Vale S.A.
Form 6-K
October 27, 2016
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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

October 2016

Vale S.A.

Avenida das Américas, No. 700 Bloco 8, Sala 218
22640-100 Rio de Janeiro, RJ, Brazil

(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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Except where otherwise indicated the operational and financial information in this release is based on the consolidated figures in accordance with IFRS and, with the exception of information on investments and behavior of markets, quarterly financial statements are reviewed by the company s independent auditors. The main subsidiaries that are consolidated are the following: Compañia Minera Miski Mayo S.A.C., Mineração Corumbaense Reunida S.A., PT Vale Indonesia Tbk (formerly International Nickel Indonesia Tbk), Salobo Metais S.A, Vale Australia Pty Ltd., Vale International Holdings GMBH, Vale Canada Limited (formely Vale Inco Limited), Vale Fertilizantes S.A., Vale International S.A., Vale Manganês S.A., Vale Moçambique S.A., Vale Nouvelle-Calédonie SAS, Vale Oman Pelletizing Company LLC and Vale Shipping Holding PTE Ltd.

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Vale s performance in 3Q16

Rio de Janeiro, October 27th, 2016 Vale S.A. (Vale) posted another quarter of sound operational performance, with several production records in 3Q16, namely: (i) iron ore production(1) of 92.1 Mt; (ii) Carajás iron ore production of 38.7 Mt; (iii) Tubarão 3, Tubarão 8 and Vargem Grande pellet plants production of 1.2 Mt, 1.8 Mt and 1.8 Mt, respectively; (iv) contained gold as a by-product in the copper and nickel concentrates of 118,000 oz and (v) Moatize coal production of 1.8 Mt.

Net revenues totaled US$ 7.324 billion in 3Q16, increasing by US$ 698 million vs. 2Q16 as a result of higher sales prices for iron ore fines and pellets (US$ 275 million), nickel and copper (US$ 95 million), and coal (US$ 25 million), along with higher sales volumes of fertilizers (US$ 142 million) and for our ferrous business segment (US$ 127 million).

Costs and expenses decreased by US$ 2.180 billion in 9M16 vs. 9M15, mainly due to cost reduction initiatives (US$ 1.740 billion) and exchange rate variations (US$ 924 million), being partially offset by higher sales volumes (US$ 1.190 billion).

Adjusted EBITDA was US$ 3.023 billion(2) in 3Q16, 26.9% higher than in 2Q16, mainly driven by EBITDA improvements in Ferrous Minerals (US$ 357 million), Base Metals (US$ 224 million) and Coal (US$ 103 million). Adjusted EBITDA margin increased by 5 percentage points, reaching 41.3% in 3Q16.

Capital expenditures totaled US$ 1.257 billion in 3Q16, decreasing by US$ 111 million vs. 2Q16. Investments in project execution totaled US$ 741 million in 3Q16, with expenditures associated with the S11D project accounting for US$ 530 million. Sustaining capex totaled US$ 516 million in 3Q16, 11.4% higher than in 2Q16 as a result of the concentration of investment in the second half of the year.

There is now one main project under development, the S11D project, which reached an important milestone, successfully initiating its hot commissioning in 3Q16. S11D s start-up is expected for 4Q16 with the first commercial ore sale planned for 1Q17.

Net income totaled US$ 575 million in 3Q16 vs. US$ 1.106 billion in 2Q16, decreasing by US$ 531 million mostly as a result of foreign exchange rate variations (US$ 2.237 billion), which were partially offset by the Samarco provision recorded in 2Q16 (US$ 1.038 billion) and the higher EBITDA in 3Q16 (US$ 640 million). Underlying earnings (earnings after adjusting for one-off effects) were US$ 954 million in 3Q16, mainly after the adjustments for foreign exchange variation (US$ 330 million).

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(1) Including third party purchases.

(2) Including US$ 150 million from the goldstream transaction.

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Net debt decreased by US$ 1.543 billion to US$ 25.965 billion with a cash position of US$ 5.484 billion. Gross debt reduced by US$ 365 million to US$ 31.449 billion in 3Q16, with the leverage ratio(3) improving to 3.6x, the same level as in 3Q15.

The main highlights of Vale s performance by business segment were:

EBITDA from the Ferrous Minerals business segment increased 17% in 3Q16 vs. 2Q16, mainly driven by higher realized prices and by lower costs and expenses

- Adjusted EBITDA for Ferrous Minerals was US$ 2.493 billion in 3Q16, US$ 357 million higher than the US$ 2.136 billion achieved in 2Q16, mainly as a result of higher realized sales prices (US$ 291 million) and lower costs and expenses(4) (US$ 213 million), which were partially offset by exchange rate variations (US$ 117 million).

- Cash flow generation, simplified by measuring adjusted EBITDA less sustaining and growth capex, was US$ 1.698 billion in 3Q16, increasing US$ 331 million (24%) from the US$ 1.367 billion recorded in 2Q16.

- C1 cash cost FOB port per metric ton of iron ore fines in BRL reduced by 10% to R$ 42.2/t in 3Q16 vs. R$ 46.9/t in 3Q15, despite inflationary pressures of 8.5%(5), mainly due to improvements in operational performance and ongoing cost-cutting initiatives.

- Iron ore fines and pellets EBITDA break-even, measured by unit cash costs and expenses on a landed-in-China basis(6), decreased US$ 0.2/dmt(7) to US$ 28.3/dmt in 3Q16 when compared to 2Q16, despite the negative impacts of the exchange rate (US$ 1.0/wmt(8)) and bunker oil prices (US$ 0.7/wmt).

EBITDA from the Base Metals business segment increased 60%(9) in 3Q16 vs. 2Q16 as a result of the goldstream transaction and higher prices

- Adjusted EBITDA for Base Metals was US$ 600 million in 3Q16, US$ 224 million higher than in 2Q16, positively impacted by the goldstream transaction (US$ 150 million) and higher prices (US$ 114 million).

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(3) Leverage ratio measured by gross debt to LTM (Last Twelve Months) adjusted EBITDA.

(4) Cost and expenses after adjusting the effects of higher volumes, exchange rate variation and lower bunker oil prices.

(5) IPCA last twelve months until September 2016.

(6) Adjusted for quality, pellets margins differential and moisture, excluding ROM.

(7) Dry metric ton.

(8) Wet metric ton.

(9) Including US$ 150 million from the goldstream transaction.

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- Salobo s EBITDA totaled US$ 131 million in 3Q16, or US$ 281 million including the impact of the goldstream transaction, increasing US$ 9 million vs. 2Q16, despite the negative impact of an exchange rate variation of US$ 12 million.

- Salobo achieved a quarterly production record of 44,300 t in 3Q16 and a monthly production record of 17,000 t in September 2016, running at nominal capacity on a monthly basis.

- Adjusted EBITDA for VNC totaled negative US$ 39 million in 3Q16 improving by US$ 11 million when compared to 2Q16 despite a planned maintenance shutdown in 3Q16. VNC s unit cost net of by-product credits reached US$ 12,425/t in 3Q16, reflecting an US$ 11 million maintenance expenditures associated with the shutdown.

EBITDA from Coal almost reached break-even, being positively impacted by lower costs in Mozambique with the ramp-up of the Nacala Logistics Corridor and the start-up of the Moatize II beneficiation plant

- Adjusted EBITDA for Coal improved significantly from negative US$ 110 million in 2Q16 to negative US$ 7 million in 3Q16, despite not fully capturing the recent hike in index prices.

- Metallurgical coal realized price in 3Q16 did not yet reflect the recent sharp increase in coal index prices due to the impact of Vale s lagged pricing systems, with Vale s realized price (US$ 91.0/t) still significantly lower than the index price average(10) of US$ 135.6/t. Vale s realized price is expected to improve considerably in 4Q16 alongside the improvement in benchmark prices.

- Adjusted EBITDA at the Nacala port improved by 71% to negative US$ 7 million, while EBITDA at the Beira Port (-US$ 28 million) was offset by EBITDA from the Australian operations (US$ 28 million).

- Production cost per ton at the Nacala port continued to improve at US$ 87/t in 3Q16, 16% lower than 2Q16, with further improvement expected for the coming quarters.

EBITDA from the Fertilizers business segment increased 84% in 3Q16 vs. 2Q16, mainly driven by lower costs and higher volumes, despite lower prices and exchange rate variation

(10) Platts Premium Low Vol Hard Coking Coal FOB Australia Index used as reference.

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- Adjusted EBITDA for Fertilizers increased 84% to US$ 59 million in 3Q16, mainly driven by lower costs(11) (US$ 42 million) and higher sales volumes (US$ 13 million).

- Costs decreased by US$ 42 million(12) in 3Q16 vs. 2Q16, mainly as a result of lower raw material prices.

- Phosphate rock, SSP (single superphosphate) and MAP (monoammonium phosphate) production volumes increased by 14.5%, 9.0% and 3.9% in 3Q16, respectively, as a result of the stabilization of the plants operational performance after maintenance stoppages carried out in 2Q16.

Selected financial indicators

US$ million	3Q16 (A)	2Q16 (B)	3Q15 (C)	% (A/B)	% (A/C)
Net operating revenues	7,324	6,626	6,505	11	13
Adjusted EBIT	2,060	1,339	834	54	147
Adjusted EBIT margin (%)	28.1	20.2	12.8		
Adjusted EBITDA	3,023	2,383	1,875	27	61
Adjusted EBITDA margin (%)	41.3	36.0	28.8		
Net income (loss)	575	1,106	(2,117)	(48)	127
Underlying earnings	954	709	(961)	35	199
Underlying earnings per share on a fully diluted basis (US$ / share)	0.19	0.14	(0.19)		
Total gross debt	31,449	31,814	28,675	(1)	10
Cash and cash equivalent	5,484	4,306	4,462	27	23
Total Net Debt	25,965	27,508	24,213	(6)	7
Total gross debt/ adjusted EBITDA (x)	3.6	4.2	3.6		
Capital expenditures	1,257	1,368	1,879	(8)	(33)

US$ million	9M16 (A)	9M15 (B)	% (A/B)
Net operating revenues	19,669	19,710	(0)
Cost and expenses	15,116	17,296	(13)
Adjusted EBIT	4,553	2,414	89
Adjusted EBIT margin (%)	23.1	12.2	
Adjusted EBITDA	7,411	5,690	30
Adjusted EBITDA margin (%)	37.7	28.9	
Underlying earnings	2,177	(667)	426
Underlying earnings per share on a fully diluted basis (US$ / share)	0.42	(0.13)	
Capital expenditures	4,074	6,207	(34)

(11) Excluding volume and exchange rate variation.

(12) After adjusting for the effects of higher volumes (US$ 129 million) and exchange rate variation (US$ 18 million)

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Operating revenues

Net operating revenues in 3Q16 were US$ 7.324 billion, 10.5% higher than in 2Q16. The increase in sales revenues was mainly due to higher sales prices for iron ore fines and pellets (US$ 275 million), for nickel and copper (US$ 95 million) and coal (US$ 25 million), and higher sales volumes in fertilizers (US$ 142 million) and in ferrous minerals (US$ 127 million).

The following tables show net operating revenues by destination and by business areas, with the main highlights being:

- Net revenue by destination was marked by: (i) the increase in the share of sales to Brazil, from 13.6% in 2Q16 to 15.2% in 3Q16, reflecting higher revenues from Fertilizers (US$ 148 million) and (ii) the relative decrease in the share of sales to Europe, from 17.2% in 2Q16 to 15.7% in 3Q16.

- Contribution by business segments in 3Q16 was generally in line with 2Q16, with the Ferrous Minerals business segment representing 67.7% of Vale s total net revenues.

Net operating revenue by destination

US$ million	3Q16	%	2Q16	%	3Q15	%
North America	**551**	**7.5**	**511**	**7.7**	**394**	**6.1**
USA	239	3.3	230	3.5	188	2.9
Canada	303	4.1	281	4.2	206	3.2
Mexico	9	0.1				
South America	**1,194**	**16.3**	**994**	**15.0**	**1,199**	**18.4**
Brazil	1,111	15.2	903	13.6	1,086	16.7
Others	83	1.1	91	1.4	113	1.7
Asia	**4,081**	**55.7**	**3,668**	**55.4**	**3,547**	**54.5**
China	2,908	39.7	2,700	40.7	2,555	39.3
Japan	483	6.6	405	6.1	498	7.7
South Korea	270	3.7	188	2.8	171	2.6
Others	420	5.7	376	5.7	323	5.0
Europe	**1,147**	**15.7**	**1,137**	**17.2**	**1,109**	**17.1**
Germany	326	4.5	358	5.4	330	5.1
Italy	110	1.5	125	1.9	104	1.6
Others	711	9.7	654	9.9	675	10.4
Middle East	**236**	**3.2**	**240**	**3.6**	**227**	**3.5**
Rest of the World	**115**	**1.6**	**76**	**1.2**	**29**	**0.4**
Total	**7,324**	**100.0**	**6,626**	**100.0**	**6,505**	**100.0**

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Net operating revenues by destination

Net operating revenue by business area

US$ million	3Q16	%	2Q16	%	3Q15	%
Ferrous minerals	**4,959**	**67.7**	**4,541**	**68.5**	**4,312**	**66.3**
Iron ore fines	3,782	51.6	3,508	52.9	3,278	50.4
ROM	4	0.1	5	0.1	24	0.4
Pellets	991	13.5	868	13.1	883	13.6
Manganese ore	51	0.7	36	0.5	23	0.4
Ferroalloys	25	0.3	25	0.4	3	
Others	106	1.4	99	1.5	101	1.6
Coal	**163**	**2.2**	**145**	**2.2**	**127**	**2.0**
Metallurgical coal	105	1.4	77	1.2	115	1.8
Thermal coal	58	0.8	68	1.0	12	0.2
Base metals	**1,579**	**21.6**	**1,447**	**21.8**	**1,347**	**20.7**
Nickel	797	10.9	710	10.7	785	12.1
Copper	452	6.2	443	6.7	360	5.5
PGMs	104	1.4	99	1.5	58	0.9
Gold as by-product	179	2.4	154	2.3	115	1.8
Silver as by-product	9	0.1	10	0.2	7	0.1
Others	38	0.5	31	0.5	22	0.3
Fertilizer nutrients	**598**	**8.2**	**464**	**7.0**	**698**	**10.7**
Potash	34	0.5	22	0.3	41	0.6
Phosphates	470	6.4	363	5.5	560	8.6
Nitrogen	69	0.9	60	0.9	80	1.2
Others	25	0,3	19	0.3	17	0.3

Others	**25**	**0.3**	**29**	**0.4**	**21**	**0.3**
Total	**7,324**	**100.0**	**6,626**	**100.0**	**6,505**	**100.0**

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Costs and expenses

Costs and expenses were US$ 5.264 billion in 3Q16 in line with the US$ 5.287 billion recorded in 2Q16, impacted by cost reduction initiatives (US$ 244 million) and lower other operating expenses, including the positive impact from the goldstream transaction (US$ 150 million), which together more than offset the higher sales volumes (US$ 230 million) and exchange rate variations (US$ 196 million).

Costs and expenses

US$ million	3Q16	2Q16	3Q15
Costs	**4,955**	**4,795**	**5,040**
Expenses	**309**	**492**	**631**
Total costs and expenses	**5,264**	**5,287**	**5,671**
Depreciation	963	927	1,022
Costs and expenses ex-depreciation	**4,301**	**4,360**	**4,649**

COST OF GOODS SOLD (COGS)

COGS totaled US$ 4.955 billion in 3Q16, increasing US$ 160 million from the US$ 4.795 billion recorded in 2Q16, as a result of higher sales volumes (US$ 230 million) and exchange rate variations(13) (US$ 174 million), which were partially offset by cost reduction initiatives (US$ 244 million).

Further details regarding cost performance are provided in the Performance of the Business Segments section.

COGS by business segment

US$ million	3Q16	%	2Q16	%	3Q15	%
Ferrous minerals	2,663	53.7	2,579	53.8	2,813	55.8
Base metals	1,429	28.8	1,424	29.7	1,406	27.9
Coal	190	3.8	250	5.2	239	4.7
Fertilizers	610	12.3	482	10.1	536	10.6
Other products	63	1.3	60	1.2	46	0.9
Total COGS	**4,955**	**100.0**	**4,795**	**100.0**	**5,040**	**100.0**
Depreciation	899		866		861	
COGS, ex-depreciation	**4,056**		**3,929**		**4,179**	

EXPENSES

Total expenses decreased 37.2% to US$ 309 million in 3Q16 from the US$ 492 million recorded in 2Q16, mainly due to the positive one-off impact of the goldstream transaction (US$ 150 million) recorded in other operating expenses , which was partially offset by the increase in SG&A (US$ 13 million), R&D (US$ 7 million), and pre-operating and stoppage expenses (US$ 8 million).

(13) COGS currency exposure in 3Q16 was as follows: 60% BRL, 26% USD, 11% CAD, 2% EUR and 1% others.

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SG&A totaled US$ 153 million in 3Q16, representing a 9.3% increase from the US$ 140 million recorded in 2Q16, and a 16.8% increase from the US$ 131 million recorded in 3Q15. SG&A, net of depreciation, increased by US$ 9 million in 3Q16 vs. 2Q16, mainly as a result of the impact of exchange rate variations (US$ 7 million) and higher selling expenses (US$ 3 million).

R&D expenses totaled US$ 85 million in 3Q16, representing an 8.9% increase from the US$ 78 million recorded in 2Q16, following the usual seasonality, and a 29.7% decrease from the US$ 121 million recorded in 3Q15. R&D expenses relate mostly to iron ore and pellets (US$ 29 million) and nickel (US$ 21 million).

Pre-operating and stoppage expenses totaled US$ 122 million in 3Q16, representing a 7.0% increase from the US$ 114 million recorded in 2Q16, mainly driven by higher S11D project expenses (US$ 9 million).

Other operating expenses recorded a positive amount of US$ 51 million in 3Q16, improving by US$ 211 million when compared to the US$ 160 million expenses in 2Q16, mainly due to: (i) the positive one-off impact of the goldstream transaction (US$ 150 million); (ii) lower contingencies (US$ 28 million); and (iii) lower disposals and write-off of assets (US$ 21 million).

Expenses

US$ million	**3Q16**	**%**	**2Q16**	**%**	**3Q15**	**%**
SG&A ex-depreciation	**116**		**107**		**100**	
SG&A	**153**	**50**	**140**	**28**	**131**	**21**
Administrative	**136**	**44**	**126**	**26**	**132**	**21**
Personnel	61	20	58	12	56	9
Services	19	6	18	4	26	4
Depreciation	37	12	33	7	31	5
Others	19	6	17	3	19	3
Selling	**17**	**6**	**14**	**3**	**(1)**	**(0)**
R&D	**85**	**28**	**78**	**16**	**121**	**19**
Pre-operating and stoppage expenses(1)	**122**	**39**	**114**	**23**	**266**	**42**
VNC					97	15
Long Harbour	39	13	45	9	65	10
S11D	28	9	19	4	11	2
Moatize	1		9	2	25	4
Others	54	18	41	8	68	11
Other operating expenses	**(51)**	**(17)**	**160**	**33**	**113**	**18**
Total Expenses	**309**	**100**	**492**	**100**	**631**	**100**
Depreciation	64		61		161	
Expenses ex-depreciation	**245**		**431**		**470**	

(1) Includes US$ 27 million of depreciation charges in 3Q16, US$ 29 million in 2Q16 and US$ 83 million in 3Q15

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Adjusted earnings before interest, taxes, depreciation and amortization(14)

Adjusted EBITDA was US$ 3.023 billion(15) in 3Q16, 26.8% higher than in 2Q16 mainly as a result of improvements in the Ferrous Minerals EBITDA (US$ 357 million), Coal EBITDA (US$ 103 million) and Base Metals EBITDA (US$ 224 million). Adjusted EBITDA margin was 41.3% in 3Q16, improving from the 36.0% recorded in 2Q16.

Adjusted EBIT was US$ 2.060 billion in 3Q16, 53.8% higher than in 2Q16.

Adjusted EBITDA

US$ million	**3Q16**	**2Q16**	**3Q15**
Net operating revenues	7,324	6,626	6,505
COGS	(4,955)	(4,795)	(5,040)
SG&A	(153)	(140)	(131)
Research and development	(85)	(78)	(121)
Pre-operating and stoppage expenses	(122)	(114)	(266)
Other operational expenses	51	(160)	(113)
Adjusted EBIT	**2,060**	**1,339**	**834**
Depreciation, amortization & depletion	963	927	1,022
Dividends received		117	19
Adjusted EBITDA	**3,023**	**2,383**	**1,875**

Adjusted EBITDA by business area

US$ million	**3Q16**	**2Q16**	**3Q15**
Ferrous minerals	2,493	2,136	1,652
Coal	(7)	(110)	(129)
Base metals	600	376	193
Fertilizer nutrients	59	32	197
Others	(122)	(51)	(38)
Total	**3,023**	**2,383**	**1,875**

(14) Net revenues less costs and expenses net of depreciation plus dividends received.

(15) Including US$ 150 million from the goldstream transaction.

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Net income

Net income totaled US$ 575 million in 3Q16 vs. US$ 1.106 billion in 2Q16, decreasing by US$ 531 million, mainly as a result of the negative impact of the foreign exchange rate variation in 3Q16 vs. 2Q16 (US$ 2.237 billion), which was partially offset by the Samarco provision recorded in 2Q16 (US$ 1.038 billion) and the higher EBITDA in 3Q16 (US$ 640 million).

Underlying earnings (earnings after adjusting for one-off effects) were US$ 954 million in 3Q16, after the adjustments for foreign exchange variation (US$ 330 million).

Underlying earnings

US$ million	3Q16	2Q16	3Q15
Underlying earnings	**954**	**709**	**(961)**
Items excluded from basic earnings			
Result on measurement or sale of non-current assets	(29)	(66)	(48)
Deferred Income tax - foreign subsidiaries			2,990
Shareholders Debentures	(48)	(86)	75
Foreign Exchange	(330)	1,960	(5,025)
Monetary variation	2	(51)	(92)
Currency and interest rate swaps	(49)	483	(1,196)
Other financial results	(55)	(31)	29
Other results in investments from joint controlled and associates	(33)	(1,038)	
Income tax over excluded items	163	(774)	2,111
Net Income (loss)	**575**	**1,106**	**(2,117)**

Net financial results showed a loss of US$ 1.047 billion vs. a gain of US$ 2.091 billion in 2Q16. The main components of the 3Q16 net financial results are: (i) financial expenses (US$ 715 million); (ii) financial revenues (US$ 35 million); (iii) foreign exchange and monetary losses (US$ 328 million); (iv) currency and interest rate swap losses (US$ 49 million); and (v) gains on other derivatives (US$ 10 million), which were partially offset by losses on bunker oil derivatives of US$ 7 million.

Financial results

US$ million	3Q16	2Q16	3Q15
Financial expenses	**(715)**	**(611)**	**(277)**
Gross interest	(466)	(452)	(239)
Capitalization of interest	172	213	
Tax and labour contingencies	(4)		10
Shareholder debentures	(48)	(86)	75
Others	(225)	(157)	15
Financial expenses (REFIS)	(144)	(129)	(138)
Financial income	**35**	**34**	**92**

Derivatives(1)	**(39)**	**759**	**(1,799)**
Currency and interest rate swaps	(49)	483	(1,196)
Others(2) (bunker oil, commodities, etc)	10	276	(603)
Foreign Exchange	**(330)**	**1,960**	**(5,025)**
Monetary variation	**2**	**(51)**	**(92)**
Financial result, net	**(1,047)**	**2,091**	**(7,101)**

(1) The net derivatives losses of US$ 39 million in 3Q16 are comprised of settlement losses of US$ 191 million and marked-to-market gains of US$ 152 million.

(2) Other derivatives include mainly bunker oil derivatives losses of US$ 7 million

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Equity income from affiliated companies

Equity income from affiliated companies was US$ 46 million in 3Q16 vs. US$ 190 million in 2Q16. The main contributors to equity income were MRS (US$ 17 million), CSI (US$ 17 million) and VLI (US$ 16 million).

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The impact of bunker oil hedging on Vale s financial performance

Vale s financial performance has been impacted by the bunker oil hedge previously contracted. The outstanding bunker oil hedge position is marked-to-market and recorded as financial results, as a proxy for future cash flow. The outstanding hedge position as of September 30th, 2016 will be completely settled by the end of 2016(16).

The impact on the financial statements can be summarized as follows:

(i) In 3Q16: a negative impact of US$ 7 million recognized in 3Q16 as financial results due to the net position of: (i) the positive impact of the mark-to-market of the open positions on September 30th, 2016; and (ii) the negative impact of the realized loss on the settlements which occurred in the quarter.

(ii) In 4Q16: financial results will only be impacted by the gains or losses related to the settlements recorded in the quarter, as all current open positions will be settled until December 31st, 2016.

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(16) Costs are no longer impacted in 2016, since all outstanding bunker oil hedge positions recorded under the hedge accounting program were settled up to 4Q15.

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Impact of bunker oil hedging on Vale s financial performance

Freight contract type	Hedge accounting	Concept Impact of derivative position in P/L statement	Current impact Impact incurred in 3Q16 P/L statement	Type of Instrument	Drivers of future impact Bunker oil derivative outstanding position (,000 tons)	Average strike price (US$/t)
FOB	No	Impact on financial results	US$7 million decrease in financial results	Forward	352	511
				Zero Cost Collar	540	300 - 380

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Effects of currency price volatility on Vale s financial performance

In 3Q16, from end to end, the Brazilian Real (BRL) depreciated 1.1% against the US Dollar (USD) from BRL 3.21/ USD as of June 30th, 2016 to BRL 3.25/ USD as of September 30th, 2016. On a quarterly average, the BRL appreciated 7.5%, from an average BRL 3.51/ USD in 2Q16 to an average BRL 3.25/ USD in 3Q16.

The end-to-end depreciation of the BRL against the USD and other currencies caused mainly non-cash losses of US$ 379 million on our earnings before taxes in 3Q16, driven by its impact on:

(i) The net position of the USD and other currency denominated liabilities and the USD and other currency denominated assets (accounts receivable and others) which amounted to a loss of US$ 330 million in 3Q16, recorded in the financial statements as Foreign exchange .

(ii) The changes in fair value and the settlements of the currency swaps from the BRL and other currencies to the USD, which caused one-off losses of US$ 49 million.

The BRL appreciation on a quarterly average brought negative impacts to Vale s cash flows. In 3Q16 most of our revenues were denominated in USD, while our COGS were 60% denominated in BRL, 26% in USD and 11% in Canadian dollars (CAD) and about 70% of our capital expenditures were denominated in BRL. The appreciation of the BRL and of other currencies in 3Q16 increased our costs and expenses by US$ 196 million.

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Investments

Capital expenditures totaled US$ 1.257 billion in 3Q16 with US$ 741 million in project execution and US$ 516 million in sustaining capital. Capital expenditures decreased US$ 111 million vs. the US$ 1.368 billion spent in 2Q16.

Project Execution and Sustaining by business area

US$ million	3Q16	%	2Q16	%	3Q15	%
Ferrous minerals	795	63.3	767	56.1	1,099	58.5
Coal	149	11.9	159	11.6	333	17.7
Base metals	189	15.0	232	17.0	370	19.7
Fertilizer nutrients	100	7.9	68	4.9	55	2.9
Power generation	15	1.2	16	1.2	16	0.9
Steel	9	0.7	126	9.2	6	0.3
Total	**1,257**	**100.0**	**1,368**	**100.0**	**1,879**	**100.0**

Evolution of capital expenditures

Project execution

The Ferrous Minerals and the Coal business segments accounted for about 78% and 14%, respectively, of the total investment in project execution in 3Q16.

The Moatize II project was delivered in 3Q16 with total investments of US$ 2.034 billion.

There is now one main project under development, the S11D project with a nominal capacity of 90 Mtpy of iron ore which will help reduce Vale s C1 cash costs and improve Vale s

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operational flexibility with the CLN S11D logistics expansion which will increase the capacity in the Northern System to 230 Mtpy by 2020.

Project execution by business area

US$ million	3Q16	%	2Q16	%	3Q15	%
Ferrous minerals	579	78.2	608	67.1	878	71.3
Coal	106	14.3	140	15.5	311	25.2
Base metals	2	0.3	1	0.1	10	0.8
Fertilizer nutrients	30	4.1	14	1.6	11	0.9
Power generation	14	1.9	16	1.7	16	1.3
Steel	9	1.2	126	13.9	6	0.5
Total	**741**	**100.0**	**905**	**100.0**	**1,232**	**100.0**

FERROUS MINERALS

About 92% of the US$ 579 million invested in Ferrous Minerals in 3Q16 relates to the S11D project and the expansion of its associated infrastructure (US$ 530 million).

S11D Mine and Plant   Plant and stockyards

S11D (including mine, plant and associated logistics CLN S11D) achieved combined physical progress of 83% in 3Q16 with 95% progress at the mine site and 74% at the logistic infrastructure sites. The duplication of the railway reached 58% physical progress with 281 Km delivered up to the quarter. The railway spur started up in early October with the circulation of the first train with 330 wagons through the entire route of the spur, including the railway loop. The offshore port initiated its hot commissioning having loaded a Capesize vessel with 160,000t of ore in October, and is expected to start up in November.

The S11D mine and plant successfully initiated its hot commissioning with approximately 196,000 t of accumulated iron ore production in 3Q16, with start-up expected for 4Q16 and the first commercial ore sales planned for 1Q17. S11D will have a 4-year phased ramp-up

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instead of the 2-year ramp-up originally planned in order to maximize margins. The S11D (Southern range) full production of 90 Mtpy will be reached by 2020, adding a net output of 75 Mtpy from the entire Northern System (Northern and Southern ranges), which is expected to supply around 155 Mt from the Northern range only in 2016 and 230 Mtpy from both ranges by 2020.

S11D Logistics Railway loop

COAL

The Moatize II coal handling and processing plant (CHPP) with net additional capacity of 11 Mtpy started up in 3Q16. Ramp-up is progressing well, having reached production of 129,000 t in August and 169,000 t in September. The project was delivered with total investments of US$ 2.034 billion.

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Moatize Expansion Stockyard

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Description and status of main projects

Project	Description	Capacity (Mtpy)	Status
Ferrous Minerals projects			
Carajás Serra Sul S11D	• Development of a mine and processing plant, located in the Southern range of Carajás, Pará, Brazil.	90	• Hot commissioning in the mine and mill initiated • Ore stocking in the yards initiated • Earthworks of all four systems concluded • Delivery of the electrocenters for the mine 98% completed
CLN S11D	• Duplication of 570 km railway, with construction of rail spur of 101 km. Acquisition of wagons, locomotives, and onshore and offshore expansions at PDM maritime terminal.	(80)(a)	• Duplication of the railway reached 58% physical progress, totaling 281 Km delivered • Railway spur start-up occurred • Offshore expansion achieved 95% physical progress with hot commissioning initiated • Onshore expansion reached 88% physical progress

(a) Net additional capacity

Progress indicators(17)

Project	Capacity (Mtpy)	Estimated start-up	Executed capex (US$ million) 2016	Executed capex (US$ million) Total	Estimated capex (US$ million) 2016	Estimated capex (US$ million) Total	Physical progress
Ferrous minerals projects							
Carajás Serra Sul S11D	90	2H16	755	5,411	890	6,405(b)	95%
CLN S11D	230 (80)(a)	1H14 to 1H20	951	5,418	1,154	7,850(c)	74%

(a) Net additional capacity.

(b) Original capex budget of US$ 8.089 billion.

(c) Original capex budget of US$ 11.582 billion.

Sustaining capex

Sustaining capital increased from US$ 463 million in 2Q16 to US$ 516 million in 3Q16. The Ferrous Minerals and Base Metals business segments accounted for 42% and 36% of the total sustaining capex in 3Q16, respectively.

Sustaining capital for the Ferrous Minerals business segment included, among others: (i) enhancement and replacement in operations (US$ 132 million), (ii) improvement in the current standards of health and safety, social and environmental protection (US$ 39 million), (iii) maintenance, improvement and expansion of tailing dams (US$ 30 million). Maintenance of railways and ports in Brazil and Malaysia accounted for US$ 66 million.

(17) Pre-operating expenses were not included in the estimated capex for the year, although included in the total estimated capex column, in line with Vale s Board of Directors approvals. Estimated capex for the year is only reviewed once a year.

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Sustaining investments in iron ore fines (excluding sustaining investments in pellets plants) amounted to US$ 171 million, equivalent to US$ 2.5/dmt of iron ore fines in 3Q16, representing a 39% increase vs. the US$ 1.8/dmt in 2Q16, mainly due to the concentration of sustaining investments in the second half of the year. The last twelve months average of sustaining for iron ore fines amounts to US$ 2.3/dmt. Sustaining investments for Pellets totaled US$ 37 million, equivalent to US$ 3.2/dmt, 10.3% higher than in 2Q16.

Sustaining capex in the Base Metals business segment was mainly dedicated to: (i) enhancement and replacement in operations (US$ 117 million), (ii) improvement in the current standards of health and safety and environmental protection (US$ 60 million); (iii) maintenance improvements and expansion of tailing dams (US$ 8 million).

Sustaining capex by type - 3Q16

US$ million	Ferrous Minerals	Coal	Base Metals	Fertilizer	TOTAL
Operations	132	39	117	50	**338**
Waste dumps and tailing dams	30		8	3	**41**
Health and Safety	31	3	13	2	**49**
CSR - Corporate Social Responsibility	8		47	13	**69**
Administrative & Others					