent Event

Without qualifying our report further, we draw your attention to Note 3 to the individual and consolidated financial statements of the Company, which describes the Brumadinho dam failure, which occurred at the Company s operating facilities, on January 25, 2019. The Company s management considered that the event is not a condition that existed at the end of the reporting period, and therefore does not require adjustments in the book values recognized in the financial statements as of December 31, 2018. The amounts disclosed in the Note related to this event are based on Management s best estimates, but, at the current stage of the investigations, assessments of the causes and possible third parties lawsuits, it is not possible to reliably measure all costs that the Company may incur for the purposes of disclosure in the financial statements.

Key Audit Matters

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

1. Impairment - Individual and consolidated financial statements

As per Notes 17,18 and 19 to the financial statements

Matter

The assessment with respect to the recoverability of property, plant and equipment (PP&E), intangible assets and goodwill, and definition of Cash-Generating Units (CGUs) encompasses significant judgments concerning factors related to the level of future production, commodities price, production cost and economic assumptions such as discount rates, inflation rates and exchange rates of the countries where the Company and its subsidiaries operates. Due to the materiality of PP&E, intangible assets and goodwill, and to the level of uncertainty for determining the related impairment, which may impact the value of those assets in the individual and consolidated financial statements and the value of the investment recorded under the equity pick-up method in the parent company s financial statements, we considered this subject as a significant matter for the audit.

Our procedures included, among others:

- Design, implementation and operating effectiveness testing of the key internal controls on the valuation of the Company s assets, including those aimed at identifying any indication of loss and/or the need for recording or reversing impairment;

- Assessment of the Company s assumptions and estimates to determine the recoverable value of its assets, including the ones related to production, production cost, capital investments, discount rates and exchange rates;

- Assessment of the definition and identification criteria for Cash-Generating Units (CGUs);

- Assessment, with the support of our specialists in economic and financial assumptions, of the cash flow forecast and the assumptions used in the preparation of the cash flow forecasts and comparasion of those assumptions with market information and based on our knowledge of the Company and Industry, preparation of sensitivity analysis;

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- Arithmetic checking of the economic models regarding future cash flows and forecast results, combining them with accounting information and management reports and approved business plans; and

- Assessment of the disclosure in relation to the testing of the value in use and the comparison of the latter with the fair value, net of costs to sell, in the applicable cases.

Based on the evidence obtained through the summarized procedures above, we considered acceptable the balances presented for property, plant and equipment, intangible assets and goodwill, as well as the respective disclosures in the accompanying notes, in the context of the individual and consolidated financial statements taken as a whole, for the year ended December 31, 2018.

2. Asset Retirement Obligation (ARO) - Individual and consolidated financial statements

As per Notes 25 and 26 to the financial statements

Matter

As a result of its operations, the Company and its subsidiaries incurs in obligations to restore and rehabilitate the environment on retiring the areas. The areas and environment rehabilitation is required by the combination of both the legislation in force and the Company s and its subsidiaries s policies. Estimating costs related to those future activities requires considerable judgment in relation to factors such as how long a certain area will be used, the time required to rehabilitate and certain economic assumptions such as the discount rate and foreign currency exchange rates. Due to the relevance of the asset retirement obligations and the level of uncertainty for the determination of its estimate, which may impact the amount of this provision in the individual and consolidated financial statements and the amount of the investment recorded under the equity pick-up method in the financial statements of the parent company, we consider this subject as a significant matter for the audit.

Our procedures included, among others:

- Design, implementation and operating effectiveness testing of the key internal controls related to the determination of estimates for the asset retirement obligation provision to restore and rehabilitate areas commercially exploited by the Company;

- Analysis of assumptions used, including the base cost of the areas to be left, inflation rates, discount rates and risk rates;

- Analysis of the provision movement for the year related to the retired, restored/rehabilitated areas, and the relevant environmental obligation, aiming at verifying the primary inputs such as costs, inflation and discount rates, as well as an approved retirement plan;

- Assessment, with the support of our corporate finance specialists, the assumptions used in preparation of the estimative of the asset retirement obligation provision to restore and rehabilitate areas commercially exploited by the Company;

- Arithmetic review of the estimative results, comparing them with the accounting information and management reports; and

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- Assessement of the disclosure in relation to the obligations to rehabilitate the environment on retiring the areas.

Based on the evidence obtained through the procedures described above, we considered acceptable the balance of the asset retirement obligation provision to restore and rehabilitate areas commercially exploited by the Company and its respectives disclosures, in the context of the individual and consolidated financial statements taken as a whole, for the year ended December 31, 2018.

3. Income taxes - Individual and consolidated financial statements

As per Note 8 to the financial statements.

Matter

The Company and its subsidiaries have operations in various countries, each one with its own taxation regime. The nature of the Company s activities triggers various tax liabilities, including tax on income, and social contributions. The nature of the Company s commodities export operations also create complexities related to international transfer pricing issues. Applying tax legislation is a complex and highly specialized activity, which requires judgment for the assessment of tax exposure estimates and for quantification of contingent liabilities. Due to the level of uncertainty and judgment involved in determining this estimate that may impact the amount recorded in the individual and consolidated financial statements and the amount of the investment recorded under the equity pick-up method in the parent company s financial statements, we consider this subject as a significant matter for the audit.

Our procedures included, among others:

- Design, implementation and operating effectiveness testing of the key internal controls related to the determination of estimates for recording the amounts of provisions for taxes and contributions payable and taxes to be offset by the Company and its subsidiaries;

- With the support of our specialists from the tax department, we assess the criteria used for determining and paying taxes and contributions and the assumptions used by the Company and its subsidiaries to determine the provisions and amounts disclosed as tax exposure and contingencies;

- We compare the assumptions used by the Company and its subsidiaries with the tax legislation applicable to each jurisdiction, and in relation to market practices and assessments performed by ourselves, based on our knowledge of and experience in the Company s operations in the use of the aforementioned legislation and on applicable precedents and sentences; and

- Assessment of the Company and its subsidiaries s disclosures in particular of current and deferred taxes and contributions and possible tax exposure.

Based on the evidence obtained through the summarized procedures above, we considered acceptable the balance of deferred taxes and contributions payable on income and its respectives disclosures, in the context of the individual and consolidated financial statements taken as a whole, for the year ended December 31, 2018.

Other Information - Statement of Added Value

The individual and consolidated statements of value added (DVA) for the year ended December 31, 2018, prepared under the responsibility of the Company s management, and presented as supplementary information for IFRS purposes, was submitted for the auditing procedures jointly with audit of the Company s financial statements. For the purposes of forming our opinion, we evaluate 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 as defined in Technical Pronouncement CPC 09 - Statement of Added Value. In our opinion, this statement of value added have been properly prepared, in all material respects, in accordance with the criteria defined in this Technical Pronouncement and is consistent with the individual and consolidated financial statements taken as a whole.

Other information accompanying the individual and consolidated financial statements and the auditor s report

Management is responsible for the other information, which comprises the Management report.

Our opinion on the individual and consolidated financial statements does not cover the other information and we do not express any form of assurance conclusion thereon.

In connection with our audit of the individual and consolidated financial statements, our responsibility is to read the Management Report and, in doing so, consider whether the other information 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 of this Management Report, we are required to report that fact. We have nothing to report regarding this matter.

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

Management is responsible for the preparation and fair presentation of the individual and consolidated financial statements in accordance with accounting practices adopted in Brazil and in accordance with 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 individual and consolidated financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the individual 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 and subsidiaries or to cease operations, or has no realistic alternative but to do so.

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

Auditors responsibilities for the audit of the individual and consolidated financial statements

Our objectives are to obtain reasonable assurance about whether the individual and consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors 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 individual and consolidated 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 individual 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 Company s and its subsidiaries internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management s use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Company s and its subsidiaries ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditors report to the related disclosures in the individual 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 auditors report. However, future events or conditions may cause the Company and its subsidiaries to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the individual and consolidated 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 Company to express an opinion on the individual and the 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.

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We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and 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 auditors 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, March 27, 2019

KPMG Auditores Independentes

CRC SP-014428/O-6 F-RJ

(Original report in Portuguese signed by)

Bernardo Moreira Peixoto Neto

Accountant CRC RJ-064887/O-8

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Income Statement

In millions of Brazilian reais, except earnings per share data

		Consolidated			Parent company	
		Year ended December 31				
	Notes	2018	2017	2016	2018	2017
Continuing operations						
Net operating revenue	4(e)	134,483	108,532	94,633	81,133	64,037
Cost of goods sold and services rendered	5(a)	(81,201)	(67,257)	(61,143)	(39,051)	(33,327)
Gross profit		**53,282**	**41,275**	**33,490**	**42,082**	**30,710**
Operating expenses						
Selling and administrative expenses	5(b)	(1,917)	(1,697)	(1,755)	(959)	(959)
Research and evaluation expenses		(1,376)	(1,086)	(1,098)	(839)	(679)
Pre operating and operational stoppage		(984)	(1,317)	(1,570)	(754)	(941)
Equity results from subsidiaries					4,195	5,277
Other operating expenses, net	5(c)	(1,613)	(1,338)	(937)	(1,163)	(893)
		(5,890)	**(5,438)**	**(5,360)**	**480**	**1,805**
Impairment and disposal of non-current assets	16, 19 and 20	(3,523)	(1,025)	(4,168)	(792)	(549)
Operating income		**43,869**	**34,812**	**23,962**	**41,770**	**31,966**
Financial income	6	1,549	1,532	606	282	364
Financial expenses	6	(8,394)	(10,512)	(9,295)	(7,673)	(9,503)
Other financial items	6	(11,213)	(670)	14,991	(10,059)	(222)
Equity results and other results in associates and joint ventures	16 and 22	(693)	(277)	(3,242)	(693)	(277)
Income before income taxes		**25,118**	**24,885**	**27,022**	**23,627**	**22,328**
Income taxes	8					
Current tax		(2,806)	(2,664)	(3,307)	(1,172)	(1,158)
Deferred tax		3,772	(1,943)	(6,260)	3,512	(957)
		966	**(4,607)**	**(9,567)**	**2,340**	**(2,115)**
Net income from continuing operations		**26,084**	**20,278**	**17,455**	**25,967**	**20,213**
Net income (loss) attributable to noncontrolling interests		117	65	(6)		
Net income from continuing operations attributable to Vale s stockholders		**25,967**	**20,213**	**17,461**	**25,967**	**20,213**
Discontinued operations	14					
Loss from discontinued operations		(310)	(2,608)	(4,159)	(310)	(2,586)
Loss attributable to noncontrolling interests			(22)	(9)		
Loss from discontinued operations attributable to Vale s stockholders		**(310)**	**(2,586)**	**(4,150)**	**(310)**	**(2,586)**
Net income		**25,774**	**17,670**	**13,296**	**25,657**	**17,627**
Net income (loss) attributable to noncontrolling interests		117	43	(15)		

Net income attributable to Vale s stockholders		**25,657**	**17,627**	**13,311**	**25,657**	**17,627**
Earnings per share attributable to Vale s stockholders:						
Basic and diluted earnings per share:	9					
Common share (R$)		4.95	3.39	2.56	4.95	3.39

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

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Statement of Comprehensive Income

In millions of Brazilian reais

	Consolidated			Parent company	
	Year ended December 31				
	2018	2017	2016	2018	2017
Net income	**25,774**	**17,670**	**13,296**	**25,657**	**17,627**
Other comprehensive income (loss):					
Items that will not be reclassified subsequently to the income statement					
Retirement benefit obligations	142	(164)	(266)	(112)	(125)
Fair value adjustment to investment in equity securities	275			228	
Equity results in associates and joint ventures				301	(39)
Transfer to reserve	(51)			(51)	
Total items that will not be reclassified subsequently to the income statement, net of tax	**366**	**(164)**	**(266)**	**366**	**(164)**
Items that may be reclassified subsequently to the income statement					
Translation adjustments	14,541	3,337	(14,188)	14,244	3,309
Cash flow hedge			36		
Net investments hedge	(1,958)	(310)	4	(1,958)	(310)
Transfer of realized results to net income	(257)	(34)	(276)	(112)	
Total of items that may be reclassified subsequently to the income statement, net of tax	**12,326**	**2,993**	**(14,424)**	**12,174**	**2,999**
Total comprehensive income (loss)	**38,466**	**20,499**	**(1,394)**	**38,197**	**20,462**
Comprehensive income (loss) attributable to noncontrolling interests	269	37	(923)		
Comprehensive income (loss) attributable to Vale s stockholders	**38,197**	**20,462**	**(471)**		
From continuing operations	38,181	20,568	(13)		
From discontinued operations	16	(106)	(458)		
	38,197	**20,462**	**(471)**		

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.

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Statement of Cash Flows

In millions of Brazilian reais

	Consolidated			Parent company	
		Year ended December 31			
	2018	2017	2016	2018	2017
Cash flow from operating activities:					
Income before income taxes from continuing operations	25,118	24,885	27,022	23,627	22,328
Adjusted for:					
Equity results from subsidiaries				(4,195)	(5,277)
Equity results and other results in associates and joint ventures	693	277	3,242	693	277
Impairment and disposal of non-current assets	3,523	1,025	4,168	792	549
Depreciation, amortization and depletion	12,240	11,842	12,107	6,059	5,604
Financial results, net	18,058	9,650	(6,302)	17,450	9,361
Changes in assets and liabilities:					
Accounts receivable	(1,012)	3,983	(9,863)	(5,762)	15,301
Inventories	(2,994)	(1,030)	616	(174)	(612)
Suppliers and contractors	(1,414)	691	768	(642)	670
Provision - Payroll, related charges and others remunerations	349	1,236	435	514	980
Proceeds from cobalt and gold stream transactions	2,603		1,683		
Other assets and liabilities, net	(482)	(2,702)	1,854	717	163
	56,682	**49,857**	**35,730**	**39,079**	**49,344**
Interest on loans and borrowings paid (note 21)	(4,023)	(5,373)	(5,894)	(5,769)	(5,911)
Derivatives paid, net	(250)	(763)	(5,604)	(381)	(577)
Interest on participative stockholders debentures paid	(400)	(428)	(268)	(400)	(428)
Income taxes (including settlement program)	(4,089)	(3,322)	(2,827)	(1,932)	(2,351)
Net cash provided by operating activities from continuing operations	**47,920**	**39,971**	**21,137**	**30,597**	**40,077**
Cash flow from investing activities:					
Capital expenditures	(13,899)	(12,236)	(17,343)	(8,200)	(8,413)
Additions to investments	(79)	(292)	(875)	(1,515)	(1,895)
Proceeds from disposal of assets and investments	4,959	2,926	1,785	492	23
Dividends and interest on capital received	922	739	669	2,836	2,645
Others investments activities, net (1)	7,173	(1,827)	(794)	5,810	(8,435)
Proceeds from gold stream transaction			885		
Net cash used in investing activities from continuing operations	**(924)**	**(10,690)**	**(15,673)**	**(577)**	**(16,075)**
Cash flow from financing activities:					
Loans and borrowings from third-parties (note 21)	4,584	6,223	25,667	4,584	2,014
Payments of loans and borrowings from third-parties (note 21)	(28,149)	(28,878)	(26,630)	(15,372)	(21,058)
	(12,415)	(4,667)	(857)	(12,415)	(4,667)

Dividends and interest on capital paid to stockholders					
Dividends and interest on capital paid to noncontrolling interest	(635)	(404)	(972)		
Share buyback program (note 30)	(3,858)			(3,858)	
Transactions with noncontrolling stockholders	(56)	(305)	(69)		
Net cash used in financing activities from continuing operations	**(40,529)**	**(28,031)**	**(2,861)**	**(27,061)**	**(23,711)**
Net cash used in discontinued operations (note 14)	**(157)**	**(817)**	**(527)**		
Increase in cash and cash equivalents	**6,310**	**433**	**2,076**	**2,959**	**291**
Cash and cash equivalents in the beginning of the year	14,318	13,891	14,022	1,876	1,203
Effect of exchange rate changes on cash and cash equivalents	2,170	38	(2,207)		
Effects of disposals of subsidiaries and merger, net of cash and cash equivalents	(385)	(44)			382
Cash and cash equivalents at end of the year	**22,413**	**14,318**	**13,891**	**4,835**	**1,876**
Non-cash transactions:					
Additions to property, plant and equipment - capitalized loans and borrowing costs	704	1,179	2,291	700	1,176

(1) 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.

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

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Statement of Financial Position

In millions of Brazilian reais

		Consolidated		Parent company	
	Notes	**December 31, 2018**	**December 31, 2017**	**December 31, 2018**	**December 31, 2017**
Assets					
Current assets					
Cash and cash equivalents		22,413	14,318	4,835	1,876
Accounts receivable	10	10,261	8,602	17,333	9,560
Other financial assets	13	1,683	6,689	360	409
Inventories	11	17,216	12,987	4,775	4,601
Prepaid income taxes		2,104	2,584	1,938	2,378
Recoverable taxes	12	3,422	3,876	2,024	2,091
Others		2,157	1,780	2,096	1,542
		59,256	**50,836**	**33,361**	**22,457**
Non-current assets held for sale	14		11,865		7,082
		59,256	**62,701**	**33,361**	**29,539**
Non-current assets					
Judicial deposits	28(c)	6,649	6,571	6,274	6,110
Other financial assets	13	12,180	10,690	5,276	1,865
Prepaid income taxes		2,107	1,754		
Recoverable taxes	12	2,913	2,109	2,281	2,062
Deferred income taxes	8(a)	26,767	21,959	17,536	14,200
Others		1,015	882	1,163	810
		51,631	**43,965**	**32,530**	**25,047**
Investments	16	12,495	11,802	139,510	117,387
Intangibles	18	30,850	28,094	15,622	13,471
Property, plant and equipment	19	187,481	181,535	103,816	102,978
		282,457	**265,396**	**291,478**	**258,883**
Total assets		**341,713**	**328,097**	**324,839**	**288,422**
Liabilities					
Current liabilities					
Suppliers and contractors		13,610	13,367	7,342	7,503
Loans and borrowings	21	3,889	5,633	2,523	4,378
Other financial liabilities	13	6,213	3,260	5,083	4,413
Taxes payable	8(d)	2,519	2,307	2,238	1,991
Provision for income taxes		813	1,175	206	
Liabilities related to associates and joint ventures	22	1,120	1,080	1,120	1,080
Provisions	26	5,278	4,610	3,331	2,904
Dividends and interest on capital	30(d)		4,742		4,439

Others		1,843	3,284	2,743	2,552
		35,285	**39,458**	**24,586**	**29,260**
Liabilities associated with non-current assets held for sale	14		3,899		
		35,285	**43,357**	**24,586**	**29,260**
Non-current liabilities					
Loans and borrowings	21	56,039	68,759	23,082	28,966
Other financial liabilities	13	10,511	9,575	71,740	54,955
Taxes payable	8(d)	15,179	16,176	14,876	15,853
Deferred income taxes	8(a)	5,936	5,687		
Provisions	26	27,491	23,243	9,758	6,900
Liabilities related to associates and joint ventures	22	3,226	2,216	3,226	2,216
Deferred revenue - Gold stream		6,212	6,117		
Others		8,151	4,861	7,168	6,514
		132,745	**136,634**	**129,850**	**115,404**
Total liabilities		**168,030**	**179,991**	**154,436**	**144,664**
Stockholders equity	30				
Equity attributable to Vale s stockholders		170,403	143,758	170,403	143,758
Equity attributable to noncontrolling interests		3,280	4,348		
Total stockholders equity		**173,683**	**148,106**	**170,403**	**143,758**
Total liabilities and stockholders equity		**341,713**	**328,097**	**324,839**	**288,422**

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

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Statement of Changes in Equity

In millions of Brazilian reais

	Share capital	Results on conversion of shares	Capital reserve	Net ownership changes in subsidiaries	Profit reserves	Treasury stocks	Unrealized fair value gain (losses)	Cumulative translation adjustments	Retained earnings	Equity attributable to Vale s stockholders	Equity attributa to noncontrollin interests
Balance at December 31, 2015	**77,300**	**50**		**(1,881)**	**3,846**	**(2,746)**	**(3,873)**	**58,464**		**131,160**	**8,2**
Net income (loss)									**13,311**	**13,311**	**(**
Other comprehensive income:											
Retirement benefit obligations							(263)			(263)	
Cash flow hedge							26			26	
Available-for-sale financial instruments							4			4	
Translation adjustments							367	(13,916)		(13,549)	(9
Transactions with stockholders:											
Dividends and interest on capital of Vale s stockholders									(3,459)	(3,459)	
Dividends of noncontrolling interest											(9
Acquisitions and disposal of noncontrolling interest				11						11	
Capitalization of noncontrolling interest advances											
Appropriation to undistributed retained earnings					9,852				(9,852)		
Balance at December 31, 2016	**77,300**	**50**		**(1,870)**	**13,698**	**(2,746)**	**(3,739)**	**44,548**		**127,241**	**6,4**
Net income									**17,627**	**17,627**	

Other comprehensive income:											
Retirement benefit obligations							(164)			(164)	
Net investments hedge								(310)		(310)	
Translation adjustments							(9)	3,318		3,309	
Transactions with stockholders:											
Dividends and interest on capital of Vale s stockholders					(2,065)				(4,721)	(6,786)	
Dividends of noncontrolling interest											(6
Acquisitions and disposal of noncontrolling interest				(793)						(793)	(1,6
Capitalization of noncontrolling interest advances											1
Appropriation to undistributed retained earnings					12,906				(12,906)		
Merger of Valepar (note 30)			3,634							3,634	
Balance at December 31, 2017	**77,300**	**50**	**3,634**	**(2,663)**	**24,539**	**(2,746)**	**(3,912)**	**47,556**		**143,758**	**4,3**
Net income									**25,657**	25,657	**1**
Other comprehensive income:											
Retirement benefit obligations				(51)			142			91	
Fair value adjustment to investment in equity securities							275			275	
Net investments hedge								(1,958)		(1,958)	
Translation adjustments							247	13,885		14,132	1
Transactions with stockholders:											
Dividends and interest on capital of Vale s stockholders									(7,694)	(7,694)	
Dividends of noncontrolling interest											(6
Acquisitions and disposal of											(7

noncontrolling interest											
Capitalization of noncontrolling interest advances											
Appropriation to undistributed retained earnings					17,963				(17,963)		
Share buyback program						(3,858)				(3,858)	
Balance at December 31, 2018	**77,300**	**50**	**3,634**	**(2,714)**	**42,502**	**(6,604)**	**(3,248)**	**59,483**		**170,403**	**3,2**

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

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Value Added Statement

In millions of Brazilian Reais

	Consolidated		Parent company	
	Year ended December 31			
	2018	2017	2018	2017
Generation of value added from continuing operations				
Gross revenue				
Revenue from products and services	136,005	110,007	82,301	65,049
Impairment and disposal of non-current assets	(3,523)	(1,025)	(792)	(549)
Revenue from the construction of own assets	12,620	6,449	8,031	5,857
Expected credit losses	(26)	(14)	(5)	4
Other revenues	7,639	663	3,338	419
Less:				
Acquisition of products	(1,901)	(1,728)	(761)	(652)
Material, service and maintenance	(35,592)	(27,022)	(19,878)	(16,796)
Oil and gas	(5,682)	(4,199)	(3,725)	(2,872)
Energy	(3,335)	(3,108)	(1,700)	(1,470)
Freight	(15,972)	(10,717)	(158)	(106)
Other costs and expenses	(10,172)	(7,681)	(7,158)	(3,027)
Gross value added	**80,061**	**61,625**	**59,493**	**45,857**
Depreciation, amortization and depletion	(12,240)	(11,842)	(6,059)	(5,604)
Net value added	**67,821**	**49,783**	**53,434**	**40,253**
Received from third parties				
Equity results from entities	(693)	(277)	3,502	5,366
Equity results from discontinued operations				(2,952)
Financial income	1,549	1,532	282	364
Monetary and exchange variation of assets	1,455	500	2,242	443
Total value added from continuing operations to be distributed	**70,132**	**51,538**	**59,460**	**43,474**
Value added from discontinued operations to be distributed	58	1,534		
Total value added to be distributed	**70,190**	**53,072**	**59,460**	**43,474**
Personnel	9,367	7,673	4,975	3,702
Taxes and contributions	11,543	6,553	5,866	6,528
Current income tax	2,806	2,664	1,172	1,158
Deferred income tax	(3,772)	1,943	(3,512)	957
Financial expense (excludes capitalized interest)	9,244	11,325	8,176	8,483
Monetary and exchange variation of liabilities	11,662	2,630	11,712	1,950
Other remunerations of third party funds	3,508	1,058	5,414	3,069
Reinvested net income	25,657	17,627	25,657	17,627
Net income attributable to noncontrolling interest	117	65		
Distributed value added from continuing operations	**70,132**	**51,538**	**59,460**	**43,474**

Distributed value added from discontinued operations	58	1,534		
Distributed value added	**70,190**	**53,072**	**59,460**	**43,474**

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

Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated

1. Corporate information

Vale S.A. and its direct and indirect subsidiaries (Vale or 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), Paris - NYSE Euronext (VALE3) and Madrid LATIBEX (XVALO).

On December 22, 2017 after the conversion of the class A preferred shares into common shares, the Company migrated to the special listing segment of B3 S.A. (*Novo Mercado*) (further details in note 30).

2. Basis for 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 the 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 under the historical cost convention 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.

The issue of these financial statements was authorized by the Board of Directors on March 27, 2019.

c) Functional currency and presentation currency

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

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

	Closing rate			Average rate for the year ended		
	2018	2017	2016	2018	2017	2016
US Dollar (US$)	3.8748	3.3080	3.2591	3.6558	3.1925	3.4833
Canadian dollar (CAD)	2.8451	2.6344	2.4258	2.8190	2.4618	2.6280
Euro (EUR or)	4.4390	3.9693	3.4384	4.3094	3.6088	3.8543

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Notes to the Financial Statements

Expressed in millions of Brazilian reais, unless otherwise stated

d) Significant accounting policies

Significant and relevant accounting policies for the understanding of the recognition and measurement basis used in the preparation of these financial statements were included in the respective notes. The accounting polices applied in the preparations of these financial statements are consistent with those adopted and disclosed in the financial statements of prior years, except for new accounting policies related to the application of IFRS 9 Financial Instruments and IFRS 15 Revenue from Contracts with Customers, which were adopted by the Company from January 1, 2018.

The nature and effect of the changes as a result of adoption of these new accounting standards are described below:

IFRS 9 Financial Instrument This standard addresses the classification and measurement of financial assets and liabilities, new impairment model and new rules for hedge accounting. The Company applied IFRS 9 prospectively, with an initial application date of January 1, 2018. The Company has not restated the comparative information, which continues to be reported under IAS 39 - Financial Instruments. The main changes are described below:

Classification and measurement - Under IFRS 9, debt instruments are subsequently measured at fair value through profit or loss (FVTPL), through amortized cost, or fair value through other comprehensive income (FVOCI). The classification is based on the Company s business model for managing the assets and whether the instruments contractual cash flows represent solely payments of principal and interest (SPPI) on the principal amount outstanding.

On the date of initial application of IFRS 9, the Company has assessed which business models apply to the financial assets held by the Company and has classified its financial instruments into the appropriate IFRS 9 categories. The reclassification of the financial instruments of the Company on January 1, 2018 were as follows:

	Measurement category		Carrying amount		
	IAS 39	IFRS 9	IAS 39	IFRS 9	Difference
Financial assets					
Current					
Financial investments		FVTPL	61	61	

	Loans and receivables			
Derivative financial instruments	FVTPL	FVTPL	351	351
Accounts receivable	Loans and receivables	Amortized cost	8,602	8,602
Related parties	Loans and receivables	Amortized cost	6,277	6,277
Non-current				
Derivative financial instruments	FVTPL	FVTPL	1,497	1,497
Loans	Loans and receivables	Amortized cost	498	498
Related parties	Loans and receivables	Amortized cost	8,695	8,695
Financial liabilities				
Current				
Suppliers and contractors	Loans and receivables	Amortized cost	13,367	13,367
Derivative financial instruments	FVTPL	FVTPL	344	344
Loans and borrowings	Loans and receivables	Amortized cost	5,633	5,633
Related parties	Loans and receivables	Amortized cost	2,916	2,916
Non-current				
Derivative financial instruments	FVTPL	FVTPL	2,269	2,269
Loans and borrowings	Loans and receivables	Amortized cost	68,759	68,759
Related parties	Loans and receivables	Amortized cost	3,226	3,226
Participative stockholders debentures	Loans and receivables	Amortized cost	4,080	4,080

These reclassifications have no impact on the measurement categories. The financial instruments that were classified as Loans and receivables under IAS 39 did meet the IFRS 9 criteria for classification at amortized cost, because these financial instruments are held within a business model whose objective is to hold to collect the cash flows, which represent solely payments of principal and interest. The derivatives held for trading are required to be held as FVTPL under IFRS 9, therefore there were no changes in relation to these instruments from the adoption of IFRS 9.

Impairment - IFRS 9 has replaced the IAS 39 s incurred loss approach with a forward-looking expected credit loss (ECL) approach.

For accounts receivables, the Company has applied the standard s simplified approach and has calculated ECLs based on lifetime expected credit losses and the identified loss is deemed not significant. The Company has established a provision matrix that is based on its historical credit loss experience, adjusted for forward-looking factors specific to the economic environment and by any financial guarantees related to these accounts receivables.

Notes to the Financial Statements

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At each reporting date, the Company assesses whether financial assets carried at amortized cost are credit-impaired. Information about the Company s exposure to credit risk is set out in note 33.

The new impairment approach of IFRS 9 did not have a significant impact to the Company for the year ended December 31, 2018.

Hedge accounting - The Company has elected to adopt the new general hedge accounting model in IFRS 9. The changes introduced by IFRS 9 relating to hedge accounting currently have no impact, as the Company does not currently apply cash flow or fair value hedge accounting. The Company currently applies the net investment hedge for which there are no changes introduced by this new standard (note 25).

IFRS 15 Revenue from Contracts with Customers This standard establishes a comprehensive framework for determining whether, how much and when revenue is recognized. It replaced IAS 18 Revenue, IAS 11 Construction Contracts and related interpretations. The Company has adopted the new standard using the modified retrospective method. Accordingly, the comparative information presented has not been restated.

The Company has assessed its revenue streams and the nature and effect of the changes as a result of adoption of IFRS 15 is described below:

• Sales of products - Under IFRS 15, there is no significant impact on the timing of products revenue recognition, since usually the transfer of risks and rewards and the transfer of control under the sales contracts are at the same point in time.

• Shipping services - A 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. According to the previous standard (IAS 18), the revenue from shipping services was recognized upon loading, as well as the related costs, and was not considered a separate service.

Under IFRS 15, the provision of shipping services for CFR and CIF contracts should be considered as a separate performance obligation in which a proportion of the transaction price would be allocated and recognized over time as the shipping services are provided. The impact on the timing of revenue recognition of the proportion that would have been allocated to the shipping service to the Company s income statement for the year ended December 31, 2018 is deemed not significant. Therefore, such revenue has not been presented separately in these financial statements.

• Provisionally priced commodities sales - Under IFRS 9 and 15, the treatment of the provisional pricing mechanisms embedded within the provisionally priced commodities sales remains unmodified. Therefore, these revenues are recognized based on the estimated fair value of the total consideration receivable, and the provisionally priced sales mechanism embedded within these sale arrangements has the character of a derivative. The fair value of the sales price adjustment is recognized as operational revenue in the income statement.

Overall, there was no material impact on the Company s financial statement from the IFRS 15 adoption for the year ended December 31, 2018.

e) Accounting standards issued but not yet effective

• **IFRS 16 Lease** IFRS 16 was issued in January 2016. It will result in vast majority of leases being recognized in the balance sheet by lessees, as the distinction between operating and finance leases is removed. Under the new standard, an asset (the right to use the leased item) and a financial liability to pay rentals are recognized. There are recognition exemptions for short-term leases and leases of low-value items.

The Company will apply the standard from its mandatory adoption date of January 1, 2019. Vale will apply the simplified transition approach and will not restate comparative amounts for the year prior to first adoption. Right-of-use assets will be measured at the amount of the lease liability on adoption.

As at December 31, 2018, the Company has non-cancellable operating lease commitments in the nominal amount of R$9,676 (note 32). The Company has set up a project team which has reviewed these leasing commitments over the last year in light of the new lease accounting rules in IFRS 16. Of these commitments, the Company expects to recognize right-of-use assets and lease liabilities an amount ranging from R$6.8 billion to R$7.9 billion at present value on January 1, 2019, an amount ranging from R$900 to R$1 billion on current liabilities and R$5.9 billion to R$6.9 billion on non-current liabilities.

Notes to the Financial Statements

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The actual impacts of adopting the standard may be subject to further changes because the Company has not finalized the testing, assessment of controls over its new IT systems and the new accounting policies are subject to change until the Company presents its first financial statements from the date of initial application.

The Company has not early adopted any standards and interpretations that have been issued or amended but are not yet effective for the year ended December 31, 2018. Therefore, there are no other standards that are not yet effective and that would be expected to have a material impact on the entity in the current or future reporting periods.

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 the estimates.

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

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

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Notes to the Financial Statements

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3. Brumadinho s dam failure

On January 25, 2019 (subsequent event), a breach has been experienced in the Dam I of the Córrego do Feijão mine, which belongs to the Paraopebas Complex in the Southern System, located in Brumadinho, Minas Gerais, Brasil (Brumadinho dam). This dam was inactive since 2016 (without additional tailings disposal) and there was no other operational activity in this structure.

Due to the dam failure, 306 people lost their lives or are missing and ecosystems were affected. Around 11.7 million metric tons of iron ore waste were contained in the Brumadinho dam. It is not yet known the exact volume of iron ore waste that was released due to the dam failure. The tailings contained in the Dam I have caused an impact of around 270 km in extension, destroying some of Vale s facilities, affecting local communities and disturbing the environment. The Paraopeba river and its ecosystems have also been impacted by the event.

The Company has not been sparing efforts to support the victims and to mitigate and recover the social and environmental damages resulting from the breach of the dam. Vale has provided support in multiple ways, aiming to ensure the humanitarian assistance to those affected by the dam breach.

To determine the causes for the event, Vale has engaged a panel of independent experts. Furthermore, the Company established three Extraordinary Independent Consulting Committees to support the Board of Directors, which are composed by independent members that are unrelated to the management or to the Company s operations to ensure that the initiatives by the committees be unbiased. Following are the committees:

(i) The Extraordinary Independent Consulting Committee for Investigation (CIAEA), dedicated to investigating the causes and responsibilities for the Brumadinho dam breach;

(ii) The Extraordinary Independent Consulting Committee for Support and Recovery (CIAEAR), dedicated to follow-up on the measures taken to support the victims and the recovery of the areas affected by the breach of the Brumadinho dam, assuring that all necessary resources will be applied; and

(iii) The Extraordinary Independent Consulting Committee for Dam Safety (CIAESB), which will provide support to the Board of Directors in questions related to the diagnosis of safety conditions, management and risk mitigation related to Vale s tailings dams, also providing recommendations of actions to strengthen safety conditions of those dams.

In addition, Vale has determined the suspension (i) of the variable remuneration of its executives; (ii) the Shareholder s Remuneration Policy and (iii) any other resolution related to shares buyback. The Company paid the shareholders in anticipation of the remuneration for the year, the amount of R$7,694 in September 2018, approved by the Board of Directors on July 25, 2018. This payment was higher than the minimum mandatory remuneration for the year ended December 31, 2018 and consequently no additional dividends to shareholders is required (note 30).

a) Financial impacts arising from the dam failure

The Company has concluded for the purpose of these financial statements that the dam breach and the following events are not a condition that existed at the end of the reporting period, and therefore does not require adjustments in the book values recognized in the financial statements prepared for the year ended December 31, 2018. Therefore, all accounting impacts will be recorded in 2019.

At the current stage of the investigations, assessments of the causes and possible third parties lawsuits, it is not possible to have a reliable measure of all cost that the Company may incur for the purpose of disclosure in the financial statements. The amounts that are being disclosed took into consideration the best estimates by the Company´s management.

i) Operation stoppages and de-characterization of the upstream dams

On January 29, 2019 the Company has informed the market and Brazilian authorities its decision to speed up the plan to de-characterize all of its tailings dams built by the upstream method (same method as Brumadinho dam), located in Brazil. The de-characterizing means that the structure will be dismantled and will no longer have its original operational characteristics.

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The Company is developing specific studies for the de-characterization of these dams which will be submitted for approval by the relevant authorities when concluded, in accordance with regulations and legal requirements. The estimate on January 29, 2019, based on a preliminary assessment, resulted in a total amount of R$5 billion assuming the removal and reprocessing of all tailings contained in the upstream dams, followed by the fully recovery of the sites in the de-characterization method.

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 and reprocessing the tailings contained in the dams. Since the event, the Company has been working on an individual detailed engineering plans to each of these dams to allow the total de-characterization of the structures. The Company is still developing the revised estimate for the costs to de-characterize the upstream dams and, therefore, the additional amount to the provision that will be recognized and disclosed in 2019 could not be reliably estimated.

In order to carry out safely the de-characterization of the dams, the Company has temporarily stopped the production of the units where the upstream dams are located, as already disclosed to the market. The stoppage results in a reduction in production of approximately 40 million tons of iron ore on annual basis.

In addition, the Company has other operations that are temporarily suspended due to judicial decisions or technical analysis performed by the Company on the dams, which represents a potential reduction in sales of 52.8 million tons of iron ore. The Company is working on legal and technical measures to resume these operations.

For reference, the Company sold 365 million tons of iron ore and pellets in 2018.

Due to the dam failure and review undertaken on the safety requirements for other dams in the Minas Gerais region, when necessary people were placed in temporary accommodation.

ii) Assets write-offs

Following the event and the decision to speed up the de-characterization of the upstream dams, the Company will write-off assets of the Córrego do Feijão mine and those related to the upstream dams in Brazil, resulting in a loss of R$480 in 2019, which will impact the Company s balance sheet and income statement.

iii) Framework Agreements

The Company has been working together with the authorities and society to remediate the environmental and social impacts of the event. As a result, the Company has started negotiations and entered into agreements with the relevant authorities and affected people.

Public Ministry of Labor

On February 15, 2019, Vale entered into a preliminary 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 agreement, Vale will maintain the jobs of its direct employees until December 31, 2019 and will either assist terminated third party employees with a replacement or pay their salaries until December 31, 2019.

The Company will also keep paying wages regularly to the missing people until the authorities have considered them as fatal victims of the event and will pay to the families of the fatal victims an amount equivalent to two thirds of their wages until December 31, 2019 or until Vale reaches the final agreement with the Public Ministry of Labor.

Under the terms proposed by Vale and considering the uncertainties related to the necessary procedures to estimate the amount to be spent, including the number of individuals entitled to indemnification, the Company has estimated that this agreement will result in a provision of approximately R$850 in 2019.

Moreover, the Company will provide a lifelong medical insurance benefit to the widows and widowers and a similar benefit to the dependents of the victims until they are 22 years old. Due to the preliminary stage of this agreement and considering the complexity of an actuarial estimate, it is not possible yet to determine a range of outcomes or reliable estimates and, therefore, the amount of the provision related to this obligation could not be estimated. The Company expects to have this information during the course of 2019.

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Brazilian Federal Government, State of Minas Gerais, Public Prosecutors and Public Defendants

On a judicial hearing that took place on February 20, 2019, in the scope of the public civil action n ° 5010709-36.2019.8.13.0024, in process of the 6th Public Treasury Lower Court of Belo Horizonte, Vale entered into a preliminary agreement with the State of Minas Gerais, Federal Government and representatives of Public Authorities in which the Company commits to make emergency indemnification payments to the residents of Brumadinho and the communities that are located up to one kilometer from the Paraopeba river bed, from Brumadinho to the city of Pompéu, subject to registration.

Due to this agreement, the Company will anticipate indemnification to each family member through monthly payments during a 12-month period, which changes based, among other factors, on the age of the beneficiary. The Company has initially estimated a provision ranging from R$1 billion to R$2 billion related to these payments, depending on the number of beneficiaries that will be registered.

The agreement also includes the following measures: (i) independent technical assistance to support on the individual indemnities of those affected, if requested; and (ii) reimbursement or direct funding of the extraordinary expenses of the State of Minas Gerais and its governmental bodies due to the dam failure, including transportation, accommodation and food expenses of the employees involved in the rescue and other emergency actions. The respective amounts are still being estimated by the State of Minas Gerais and will be presented in Court.

iv) Donations and other incurred expenses

Donations

Vale has offered donations of R$100 thousand to each of the families with missing members or affected by fatalities, R$50 thousand to families that resided in the Self-Saving Zone (ZAS) near to Brumadinho dam, R$15 thousand to business owners of the region and R$5 thousand for each family that resided in the ZAS of Sul Superior dam, which belongs to the Gongo Soco mine, in Barão de Cocais. The estimated amount spent to date is around R$62. These humanitarian donations will not be subject to any compensation with eventual indemnification obligations that the Company may have with its beneficiaries.

Vale also entered into an agreement with the Brumadinho city in which the Company will donate to the city an amount of approximately R$80 over the next 2 years.

Environment and fauna

The Company is building a retention dike for the tailings on the affected areas. The Company has also installed anti-turbidity barriers for sediment retention alongside the Paraopeba River. In addition, Vale has mobilized cleaning, de-sanding and dredging the Paraopeba river channel.

Daily collection points of water and barriers for sediment retention were installed alongside the Paraopeba River, Três Maias reservoir and São Francisco river.

Vale also has set up an exclusive structure for treatment of the rescued animals, enabling emergency care and recovery before the animals are authorized, after veterinarian assessment, to be returned to their tutors.

Furthermore, the Company has agreed to pay the administrative fines imposed by the State Secretary for Environment and Sustainable Development SEMAD MG, in the total approximated amount of R$99.

The Company has incurred the following expenses up to the present moment:

	2019
Incurred expenses	
Administrative sanctions	99
Donations to the affected people and to the city	62
Drilling and infrastructure	20
Environmental recovery	17
Medical aid and other materials	9
Fuel and transportation	8
Others (*)	85
	300

(*) Includes expenses with communication, accommodation, humanitarian assistance, equipment, legal services, water, food aid, taxes, among others.

Off the events identified at this stage, a significant portion has not been disbursed or measured. The total costs incurred with Vale s employees dedicated to providing support with matters related to the event (including wages), equipment and materials were not measured yet.

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b) 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. New contingencies are expected to come in the future. Vale is still evaluating these contingencies and will recognize a provision based on the stage of these claims. Due to the preliminary stage of the investigations and claims, it is not possible to determine a range of reliable results or estimates of potential exposure related to dam breach at this point in time.

Lawsuits

On January 27, 2019, following the injunctions granted upon the requests of the Public Prosecutors of the State of Minas Gerais and the State of Minas Gerais, the Company had restricted R$11 billion on its bank accounts to take the necessary measures to reassure the stability of the other dams of the Córrego do Feijão Mine Complex, provide accommodation and assistance to the affected people, remediate environmental impacts, among other obligations.

On January 31, 2019, the Public Ministry of Labor filed a Public Civil Action and a couple of preliminary injunctions were granted determining the freezing of R$1.6 billion on the Company s bank accounts to secure the indemnification of direct and third-party employees that worked in the Córrego de Feijão mine at the time of the Brumadinho dam breach.

On March 18, 2019 the Public Prosecutor of the State of Minas Gerais filed a Public Civil Action and a preliminary injunction was granted to freeze R$1 billion of the Company s assets, aiming to grant funds that could be required to indemnify for losses that may arise from the evacuation of the community of Sebastião de Águas Claras Macacos community.

On March 25, 2019, the Public Prosecutor of the State of Minas Gerais filed a Public Civil Action and a preliminary injunction was granted to freeze R$2.95 billion of the Company s assets, to grant funds that might be required to indemnify for losses that may arise from evacuation of the communities in Gongo Soco, Barão de Cocais.

In total, approximately R$16.9 billion of the Company s assets were blocked, of which approximately R$468 were freeze on the Company s bank accounts, R$12.6 billion were converted into judicial deposits and R$3.75 billion was guaranteed using 75,312,728 treasury shares out of the 158,216,372 treasury shares held by Vale as at December 31, 2018.

Other collective and individual claims related to the Brumadinho dam breach were filed. Some collective claims were extinguished by the applicable court.

Administrative sanctions

In addition, the Company was notified of the imposition of administrative fines by Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA), in the amount of R$250 and a daily fine of R$100 thousand, drawn up on February 7, 2019, which Vale has presented defenses against all of them. In addition, the Brumadinho Municipal Department of the Environment has also imposed fines totaling approximately R$108, which the Company has also presented a defense.

U.S. Securities class action suits

Vale and certain of its current officers have been named as defendants in securities class action complaints in Federal Courts in New York brought by holders of Vale s securities under U.S. federal securities laws. The complaints allege that Vale made false and misleading statements or omitted to make disclosures concerning the risks and potential damage of a breach of the dam in the Córrego de Feijão mine. The plaintiffs have not specified an amount of alleged damages in these complaints. Vale intends to defend these actions and mount a full defense against these claims. As a consequence of the preliminary nature of these proceedings, it is not possible to determine a range of outcomes or reliable estimates of the potential exposure at this time, and the amount of provision that will be recognized in 2019 could not be estimated.

The Company is negotiating with insurers under its operational risk, general liability and engineering risk policies, 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. In light of the uncertainties, no indemnification to the Company was recognized in Vale s financial statements.

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4. Information by business segment and by geographic area

The Company operated the following reportable segments during this year: Ferrous Minerals, Coal, Base Metals and Fertilizers (presented as discontinued operations). 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.

Coal comprise of the production and extraction of metallurgical and thermal coal 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 their by-products (gold and silver).

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

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) special events (note 4b).

The Company allocate in Others the sales and expenses of other products, services, research and development, investments in joint ventures and associates of other business and unallocated corporate expenses.

In 2018, the Company has allocated general and corporate expenses to Others as these are not directly related to the performance of each business segment. The comparative periods were restated to reflect this change in the allocation criteria.

	Consolidated Year ended December 31, 2018						
	Net operating revenue	**Cost of goods sold and services rendered**	**Selling, 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**
Coal	**6,025**	**(5,811)**	**(33)**	**(75)**		**511**	**617**
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**
Others	1,089	(961)	(2,738)	(584)	(76)	204	(3,066)
Total of 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**

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	Consolidated Year ended December 31, 2017						
	Net operating revenue	Cost of goods sold and services rendered	Selling, 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**
Coal	**5,003**	**(4,326)**	**(39)**	**(45)**	**(14)**	**574**	**1,153**
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**
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**

	Consolidated Year ended December 31, 2016						
	Net operating revenue	Cost of goods sold and services rendered	Selling, 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	54,187	(22,817)	(894)	(308)	(521)	35	29,682
Iron ore Pellets	13,198	(6,932)	(121)	(45)	(77)	359	6,382
	1,031	(793)		(1)	(39)		198

Ferroalloys and manganese							
Other ferrous products and services	1,513	(933)	(13)	(5)	(12)		550
	69,929	**(31,475)**	**(1,028)**	**(359)**	**(649)**	**394**	**36,812**
Coal	**2,882**	**(3,090)**	**248**	**(50)**	**(137)**		**(147)**
Base metals							
Nickel and other products	15,504	(11,145)	2	(268)	(399)	13	3,707
Copper	5,770	(3,198)	(51)	(17)			2,504
Other base metals products			480				480
	21,274	**(14,343)**	**431**	**(285)**	**(399)**	**13**	**6,691**
Others	**548**	**(889)**	**(1,963)**	**(404)**	**(4)**	**262**	(2,450)
Total of continuing operations	**94,633**	**(49,797)**	**(2,312)**	**(1,098)**	**(1,189)**	**669**	**40,906**
Discontinued operations (Fertilizers)	**6,470**	**(5,315)**	**(298)**	**(75)**	**(58)**	**12**	**736**
Total	**101,103**	**(55,112)**	**(2,610)**	**(1,173)**	**(1,247)**	**681**	**41,642**

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

From continuing operations

	Consolidated		
	Year ended December 31		
	2018	**2017**	**2016**
Net income from continuing operations	**26,084**	**20,278**	**17,455**
Depreciation, depletion and amortization	12,240	11,842	12,107
Income taxes	(966)	4,607	9,567
Financial results, net	18,058	9,650	(6,302)
LAJIDA (EBITDA)	**55,416**	**46,377**	**32,827**
Items to reconciled LAJIDA (EBITDA) adjusted			
Equity results and other results in associates and joint ventures, net of dividends received	2,126	1,590	3,911
Special events (note 4b)	3,523	1,025	4,168
Adjusted LAJIDA (EBITDA) from continuing operations	**61,065**	**48,992**	**40,906**

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From discontinued operations

	Consolidated Year ended December 31		
	2018	2017	2016
Loss from discontinued operations	**(310)**	**(2,608)**	**(4,159)**
Depreciation, depletion and amortization		4	1,197
Income taxes	(134)	(324)	(2,134)
Financial results, net	18	89	(69)
LAJIDA (EBITDA)	**(426)**	**(2,839)**	**(5,165)**
Items to reconciled LAJIDA (EBITDA) adjusted			
Equity results in associates and joint ventures, net of dividends received		18	2
Impairment of non-current assets	415	2,833	5,899
Adjusted LAJIDA (EBITDA) from discontinued operations	**(11)**	**12**	**736**

b) Special events occurred during the year

Special events are gains or losses recognized in the Company s operating results that are not related to the performance of the business segments. The Company excludes special events from adjusted LAJIDA (EBITDA) to keep the segment performance analysis comparable with prior periods.

The special events identified by the Company are as follows:

	Consolidated Year ended December 31		
	2018	2017	2016
Result in disposal of assets (note 19)	(1,283)	(1,580)	(228)
Nacala Logistic Corridor (note 16)		1,438	
Impairment and onerous contracts (note 20)	(2,240)	(883)	(3,940)
Total	**(3,523)**	**(1,025)**	**(4,168)**

c) Assets by segment

	Consolidated					
	December 31, 2018			December 31, 2017		
	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangible (i)	Product inventory	Investments in associates and joint ventures	Property, plant and equipment and intangible (i)
Ferrous minerals	8,562	7,030	121,572	5,859	6,358	119,429
Coal	461	1,228	6,157	271	1,048	5,686
Base metals	4,443	54	82,515	3,336	43	78,080
Others	45	4,183	8,087	20	4,353	6,434
Total	**13,511**	**12,495**	**218,331**	**9,486**	**11,802**	**209,629**

	Consolidated								
	Year ended December 31								
	2018			2017			2016		
	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	5,793	2,925	6,109	3,821	4,732	5,463	3,081	8,303	5,299
Coal	492	82	921	235	141	934	502	1,634	632
Base metals	4,442	119	4,934	3,069	162	5,076	3,659	14	5,717
Others	20	26	276	11	65	369	8	142	459
Total	**10,747**	**3,152**	**12,240**	**7,136**	**5,100**	**11,842**	**7,250**	**10,093**	**12,107**

(i) Goodwill is allocated mainly to ferrous minerals and base metals segments in the amount of R$7,133 and R$7,022 in December 31, 2018 and R$7,133 and R$6,460 in December 31, 2017, respectively.

(ii) Cash outflows.

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d) Investment in associates and joint ventures, intangible and property, plant and equipment by geographic area

	Consolidated							
	December 31, 2018				December 31, 2017			
	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	10,089	22,764	113,252	146,105	9,900	20,615	113,162	143,677
Canada		7,578	38,381	45,959		7,005	36,277	43,282
Americas, except Brazil and Canada	957			957	663			663
Europe			1,419	1,419			1,303	1,303
Indonesia		3	10,757	10,760			9,220	9,220
Asia, except Indonesia	1,449		3,972	5,421	1,239		3,638	4,877
Australia							149	149
New Caledonia			10,833	10,833			9,809	9,809
Mozambique		505	5,653	6,158		472	5,067	5,539
Oman			3,211	3,211		2	2,873	2,875
Other regions			3	3			37	37
Total	**12,495**	**30,850**	**187,481**	**230,826**	**11,802**	**28,094**	**181,535**	**221,431**

e) Net operating revenue by geographic area

	Consolidated				
	Year ended December 31, 2018				
	Ferrous minerals	Coal	Base metals	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	1,603	6,559		16,316
Middle East/Africa/Oceania	9,450	548	91		10,089
Japan	7,597	608	1,861		10,066
China	53,120		3,163		56,283
Asia, except Japan and China	6,648	2,817	4,011		13,476
Brazil	9,365	449	1,001	1,045	11,860

Net operating revenue	**102,842**	**6,025**	**24,527**	**1,089**	**134,483**

	Consolidated Year ended December 31, 2017				
	Ferrous minerals	**Coal**	**Base metals**	**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	1,275	6,347	35	13,156
Middle East/Africa/Oceania	5,640	543	41		6,224
Japan	6,150	409	1,277		7,836
China	43,005		1,842		44,847
Asia, except Japan and China	4,251	2,268	4,927		11,446
Brazil	9,232	508	597	754	11,091
Net operating revenue	**80,291**	**5,003**	**21,966**	**1,272**	**108,532**

	Consolidated Year ended December 31, 2016				
	Ferrous minerals	**Coal**	**Base metals**	**Others**	**Total**
Americas, except United States and Brazil	1,167	72	4,079		5,318
United States of America	792		2,602	81	3,475
Germany	3,719		1,053		4,772
Europe, except Germany	5,107	723	5,381	59	11,270
Middle East/Africa/Oceania	4,266	329	72	1	4,668
Japan	4,464	432	1,123		6,019
China	41,135	223	2,420		43,778
Asia, except Japan and China	3,125	1,052	4,053		8,230
Brazil	6,154	51	491	407	7,103
Net operating revenue	**69,929**	**2,882**	**21,274**	**548**	**94,633**

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Accounting policy

Vale recognizes revenue when the control of a good or service transfers to a customer of an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. Net revenue excludes any applicable sales taxes.

Depending on the contract, sales revenue can 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. Service revenues are recognized in the amount by which the services are rendered and accepted by the customer.

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 and were not changed from previous years. 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.

Commodity price risk 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.

As of December 31, 2018, the Company had 27 million tons (2017: 33 million tons) provisionally priced based on iron ore forward prices and 78 thousand tons (2017: 106 thousand tons) provisionally priced based on copper forward prices. The final price of these sales will be determined during the first quarter of 2019. A 10% change in the price of iron ore realized on the provisionally priced sales, with all other factors held constant, would increase or reduce net income by R$719. A 10% change in the price of copper realized on the provisionally priced sales, with all other factors held constant, would increase or reduce net income by R$218.

5. Costs and expenses by nature

a) Cost of goods sold and services rendered

	Consolidated			Parent company	
			Year ended December 31		
	2018	2017	2016	2018	2017
Personnel	8,346	7,332	7,222	4,615	3,986
Materials and services	14,554	12,183	10,808	6,248	5,504
Fuel oil and gas	5,646	4,197	4,280	3,703	2,869
Maintenance	10,253	9,899	9,487	7,250	6,926
Energy	3,301	3,078	2,406	1,688	1,463
Acquisition of products	1,883	1,728	1,762	760	652
Depreciation and depletion	11,719	11,126	11,346	5,693	5,078
Freight	15,972	10,717	8,641	158	106
Others	9,527	6,997	5,191	8,936	6,743
Total	**81,201**	**67,257**	**61,143**	**39,051**	**33,327**
Cost of goods sold	79,074	65,300	59,409	37,601	31,991
Cost of services rendered	2,127	1,957	1,734	1,450	1,336
Total	**81,201**	**67,257**	**61,143**	**39,051**	**33,327**

b) Selling and administrative expenses

	Consolidated			Parent company	
			Year ended December 31		
	2018	2017	2016	2018	2017
Personnel	771	747	727	490	514
Services	338	259	248	180	152
Depreciation and amortization	225	292	414	115	185
Others	583	399	366	174	108
Total	**1,917**	**1,697**	**1,755**	**959**	**959**

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c) Other operating expenses, net

	Consolidated			Parent company	
	Year ended December 31				
	2018	2017	2016	2018	2017
Provision for litigation	681	540	487	464	423
Profit sharing program	674	476	252	435	307
Others	258	322	198	264	163
Total	**1,613**	**1,338**	**937**	**1,163**	**893**

6. Financial result

	Consolidated			Parent company	
	Year ended December 31				
	2018	2017	2016	2018	2017
Financial income					
Short-term investments	661	560	336	149	208
Others	888	972	270	133	156
	1,549	**1,532**	**606**	**282**	**364**
Financial expenses					
Loans and borrowings gross interest	(4,301)	(5,418)	(6,152)	(4,953)	(5,606)
Capitalized loans and borrowing costs	704	1,179	2,291	700	1,176
Participative stockholders debentures	(1,871)	(1,982)	(1,456)	(1,871)	(1,982)
Interest on REFIS	(737)	(1,262)	(1,787)	(698)	(1,236)
Others	(2,189)	(3,029)	(2,191)	(851)	(1,855)
	(8,394)	**(10,512)**	**(9,295)**	**(7,673)**	**(9,503)**
Other financial items					
Net foreign exchange gains (losses) on loans and borrowings	(9,721)	(802)	17,734	(9,104)	(678)
Derivative financial instruments	(1,006)	1,460	4,172	(589)	1,285
Other net foreign exchange gains (losses)	1,484	(698)	(6,388)	1,177	(191)
Net indexation losses	(1,970)	(630)	(527)	(1,543)	(638)
	(11,213)	**(670)**	**14,991**	**(10,059)**	**(222)**
Financial results, net	**(18,058)**	**(9,650)**	**6,302**	**(17,450)**	**(9,361)**

a) Hedge in foreign operations

As at January 1, 2017, Vale S.A., which the functional currency is Reais, designated its debts in US$ and Euro, as an instrument in a hedge of its investment in foreign operations (Vale International S.A. and Vale International Holding GmbH; hedging objects) to mitigate part of the foreign exchange risk on financial statements. Further details are disclosed in note 25.

b) Net investment in the foreign operation

From January 1, 2019 (subsequent event), the Company will consider 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 the foreign operation. The foreign exchange differences arising on the monetary item, forming part of the net investment in the foreign operation, will be recognized in other comprehensive income and reclassified from stockholders equity to income statement on disposal or partial disposal of the net investment. Therefore, upon adoption the effect of net foreign exchange gains or losses in the income statement is expected to reduce.

Accounting policy

Transactions in foreign currencies - 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.

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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. Furthermore, the Company restarted the Voisey s Bay underground mine expansion project, which is going to increase the expected useful life of Voisey s Bay mine from 2023 to 2034. The first year of underground production is expected to be 2021, when the current operations on the open pit mine begin to ramp down.

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 other 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.

Thus, from January 1, 2021 onwards, Wheaton and Cobalt 27 will be entitled to receive 42.4% and 32.6%, respectively, of cobalt equivalent to the production from the Voisey s Bay mine, while Vale remains exposed to approximately 40% of the cobalt economic exposure, as Vale retains the rights to 25% of the future cobalt production and will receive 20% additional payments for the cobalt stream. The estimated result of the sale of the mineral rights is not expected to be significant and it will be accounted for once certain production thresholds have been met at Voisey s Bay mine.

Gold streaming

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

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 deferred revenue (liability) related to the services for gold extraction on the portion in which Vale operates as an agent for Wheaton gold extraction.

The Company recognized R$480 in the income statement for the year ended December 31, 2016, related to the sale of mineral rights from the additional transaction in August 2016.

Critical accounting estimates and judgments

Defining the gain on sale of mineral interest and the deferred revenue portion of the gold transaction requires the use of critical accounting estimates as follows:

• Discount rates used to measure the present value of future inflows and outflows;

• Allocation of costs between nickel or copper and gold based on relative prices;

• Expected margin for the independent elements (sale of mineral rights and service for gold extraction) based on Company s best estimate.

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8. Income taxes

a) Deferred income tax assets and liabilities

	Consolidated		Parent company	
	December 31, 2018	**December 31, 2017**	**December 31, 2018**	**December 31, 2017**
Taxes losses carryforward	**18,917**	**14,791**	**10,654**	**6,994**
Temporary differences:				
Employee post retirement obligations	2,610	2,263	822	586
Provision for litigation	1,586	1,510	1,524	1,435
Timing differences arising on assets	4,857	4,195	3,671	3,319
Fair value of financial instruments	2,084	1,816	2,084	1,816
Allocated goodwill	(9,022)	(8,048)		
Goodwill amortization	(1,527)	(948)	(1,527)	(948)
Others	1,326	693	308	998
	1,914	**1,481**	**6,882**	**7,206**
Total	**20,831**	**16,272**	**17,536**	**14,200**
Assets	26,767	21,959	17,536	14,200
Liabilities	(5,936)	(5,687)		
	20,831	**16,272**	**17,536**	**14,200**

Changes in deferred tax are as follows:

		Consolidated		Parent company
	Assets	**Liabilities**	**Deferred taxes, net**	**Deferred taxes, net**
Balance at December 31, 2016	**23,931**	**5,540**	**18,391**	**15,299**
Utilization of taxes losses carryforward	(6,615)		(6,615)	(3,316)
Timing differences arising on assets	335		335	421
Fair value of financial instruments	1,222		1,222	(105)
Allocated goodwill		(369)	369	
Others	2,746		2,746	2,043
Effect in income statement	**(2,312)**	**(369)**	**(1,943)**	**(957)**
Transfers between asset and liabilities	131	131		
Translation adjustment	118	350	(232)	

Other comprehensive income	(233)	35	(268)	224
Effect of discontinued operations				
Effect in income statement	324		324	(366)
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	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**

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.

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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				
	2018	2017	2016	2018	2017
Income before income taxes	**25,118**	**24,885**	**27,022**	**23,627**	**22,328**
Income taxes at statutory rates - 34%	**(8,540)**	**(8,461)**	**(9,187)**	**(8,033)**	**(7,592)**
Adjustments that affect the basis of taxes:					
Income tax benefit from interest on stockholders equity	3,174	2,329	291	3,174	2,329
Tax incentives	2,112	1,175	1,130	1,529	750
Equity results	389	99	378	1,811	1,903
Additions (reversals) of tax loss carryforward (i)	5,814	315	(952)	4,189	(962)
Unrecognized tax losses of the year	(1,711)	(1,389)	(2,465)		
Nondeductible effect of impairment	(92)	(138)	(325)		
Others	(180)	1,463	1,563	(330)	1,457
Income taxes	**966**	**(4,607)**	**(9,567)**	**2,340**	**(2,115)**

(i) In 2018, the Company recognized tax loss carryforward from tax losses of subsidiary abroad.

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, 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 our 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. As December 31, 2018, the balance of R$16,852 (R$1,673 as current and R$15,179 as non-current) is due in 118 remaining monthly installments, bearing interest at the SELIC rate (Special System for Settlement and Custody), while at December 31, 2017, the balance was R$17,780 (R$1,604 as current and R$16,176 as non-current).

As at December 31, 2018, the SELIC rate was 6.50% per annum (7.00% per annum at December 31, 2017).

Accounting policy

The recognition of income taxes as deferred taxes is based on temporary differences between carrying amount and the tax basis of assets and liabilities as well as tax losses carryforwards. The deferred income tax assets and liabilities are offset when there is a legally enforceable right on the same taxable entity.

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

Income taxes are recognized in the income statement, except for items recognized directly in stockholders equity. The provision for income tax is calculated individually for each entity of the Company based on Brazilian tax rates, on an accrual basis, by applying the differential between the nominal local tax rates (based on rules enacted in the location of the entity) and the Brazilian tax rate.

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Critical accounting estimates and judgments

Deferred tax assets arising from tax losses, negative social contribution basis and temporary differences are registered taking into account the analysis of future performance, considering economic and financial projections, prepared based on internal assumptions and macroeconomic environment, trade and tax scenarios that may be subject to changes in the future. The assumptions of future profits are based on production and sales planning, commodity prices, operational costs and planned capital costs.

9. Basic and diluted earnings per share

The basic and diluted earnings per share are presented below:

	Year ended December 31		
	2018	**2017**	**2016**
Net income (loss) attributable to Vale s stockholders:			
Net income from continuing operations	25,967	20,213	17,461
Loss from discontinued operations	(310)	(2,586)	(4,150)
Net income	**25,657**	**17,627**	**13,311**
Thousands of shares			
Weighted average number of shares outstanding - common shares	5,182,445	5,197,432	5,197,432
Basic and diluted earnings per share from continuing operations:			
Common share (R$)	5.01	3.89	3.36
Basic and diluted loss per share from discontinued operations:			
Common share (R$)	(0.06)	(0.50)	(0.80)
Basic and diluted earnings per share:			
Common share (R$)	4.95	3.39	2.56

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

10. Accounts receivable

	Consolidated		Parent company	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Accounts receivable	10,502	8,802	17,398	9,627
Expected credit loss	(241)	(200)	(65)	(67)
	10,261	**8,602**	**17,333**	**9,560**
Revenue related to the steel sector - %	**85.50%**	**82.90%**		

	Consolidated			Parent company	
	Year ended December 31				
	2018	2017	2016	2018	2017
Impairment of accounts receivable recorded in the income statement	(26)	(14)	(16)	(5)	4

There is no customer that individually represents over 10% of 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 consists of financial assets initially recognized at fair value and subsequently measured at amortized cost, except for component of provisionally priced commodities sales that are subsequently measured at fair value through profit or loss (FVTPL).

The portion of accounts receivables measured at amortized cost is subsequently measured using the effective interest (EIR) method and it is subject to impairment. The Company has established a provision matrix that is based on its historical credit loss experience, adjusted for forward-looking factors specific to the economic environment and by any financial guarantees related to these accounts receivables.

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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.

11. Inventories

	Consolidated		Parent company	
	December 31, 2018	**December 31, 2017**	**December 31, 2018**	**December 31, 2017**
Finished products	10,847	7,324	3,169	2,796
Work in progress	2,664	2,162	183	273
Consumable inventory	3,705	3,501	1,423	1,532
Total	**17,216**	**12,987**	**4,775**	**4,601**

	Consolidated			Parent company	
	Year ended December 31				
	2018	**2017**	**2016**	**2018**	**2017**
Reversal (provision) for net realizable value	14	(284)	(649)	77	(170)

Finished and work in progress product inventory by segments is presented in note 4(c).

Accounting policy

Inventories are stated at the lower of cost and the net realizable value. The inventory production cost is determined on the basis of variable and fixed costs, direct and indirect costs of production, using the average cost method. At each statement of financial position date, inventories are assessed for impairment and a provision for losses on obsolete or slow-moving inventory may be recognized. The write-downs and reversals are included in 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, 2018	**December 31, 2017**	**December 31, 2018**	**December 31, 2017**
Value-added tax	3,151	2,934	1,425	1,561
Brazilian federal contributions	3,134	2,909	2,839	2,517
Others	50	142	41	75
Total	**6,335**	**5,985**	**4,305**	**4,153**
Current	3,422	3,876	2,024	2,091
Non-current	2,913	2,109	2,281	2,062
Total	**6,335**	**5,985**	**4,305**	**4,153**

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13. Other financial assets and liabilities

	Consolidated			
	Current		Non-Current	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Other financial assets				
Financial investments	125	61		
Loans			589	498
Derivative financial instruments (note 25)	149	351	1,520	1,497
Investments in equity securities (note 14)			3,823	
Related parties - Loans (note 31)	1,409	6,277	6,248	8,695
	1,683	**6,689**	**12,180**	**10,690**
Other financial liabilities				
Derivative financial instruments (note 25)	1,821	344	1,335	2,269
Related parties (note 31)	4,392	2,916	3,722	3,226
Participative stockholders debentures			5,454	4,080
	6,213	**3,260**	**10,511**	**9,575**

	Parent company			
	Current		Non-Current	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Other financial assets				
Financial investments	4	4		
Loans			18	18
Derivative financial instruments (note 25)	116	199	1,471	1,268
Investments in equity securities			3,334	
Related parties	240	206	453	579
	360	**409**	**5,276**	**1,865**
Other financial liabilities				
Derivative financial instruments (note 25)	1,506	311	1,245	2,113
Related parties	3,577	4,102	65,041	48,762
Participative stockholders debentures			5,454	4,080
	5,083	**4,413**	**71,740**	**54,955**

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. The Company paid as remuneration the amount of R$529 and R$467, respectively, for the year ended December 31, 2018 and 2017.

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14. Non-current assets and liabilities held for sale and discontinued operations

	Consolidated December 31, 2017 Fertilizers
Assets	
Accounts receivable	297
Inventories	1,522
Other current assets	363
Investments in associates and joint ventures	274
Property, plant and equipment and Intangible	7,110
Other non-current assets	2,299
Total assets	**11,865**
Liabilities	
Suppliers and contractors	1,070
Other current liabilities	711
Other non-current liabilities	2,118
Total liabilities	**3,899**
Net non-current assets held for sale	**7,966**

a) 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 Compañia 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 were accounted for as a financial investment measured at fair value through other comprehensive income. The Company recognized a gain of R$392 (R$275, net of tax) for the year ended December 31, 2018, in other comprehensive income as Fair value adjustment to investment in equity securities .

b) Cubatão (part of the fertilizer segment)

In November 2017, the Company entered into an agreement with Yara International ASA to sell its assets located in Cubatão, Brazil. In May 2018, the transaction was concluded and the Company 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	2016
Discontinued operations			
Net operating revenue	397	5,572	6,470
Cost of goods sold and services rendered	(393)	(5,124)	(6,495)
Operating expenses	(15)	(450)	(448)
Impairment of non-current assets	(415)	(2,833)	(5,899)
Operating loss	**(426)**	**(2,835)**	**(6,372)**
Financial Results, net	(18)	(89)	69
Equity results in associates and joint ventures		(8)	10
Loss before income taxes	**(444)**	**(2,932)**	**(6,293)**
Income taxes	134	324	2,134
Loss from discontinued operations	**(310)**	**(2,608)**	**(4,159)**
Loss attributable to noncontrolling interests		(22)	(9)
Loss attributable to Vale s stockholders	**(310)**	**(2,586)**	**(4,150)**

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Statement of cash flow

	Consolidated Year ended December 31		
	2018	**2017**	**2016**
Discontinued operations			
Cash flow from operating activities			
Loss before income taxes	(444)	(2,932)	(6,293)
Adjustments:			
Equity results in associates and joint ventures		8	(10)
Depreciation, amortization and depletion		4	1,197
Impairment of non-current assets	415	2,833	5,899
Others	18		(69)
Increase (decrease) in assets and liabilities	(110)	356	(226)
Net cash provided by (used in) operating activities	**(121)**	**269**	**498**
Cash flow from investing activities			
Additions to property, plant and equipment	(36)	(978)	(995)
Others		(1)	29
Net cash used in investing activities	**(36)**	**(979)**	**(966)**
Cash flow from financing activities			
Loans and borrowings			
Repayments		(107)	(59)
Net cash used in financing activities		**(107)**	**(59)**
Net cash used in discontinued operations	**(157)**	**(817)**	**(527)**

Accounting policy

A non-current asset is classified as held for sale if its carrying amount will be recovered principally through a sale transaction rather than through continuing use.

The criteria for recognition of the non-current assets as held for sale are only considered satisfied when the sale is highly probable and the asset (or group of assets) is available for immediate sale in its present condition.

The Company measures the assets held for sale (or group of assets) at the lower of its carrying amount and fair value less costs to sell. If the carrying amount exceeds the fair value less costs to sell an impairment loss is recognized against income statement. Any subsequent reversal of impairment is recognized only to the extent of the loss previously recognized.

The assets and liabilities classified as held for sale are presented separately in the statement of financial position.

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.

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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%
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	62.5%	98.3%	37.5%
Salobo Metais S.A.	Brazil	Copper	100.0%	100.0%	0.0%
PT Vale Indonesia	Indonesia	Nickel	59.2%	59.2%	40.8%
Vale International Holdings GmbH	Austria	Holding and research	100.0%	100.0%	0.0%
Vale Canada Limited	Canada	Nickel	100.0%	100.0%	0.0%
Vale International S.A.	Switzerland	Trading and holding	100.0%	100.0%	0.0%
Vale Malaysia Minerals Sdn. Bhd.	Malaysia	Iron ore	100.0%	100.0%	0.0%
Vale Manganês S.A.	Brazil	Manganese and ferroalloys	100.0%	100.0%	0.0%
Vale Moçambique S.A.	Mozambique	Coal	80.7%	80.7%	19.3%
Vale Nouvelle Caledonie S.A.S.	New Caledonia	Nickel	95.0%	95.0%	5.0%
Vale 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%

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					
Compañia 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.

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16. Investments

The significant non-consolidated entities of the Company are as follows:

	Location	Main activity/Business	% Ownership	% Voting capital	% Noncontrolling interest
Joint ventures					
Aliança Geração de Energia S.A.	Brazil	Energy	55.0%	55.0%	45.0%
Companhia Coreano-Brasileira de Pelotização	Brazil	Pelletizing	50.0%	50.0%	50.0%
Companhia Hispano-Brasileira de Pelotização	Brazil	Pelletizing	50.9%	51.0%	49.1%
Companhia Ítalo-Brasileira de Pelotização	Brazil	Pelletizing	50.9%	51.0%	49.1%
Companhia Nipo-Brasileira de Pelotização	Brazil	Pelletizing	51.0%	51.1%	49.0%
Companhia Siderúrgica do Pecém (CSP)	Brazil	Steel	50.0%	50.0%	50.0%
MRS Logística S.A.	Brazil	Logistics	48.2%	46.8%	51.8%
Nacala Corridor Holding Netherlands B.V.	Netherlands	Coal	50.0%	50.0%	50.0%
Samarco Mineração S.A.	Brazil	Pelletizing	50.0%	50.0%	50.0%
Direct and indirect associates					
Henan Longyu Energy Resources Co., Ltd.	China	Coal	25.0%	25.0%	75.0%
VLI S.A.	Brazil	Logistics	37.6%	37.6%	62.4%

a) Changes during the year

Changes in investments in associates and joint ventures as follows:

	Consolidated					
	2018			2017		
	Associates	Joint ventures	Total	Associates	Joint ventures	Total
Balance at January 1st,	**4,774**	**7,028**	**11,802**	**4,683**	**7,363**	**12,046**
Additions (i)		79	79	1	291	292
Translation adjustment	147	119	266	66	(14)	52
Equity results in income statement	169	976	1,145	184	118	302
Equity results in statement of comprehensive income					(466)	(466)

Dividends declared	(2)	(1,055)	(1,057)	(181)	(725)	(906)
Transfer from non-current assets held for sale (ii)	280		280			
Others	35	(55)	(20)	21	461	482
Balance at December 31,	**5,403**	**7,092**	**12,495**	**4,774**	**7,028**	**11,802**

(i) Refers to the Coal segment and others in the amounts of R$35 and R$44, respectively, on December 31, 2018 and R$237 and R$55, respectively, on December 31, 2017.

(ii) Refers to 18% interest held by Vale Fertilizantes at Ultrafertil which was transferred to Vale as part of the settlement in January 2018 (note 14).

The investments by segments are presented in note 4(c).

b) Acquisitions and divestitures

2018

Ferrous Resources Limited In December 2018, the Company entered into an agreement to purchase the control of Ferrous Resources Limited, a company that currently owns and operates iron ore mines closely located to Company s operations in Minas Gerais, Brazil. The purchase price is R$2,131 (US$550 million) and the conclusion of transaction is expected to occur in 2019, subject to conditions precedent.

New Steel - In January 2019 (subsequent event), the Company acquired for the total consideration of R$1,937 (US$500 million) the control of New Steel Global NV, a company that develops innovative iron ore beneficiation technologies and currently owns patents of dry processing concentration in 56 countries.

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2017

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).

After the completion of the transaction, the Company (i) holds 81% of Vale Moçambique and retains the control of the Moatize Coal Project and (ii) shares control of the Nacala Logistic Corridor structure (Nacala BV), with Mitsui.

As a consequence of sharing control of Nacala BV, the Company:

(i) derecognized the assets and liabilities classified as held for sale in the total amount of R$13,130 (US$4,144 million), from which R$12,874 (US$4,063 million) refers to property, plant and equipment and intangibles;

(ii) derecognized R$44 (US$14 million) related to cash and cash equivalents;

(iii) 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;

(iv) reclassified the gain related to the cumulative translation adjustments on to income statements in the amount of R$35 (US$11 million);

The result of the transaction regarding the assets from Nacala s logistic corridor was recognized in the income statement as Impairment and disposal of non-current assets .

The results of the transaction with the coal holding entity was recognized in Results from operation with noncontrolling interest in the amount of R$329 (US$105 million), directly in Stockholders Equity.

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.

2016

Thyssenkrupp Companhia Siderúrgica do Atlântico Ltd (CSA) In April 2016, the Company sold 100% of its interest at CSA (26.87%) for a non-significant amount. The transaction resulted in a loss of R$266 due to recycling the Cumulative translation adjustments recognized in the income statement as Equity results and other results in associates and joint ventures .

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Investments (continued)

			Investments		Equity results in the income statement			Dividends received (i)		
					Year ended December 31			Year ended December 31		
	% ownership	% voting capital	December 31, 2018	December 31, 2017	2018	2017	2016	2018	2017	2016
Subsidiaries										
Aços Laminados do Pará S.A.	100.00	100.00	91	97	(6)	(247)				
Biopalma da Amazônia S.A.	98.96	98.96	761	994	(562)	(173)	59			
Companhia Portuária da Baía de Sepetiba	100.00	100.00	276	267	161	142	318	143	318	455
Mineração Corumbaense Reunida S.A.	100.00	100.00			(73)	(682)	(117)			
Minerações Brasileiras Reunidas S.A.	58.93	98.32	5,760	5,417	752	731	716	866	542	1,329
Minerações Brasileiras Reunidas S.A. - Goodwill			4,060	4,060						
Salobo Metais S.A.	100.00	100.00	10,716	9,535	2,384	1,564	598	1,094	417	258
Tecnored Desenvolvimento Tecnológico S.A.	100.00	100.00	76	45	(60)	(24)	(38)			
Vale International Holdings GmbH	100.00	100.00	7,372	7,830	(1,808)	(609)	(2,694)			
Vale Canada Limited (ii)	100.00	100.00	20,260	17,125	(569)	(2,988)	(4,889)			
Vale International S.A.	100.00	100.00	65,927	41,389	4,054	7,649	12,709			
Vale Malaysia Minerals Sdn. Bhd.	100.00	100.00	5,210	4,243	226	273	394			
Vale Manganês S.A.	100.00	100.00	711	679	32	84	(81)			
Vale Shipping Holding Pte. Ltd.	100.00	100.00	1,476	9,334	301	29	32			
Valepar - Goodwill			3,073	3,073						
Others			1,246	1,497	(637)	(472)	(504)	7	791	71
			127,015	**105,585**	**4,195**	**5,277**	**6,503**	**2,110**	**2,068**	**2,113**
Joint Ventures										
Aliança Geração de Energia S.A.	55.00	55.00	1,882	1,889	81	86	157	88	93	137

Aliança Norte Energia Participações S.A.	51.00	51.00	628	529	54	(7)	(21)			
California Steel Industries, Inc.	50.00	50.00	958	663	289	135	107	114	88	13
Companhia Coreano-Brasileira de Pelotização	50.00	50.00	404	295	253	161	61	121	62	90
Companhia Hispano-Brasileira de Pelotização	50.89	51.00	323	270	200	132	50	86	53	95
Companhia Ítalo-Brasileira de Pelotização	50.90	51.00	312	263	219	128	56	122	54	33
Companhia Nipo-Brasileira de Pelotização	51.00	51.11	575	453	460	295	101	255	96	141
Companhia Siderúrgica do Pecém	50.00	50.00		867	(867)	(849)	135			
MRS Logística S.A.	48.16	46.75	1,922	1,711	264	219	201	106	95	34
Others			88	90	23	(183)	27	2		1
			7,092	**7,030**	**976**	**117**	**874**	**894**	**541**	**544**
Associates										
Henan Longyu Energy Resources Co., Ltd.	25.00	25.00	1,228	1,048	58	63	(18)			
Mineração Rio Grande do Norte S.A.	40.00	40.00	360	333	6	43	172		136	111
VLI S.A.	37.60	37.60	3,319	3,202	119	94	120	28	62	
Zhuhai YPM Pellet Co.	25.00	25.00	87	76	2					
Others			409	113	(16)	(15)	(37)			14
			5,403	**4,772**	**169**	**185**	**237**	**28**	**198**	**125**
Total of joint ventures and associates			**12,495**	**11,802**	**1,145**	**302**	**1,111**	**922**	**739**	**669**
Total			**139,510**	**117,387**	**5,340**	**5,579**	**7,614**	**3,032**	**2,807**	**2,782**

(i) Dividends received by the Parent Company during the year ended at December 31, 2018 and 2017 were R$2.836 and R$2,644, respectively.

(ii) Includes foreign subsidiaries of the base metals segment.

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c) Summarized financial information

The summarized financial information about relevant associates and joint-ventures for the Company are as follows:

	December 31, 2018					
		Joint ventures			Associates	
	Aliança Geração de Energia	CSP	Pelletizing (i)	MRS Logística	Henan Longyu	VLI S.A.
Current assets	720	2,684	3,736	1,017	4,278	2,632
Non-current assets	3,635	11,875	1,147	7,074	1,520	15,257
Total assets	**4,355**	**14,559**	**4,883**	**8,091**	**5,798**	**17,889**
Current liabilities	321	3,764	1,693	1,392	787	2,109
Non-current liabilities	612	10,795	6	2,709	101	6,954
Total liabilities	**933**	**14,559**	**1,699**	**4,101**	**888**	**9,063**
Stockholders equity	**3,422**		**3,184**	**3,990**	**4,910**	**8,826**
Net income (loss)	**148**	**(1,734)**	**2,229**	**549**	**233**	**317**

	December 31, 2017					
		Joint ventures			Associates	
	Aliança Geração de Energia	CSP	Pelletizing (i)	MRS Logística	Henan Longyu	VLI S.A.
Current assets	453	2,511	2,507	1,021	3,545	2,442
Non-current assets	3,972	12,281	1,024	6,813	1,396	13,795
Total assets	**4,425**	**14,792**	**3,531**	**7,834**	**4,941**	**16,237**
Current liabilities	285	3,509	994	1,498	749	1,769
Non-current liabilities	705	3,549	16	2,784		5,952
Total liabilities	**990**	**13,058**	**1,010**	**4,282**	**749**	**7,721**
Stockholders equity	**3,435**	**1,734**	**2,521**	**3,552**	**4,192**	**8,516**
Net income (loss)	**157**	**(1,698)**	**1,410**	**454**	**252**	**251**

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

The stand-alone financial statements of those entities may differ from the financial information reported herein, which is prepared considering Vale s accounting policies including eventual goodwill, provisional price adjustment and others.

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.

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Critical accounting estimates and judgments

Judgment is required in some circumstances to determine whether after considering all relevant factors, the Company has either control, joint control or significant influence over an entity. Significant influence includes situations of collective control.

The Company holds the majority of the voting capital in five joint arrangements (Aliança Geração de Energia S.A., Aliança Norte Energia Participações S.A., Companhia Hispano-Brasileira de Pelotização, Companhia Ítalo-Brasileira de Pelotização and Companhia Nipo-Brasileira de Pelotização), but management has concluded that the Company does not have a sufficiently dominant voting interest to have the power to direct the activities of 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 follows:

	December 31, 2018					
	MBR	**PTVI**	**VNC**	**Vale Moçambique S.A.**	**Others (i)**	**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	**587**				**48**	**635**

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

	December 31, 2017						
	MBR	**PTVI**	**VNC**	**Vale Moçambique S.A.**	**Compañia Mineradora Miski Mayo S.A.C. (i)**	**Others (ii)**	**Total**
Current assets	1,349	1,305	827	1,261	225		
Non-current assets	10,061	5,247	6,767	5,467	1,481		
Related parties Stockholders	1,954	486	382	837	19		
Total assets	**13,364**	**7,038**	**7,976**	**7,565**	**1,725**		
Current liabilities	561	423	469	419	117		
Non-current liabilities	953	784	728	107	319		
Related parties - Stockholders	747	10	4,363	27,231	32		
Total liabilities	**2,261**	**1,217**	**5,560**	**27,757**	**468**		
Stockholders equity	11,103	5,821	2,416	(20,192)	1,257		
Equity attributable to noncontrolling interests	**4,441**	**2,431**	**121**	**(3,641)**	**754**	**242**	**4,348**
Net income (loss)	1,385	(49)	(1,827)	(2,110)	(37)		
Net income (loss) attributable to noncontrolling interests	**554**	**(20)**	**(91)**	**(332)**	**(22)**	**(46)**	**43**
Dividends paid to noncontrolling interests	**361**					**43**	**404**

(i) Discontinued operations

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

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	December 31, 2016						
	MBR	**PTVI**	**VNC**	**Vale Moçambique S.A.**	**Compañia Mineradora Miski Mayo S.A.C. (i)**	**Others (ii)**	**Total**
Net income (loss)	1,393	6	(2,627)	(1,928)	16		
Net income (loss) attributable to noncontrolling interests	**572**	**3**	**(131)**	**(96)**	**9**	**(372)**	**(15)**
Dividends paid to noncontrolling interests	**886**				**38**	**48**	**972**

(i) Discontinued operation

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

The stand-alone financial statements of those entities may differ from the financial information reported herein, which is prepared considering Vale s accounting policies including eventual goodwill, provisional price adjustment and others.

18. Intangibles

Changes in intangibles are as follows:

			Consolidated		
	Goodwill	**Concessions**	**Right of use**	**Software**	**Total**
Balance at December 31, 2016	**10,041**	**10,759**	**480**	**1,115**	**22,395**
Additions		3,140		81	3,221
Disposals		(30)			(30)
Amortization		(671)	(7)	(456)	(1,134)
Translation adjustment	479	38	33	19	569
Merger of Valepar (note 30)	3,073				3,073
Balance at December 31, 2017	**13,593**	**13,236**	**506**	**759**	**28,094**
Cost	13,593	16,787	798	5,141	36,319

Accumulated amortization		(3,551)	(292)	(4,382)	(8,225)
Balance at December 31, 2017	**13,593**	**13,236**	**506**	**759**	**28,094**
Additions		3,046		22	3,068
Disposals		(99)		(8)	(107)
Amortization		(494)	(6)	(356)	(856)
Translation adjustment	562	48	30	11	651
Balance at December 31, 2018	**14,155**	**15,737**	**530**	**428**	**30,850**
Cost	14,155	19,539	778	3,574	38,046
Accumulated amortization		(3,802)	(248)	(3,146)	(7,196)
Balance at December 31, 2018	**14,155**	**15,737**	**530**	**428**	**30,850**

	Parent company			
	Concessions	**Right of use**	**Software**	**Total**
Balance at December 31, 2016	**10,278**	**118**	**918**	**11,314**
Additions	2,778		69	2,847
Disposals	(22)			(22)
Amortization	(261)	(7)	(400)	(668)
Balance at December 31, 2017	**12,773**	**111**	**587**	**13,471**
Cost	16,245	223	4,110	20,578
Accumulated amortization	(3,472)	(112)	(3,523)	(7,107)
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**

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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.

c) Right of use - 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.

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
Concessions	3 to 50 years
Right of use	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	Others	Constructions in progress	Total
Balance at December 31, 2016	**2,360**	**34,790**	**30,866**	**22,141**	**27,312**	**24,494**	**38,653**	**180,616**
Additions (i)							10,867	10,867
Disposals	(2)	(37)	(181)	(214)	(490)	(684)	(503)	(2,111)
Assets retirement obligation					1,382			1,382
Depreciation, amortization and depletion		(1,871)	(2,351)	(2,596)	(1,971)	(2,407)		(11,196)
Impairment (note 20)	(65)			(110)	(429)		(279)	(883)
Translation adjustment	293	326	454	63	1,237	572	(85)	2,860
Transfers	(211)	6,820	10,198	3,519	2,958	5,129	(28,413)	
Balance at December 31, 2017	**2,375**	**40,028**	**38,986**	**22,803**	**29,999**	**27,104**	**20,240**	**181,535**
Cost	2,375	63,392	60,509	42,490	57,794	41,223	20,240	288,023
Accumulated depreciation		(23,364)	(21,523)	(19,687)	(27,795)	(14,119)		(106,488)
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**

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	Parent company							
	Land	**Building**	**Facilities**	**Equipment**	**Mineral properties**	**Others**	**Constructions in progress**	**Total**
Balance at December 31, 2016	**1,684**	**20,945**	**20,416**	**8,479**	**4,122**	**16,499**	**29,911**	**102,056**
Additions (i)							6,195	6,195
Disposals	(1)		(70)	(66)		(96)	(366)	(599)
Assets retirement obligation					269			269
Depreciation, amortization and depletion		(755)	(1,092)	(1,098)	(267)	(1,731)		(4,943)
Transfers	56	5,125	7,950	2,401	1,243	3,533	(20,308)	
Balance at December 31, 2017	**1,739**	**25,315**	**27,204**	**9,716**	**5,367**	**18,205**	**15,432**	**102,978**
Cost	1,739	30,456	34,144	16,482	7,088	27,735	15,432	133,076
Accumulated depreciation		(5,141)	(6,940)	(6,766)	(1,721)	(9,530)		(30,098)
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**

(i) Includes capitalized borrowing costs.

Disposals of assets

The Company recognized a loss of R$1,283 and R$1,144 in the income statement as Impairment and disposal of non-current assets for the year ended December 31, 2018 and 2017, respectively, due to non-viable projects and operating assets written off through sale or obsolescence.

Additionally, in the year ended December 31, 2017, the Company concluded the sale of four VLOC s and two Floating Transfer Stations in the amount of R$1,259. The Company recognized a loss of R$436 in the income statement as Impairment and disposal of non-current assets .

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	15 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

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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 other researches - 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 costs 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.

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.

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20. Impairment and onerous contracts

The impairment losses (reversals) recognized in the year are presented below:

		Income statement Impairment (reversals)		
Segments by class of assets	**Assets or cash-generating unit**	**2018**	**2017**	**2016**
Property, plant and equipment and intangible				
Iron ore	North system			(536)
Coal	Australia			91
Base metals nickel	Stobie (VCL)		428	
Base metals nickel	Newfoundland (VNL)			2,112
Base metals nickel	Nouvelle Caledonie (VNC)			952
Several segments	Other assets	713	455	460
Impairment of non-current assets		**713**	**883**	**3,079**
Onerous contracts		1,527		861
Impairment of non-current assets and onerous contracts		**2,240**	**883**	**3,940**

a) Impairment of non-financial assets

The Company has carried out an impairment test for the assets for which triggering event was identified. The recoverable amount is assessed by reference to the higher of value in use (VIU) and fair value less costs of disposal (FVLCD).

The recoverable amount of each Cash Generating Unit (CGU) under the impairment testing was assessed using FVLCD model, 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 ranging from 6% to 10%, 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 operates.

Iron ore and pellets - During 2018, the Company did not identify any changes in the circumstances or indicators that would require reassessment of the carrying amount of the iron ore and pellets CGUs. Of the total goodwill (note 18), R$7,133 is allocated to the group of ferrous mineral CGUs. The impairment analysis based on FVLCD model demonstrates that there was no impairment loss in relation to the individual CGUs or goodwill.

In 2016, based on the market circumstances, the Company decided to resume Nortés system pelletizing plant, based on the studies carried out by management that demonstrated its economic feasibility. Accordingly, the Company reversed the full impairments of R$536 recorded in 2013 and 2015.

Coal - Based on the 2018 impairment triggering assessment, the Company has identified trigger of impairment in the Mozambique CGU driven by the lower than planned production volumes during the year. The Company carried out an impairment test based on FVLCD model and concluded that there were no changes in the impairment recognized in 2015.

In 2016, the mining plans for the coal assets in Australia were revised and an impairment loss of R$91 was recognized in the income statement.

Nickel (Onça Puma) - In September 2017, the Federal Court granted an injunction suspending the nickel mining operations at Onça Puma (base metals segment). The Company has appealed this decision to seek a suspension of this injunction, but it is not possible to anticipate when Onça Puma activities will resume. On the assumption that the Company will be able to operate this asset in the future, the Company carried out an impairment test based on FVLCD model assuming different returning of operations scenarios and concluded that no impairment loss should be booked.

Nickel (Others) - In addition, the Company did not identify any changes in the circumstances or indicators during 2018 that would require reassessment of the carrying amount of the other Nickel CGUs. Of the total goodwill (note 18), R$7,022 is allocated to the group of nickel CGUs. The impairment analysis based on FVLCD model demonstrates that there was no impairment loss in relation to the individual CGUs or goodwill.

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In 2017, an underground mine in Sudbury (Stobie) 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.

In 2016, the decrease in long term nickel price projections, that significantly reduced the recoverable amounts of the VNL and VNC CGUs, associated with significant capital investments in new processing facilities in recent years, resulted in impairment losses of R$2,112 and R$952, respectively.

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. The Company carried out an impairment test based on FVLCD model and an impairment loss of R$713 was recognized in the income statement.

b) Onerous contract

In 2018, the Company recognized a provision of R$1,527 (2016: R$861) for the costs in respect of certain long-term contracts in the Midwest system for fluvial transportation and port structure, with minimum guaranteed volume.

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

The Company determines its cash flows based on the budgets approved by management, which require the use of the following assumptions: (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 subject to risk and uncertainty. Hence, there is a possibility that changes in circumstances will change these projections, which may affect the recoverable amount of the assets.

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21. Loans, borrowings and cash and cash equivalents

a) 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.

b) Loans and borrowings

As at December 31, 2018 and 2017, loans and borrowings are secured by property, plant and equipment and receivables in the amount of R$857 and R$910, 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, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Principal in:				
US$	993	2,148	39,909	53,125
EUR			4,217	3,771
R$	1,907	1,703	11,392	11,142
Other currencies	96	57	492	682
Accrued charges	**893**	**1,725**	**29**	**39**
Total	**3,889**	**5,633**	**56,039**	**68,759**

	Parent company			
	Current liabilities		Non-current liabilities	
	December 31, 2018	December 31, 2017	December 31, 2018	December 31, 2017
Principal in:				
US$	557	1,829	9,004	15,713
EUR			3,329	2,977
R$	1,581	1,404	10,749	10,276
Accrued charges	**385**	**1,145**		
Total	**2,523**	**4,378**	**23,082**	**28,966**

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

	Consolidated		Parent company
	Principal	Estimated future interest payments (i)	Principal
2019	2,996	3,219	2,137
2020	4,079	3,095	3,407
2021	4,778	2,835	3,040
2022	7,252	2,565	2,720
Between 2023 and 2027	19,796	8,262	11,043
2028 onwards	20,105	14,701	2,873
Total	**59,006**	**34,677**	**25,220**

(i) Based on interest rate curves and foreign exchange rates applicable as at December 31, 2018 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.

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

	Consolidated Loans and borrowings
December 31, 2017	**74,392**
Additions	4,584
Repayments (i)	(28,149)
Interest paid	(4,023)
Cash flow from financing activities	**(27,588)**
Effect of exchange rate	8,982
Interest accretion	4,142
Non-cash changes	13,124
December 31, 2018	**59,928**

(i) In 2018, the Company conducted a cash tender offer for Vale Overseas 5.875% guaranteed notes due 2021, 6.875% guaranteed notes due 2036, 4.375% guaranteed notes due 2022 and a cash tender offer for Vale S.A. 5.625% guaranteed notes due 2042 and repurchased a total of R$14,453 (US$3,730 million). The Company also redeemed all of Vale Overseas 4.625% guaranteed notes due 2020 totaling R$1,698 (US$499 million).

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 17%. Borrowing costs that are not capitalized are recognized in the income statement in the period in which they are incurred.

Liquidity risk - 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 2020 and 2022, in the available amount of R$19,374 (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, 2018, these lines are undrawn.

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 (LAJIDA - Earnings before Interest Taxes, Depreciation and Amortization) and interest coverage. The Company has not identified any instances of noncompliance as at December 31, 2018 and 2017.

22. Liabilities related to associates and joint ventures

In March 2016 Samarco and its shareholders, Vale S.A. and BHP Billiton Brasil Ltda. (BHPB), entered into an Agreement (Framework Agreement) with the Brazilian federal government, the two Brazilian states (Espírito Santo and Minas Gerais) and other governmental authorities, in connection with the lawsuit related to the Samarco dam failure (note 28d), in order to implement the programs for remediation and compensation of the areas and communities affected.

The Framework Agreement has a 15-year term, renewable for successive one-year periods until all the obligations under the Framework Agreement have been satisfied.

Under the Framework Agreement, Samarco, Vale S.A. and BHPB have established a foundation (Fundação Renova or Foundation) to develop and implement social and economic remediation and compensation, to be funded by Samarco. To the extent that Samarco does not meet its funding obligations to the foundation, each of Vale S.A. and BHPB will provide, under the terms of the Framework Agreement, funds to the Foundation in proportion to its 50% equity interest in Samarco.

As a consequence of the dam failure, governmental authorities ordered the suspension of Samarco s operations.

Due to the uncertainties regarding Samarco s future cash flow, Vale S.A. maintains a provision for the obligation to comply with the reparation and compensation programs under the Framework Agreement (pro rata to its proportional equity interest in Samarco).

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The changes in the provisions are as follows:

	2018	2017
Balance at January 01,	**3,296**	**3,511**
Payments	(1,065)	(941)
Present value valuation	592	598
Provision increase	1,523	128
Balance at December 31,	**4,346**	**3,296**
Current liabilities	1,120	1,080
Non-current liabilities	3,226	2,216
Liabilities	**4,346**	**3,296**

In 2018, the Fundação Renova reviewed the estimates for the expenditures required to mitigate and compensate for the impacts of the disruption from Samarco s tailing dam. As a result of this revision, Vale S.A. recognized in 2018 an additional provision of R$1,523, which amounts to the present value of Vale s new estimated secondary responsibility to support the Renova Foundation works and is equivalent to 50% of Samarco s additional obligations over the next 12 years.

In addition to the provision above, Vale S.A. made available in the year ended December 31, 2018 and 2017 the amount of R$315 and R$452, respectively, which was fully used to fund Samarco s working capital and was recognized in Vale´s income statement as an expense in Equity results and other results in associates and joint ventures . Vale S.A. intends to make available until June 30, 2019 short-term facilities up to R$341 to support Samarco s cash necessity, without any binding obligation to Samarco in this regard. Such support will be released simultaneously with BHPB, and pursuant to the same amounts, terms and conditions, subject to the fulfillment of certain milestones.

The summarized financial information of Samarco are as follows:

	December 31, 2018	December 31, 2017
Current assets	210	220
Non-current assets	13,342	19,901
Total assets	**13,552**	**20,121**
Current liabilities	23,517	18,132
Non-current liabilities	15,242	11,996

Total liabilities	**38,759**	**30,128**
Negative reserves	**(25,207)**	**(10,007)**
Loss	**(4,869)**	**(3,062)**

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

Critical accounting estimates and judgments

The provision 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 in the discount rate; and (iv) resolution of existing and potential legal claims. 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, Vale S.A. will reassess the key assumptions used by Samarco in the preparation of the projected cash flows and will adjust the provision, if required.

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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:

	Consolidated						
	December 31, 2018				December 31, 2017		
Financial assets	**Amortized cost**	**At fair value through OCI**	**At fair value through profit or loss**	**Total**	**Loans and receivables or amortized cost**	**At fair value through profit or loss**	**Total**
Current							
Cash and cash equivalents	22,413			22,413	14,318		14,318
Financial investments			125	125	61		61
Derivative financial instruments			149	149		351	351
Accounts receivable	10,679		(418)	10,261	8,039	563	8,602
Related parties	1,409			1,409	6,277		6,277
	34,501		**(144)**	**34,357**	**28,695**	**914**	**29,609**
Non-current							
Derivative financial instruments			1,520	1,520		1,497	1,497
Investments in equity securities		3,823		3,823			
Loans	589			589	498		498
Related parties	6,248			6,248	8,695		8,695
	6,837	**3,823**	**1,520**	**12,180**	**9,193**	**1,497**	**10,690**
Total of financial assets	**41,338**	**3,823**	**1,376**	**46,537**	**37,888**	**2,411**	**40,299**
Financial liabilities							
Current							
Suppliers and contractors	13,610			13,610	13,367		13,367
Derivative financial instruments			1,821	1,821		344	344
Loans and borrowings	3,889			3,889	5,633		5,633
Related parties	4,392			4,392	2,916		2,916
	21,891		**1,821**	**23,712**	**21,916**	**344**	**22,260**
Non-current							
Derivative financial instruments			1,335	1,335		2,269	2,269

Loans and borrowings	56,039			56,039	68,759		68,759
Related parties	3,722			3,722	3,226		3,226
Participative stockholders debentures			5,454	5,454		4,080	4,080
	59,761		**6,789**	**66,550**	**71,985**	**6,349**	**78,334**
Total of financial liabilities	**81,652**		**8,610**	**90,262**	**93,901**	**6,693**	**100,594**

				Parent company			
	December 31, 2018				**December 31, 2017**		
Financial assets	**Amortized cost**	**At fair value through OCI**	**At fair value through profit or loss**	**Total**	**Loans and receivables or amortized cost**	**At fair value through profit or loss**	**Total**
Current							
Cash and cash equivalents	4,835			4,835	1,876		1,876
Financial investments			4	4	4		4
Derivative financial instruments			116	116		199	199
Accounts receivable	17,344		(11)	17,333	9,571	(11)	9,560
Related parties	240			240	206		206
	22,419		**109**	**22,528**	**11,657**	**188**	**11,845**
Non-current							
Derivative financial instruments			1,471	1,471		1,268	1,268
Investments in equity securities		3,334		3,334			
Loans	18			18	18		18
Related parties	453			453	579		579
	471	**3,334**	**1,471**	**5,276**	**597**	**1,268**	**1,865**
Total of financial assets	**22,890**	**3,334**	**1,580**	**27,804**	**12,254**	**1,456**	**13,710**
Financial liabilities							
Current							
Suppliers and contractors	7,342			7,342	7,503		7,503
Derivative financial instruments			1,506	1,506		311	311
Loans and borrowings	2,523			2,523	4,378		4,378
Related parties	3,577			3,577	4,102		4,102
	13,442		**1,506**	**14,948**	**15,983**	**311**	**16,294**
Non-current							
Derivative financial instruments			1,245	1,245		2,113	2,113
Loans and borrowings	23,082			23,082	28,966		28,966
Related parties	65,041			65,041	48,762		48,762
Participative stockholders debentures			5,454	5,454		4,080	4,080
	88,123		**6,699**	**94,822**	**77,728**	**6,193**	**83,921**
Total of financial liabilities	**101,565**		**8,205**	**109,770**	**93,711**	**6,504**	**100,215**

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

			Consolidated December 31, 2018			
Financial assets	**R$**	**US$**	**CAD**	**EUR**	**Others currencies**	**Total**
Current						
Cash and cash equivalents	10,715	11,172	89	46	391	22,413
Financial 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						
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
	1,489	**10,691**				**12,180**
Total of financial assets	**14,055**	**31,943**	**102**	**46**	**391**	**46,537**
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
	18,376	**43,467**	**491**	**4,216**		**66,550**
Total of financial liabilities	**31,864**	**51,362**	**1,722**	**4,904**	**410**	**90,262**

			Consolidated December 31, 2017			
Financial assets	**R$**	**US$**	**CAD**	**EUR**	**Others currencies**	**Total**
Current						
Cash and cash equivalents	5,921	7,924	159	36	278	14,318
Financial investments	3	58				61

Derivative financial instruments	199	152				351
Accounts receivable	813	7,723	20		46	8,602
Related parties		6,277				6,277
	6,936	**22,134**	**179**	**36**	**324**	**29,609**
Non-current						
Derivative financial instruments	1,269	228				1,497
Loans	17	481				498
Related parties		8,695				8,695
	1,286	**9,404**				**10,690**
Total of financial assets	**8,222**	**31,538**	**179**	**36**	**324**	**40,299**
Financial liabilities						
Current						
Suppliers and contractors	8,150	3,665	1,277	162	113	13,367
Derivative financial instruments	314	30				344
Loans and borrowings	2,541	2,911	57	124		5,633
Related parties		2,916				2,916
	11,005	**9,522**	**1,334**	**286**	**113**	**22,260**
Non-current						
Derivative financial instruments	2,110	159				2,269
Loans and borrowings	11,178	53,125	685	3,771		68,759
Related parties	258	2,968				3,226
Participative stockholders debentures	4,080					4,080
	17,626	**56,252**	**685**	**3,771**		**78,334**
Total of financial liabilities	**28,631**	**65,774**	**2,019**	**4,057**	**113**	**100,594**

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			Parent company December 31, 2018		
Financial assets	**R$**	**US$**	**EUR**	**Others currencies**	**Total**
Current					
Cash and cash equivalents	4,773	62			4,835
Financial 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					