Vale S.A.
Form 20-F
March 31, 2016

Use these links to rapidly review the document
TABLE OF CONTENTS
Contents

Table of Contents

As filed with the Securities and Exchange Commission on March 31, 2016

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

Form 20-F

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

For the fiscal year ended: December 31, 2015
Commission file number: 001-15030

VALE S.A.

(Exact name of Registrant as specified in its charter)

Federative Republic of Brazil
(Jurisdiction of incorporation or organization)

Luciano Siani Pires, Chief Financial Officer
phone: +55 21 3814 8888
fax: +55 21 3814 8820

Avenida das Américas, 700 Bloco 8 Loja 318
22640-100 Rio de Janeiro, RJ, Brazil
(Address of principal executive offices)

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

Title of Each Class	**Name of Each Exchange on Which Registered**
Preferred class A shares of Vale, no par value per share	New York Stock Exchange*
American Depositary Shares (evidenced by American Depositary Receipts), each representing one preferred class A share of Vale	New York Stock Exchange
Common shares of Vale, no par value per share	New York Stock Exchange*
American Depositary Shares (evidenced by American Depositary Receipts), each representing one common share of Vale	New York Stock Exchange
6.250% Guaranteed Notes due 2017, issued by Vale Overseas	New York Stock Exchange

5.625% Guaranteed Notes due 2019, issued by Vale Overseas	New York Stock Exchange
4.625% Guaranteed Notes due 2020, issued by Vale Overseas	New York Stock Exchange
4.375% Guaranteed Notes due 2022, issued by Vale Overseas	New York Stock Exchange
8.25% Guaranteed Notes due 2034, issued by Vale Overseas	New York Stock Exchange
6.875% Guaranteed Notes due 2036, issued by Vale Overseas	New York Stock Exchange
6.875% Guaranteed Notes due 2039, issued by Vale Overseas	New York Stock Exchange
5.625% Notes due 2042, issued by Vale S.A.	New York Stock Exchange

---

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

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

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

The number of outstanding shares of each class of stock of Vale as of December 31, 2015 was:

3,185,653,000 common shares, no par value per share
1,967,721,914 preferred class A shares, no par value per share
12 golden shares, no par value per share

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act.

Yes ý No o

If this report is an annual or transition report, indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934.

Yes o No ý

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports) and (2) has been subject to such filing requirements for the past 90 days.

Yes ý No o

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files).

Yes ý No o

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of "accelerated filer" and "large accelerated filer" in Rule 12b-2 of the Exchange Act. (Check one):

Large accelerated filer ý Accelerated filer o Non-accelerated filer o

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

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

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

Item 17 o Item 18 o

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

Yes o No ý

Table of Contents

TABLE OF CONTENTS

Table of Contents

FORM 20-F CROSS REFERENCE GUIDE

Item	Form 20-F caption	Location in this report	Page
1	**Identity of directors, senior management and advisers**	Not applicable	
2	**Offer statistics and expected timetable**	Not applicable	
3	**Key information**		
	3A Selected financial data	Selected financial data	14
	3B Capitalization and indebtedness	Not applicable	
	3C Reasons for the offer and use of proceeds	Not applicable	
	3D Risk factors	Risk factors	1
4	**Information on the Company**		
	4A History and development of the company	Business overview, Capital expenditures	16, 74
	4B Business overview	Business overview, Lines of business, Reserves, Regulatory matters	16, 25, 63, 77
	4C Organizational structure	Exhibit 8	
	4D Property, plant and equipment	Lines of business, Capital expenditures, Regulatory matters	25, 74, 77
4A	**Unresolved staff comments**	None	
5	**Operating and financial review and prospects**		
	5A Operating results	Results of operations	87
	5B Liquidity and capital resources	Liquidity and capital resources	101
	5C Research and development, patents and licenses, etc.	Capital expenditures	74
	5D Trend information	Results of operations	87
	5E Off-balance sheet arrangements	Off-balance sheet arrangements	104
		Critical accounting policies and estimates	104
	5F Tabular disclosure of contractual obligations	Contractual obligations	104
	5G Safe harbor	Forward-looking statements	iv
6	**Directors, senior management and employees**		
	6A Directors and senior management	Management	120
	6B Compensation	Management compensation	132
	6C Board practices	Management Board of directors	120
	6D Employees	Employees	134
	6E Share ownership	Major shareholders, Employees Performance-based compensation	135
7	**Major shareholders and related party transactions**		
	7A Major shareholders	Major shareholders	111
	7B Related party transactions	Related party transactions	114
	7C Interests of experts and counsel	Not applicable	
8	**Financial information**		
	8A Consolidated statements and other financial information	Financial statements	F-1
		Distributions	116
		Legal proceedings	135
	8B Significant changes	Not applicable	
9	**The offer and listing**		
	9A Offer and listing details	Share price history	118
	9B Plan of distribution	Not applicable	

Table of Contents

Table of Contents

FORWARD-LOOKING STATEMENTS

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

- our direction and future operation;
- the implementation of our principal operating strategies, including our potential participation in acquisition, divestiture or joint venture transactions or other investment opportunities;
- the implementation of our financing strategy and capital expenditure plans;
- the exploration of mineral reserves and development of mining facilities;
- the depletion and exhaustion of mines and mineral reserves;
- trends in commodity prices, supply and demand for commodities;
- the future impact of competition and regulation;
- the payment of dividends or interest on shareholders' equity;
- compliance with financial covenants;
- industry trends, including the direction of prices and expected levels of supply and demand;
- the outcome of the various regulatory, governmental and legal proceedings in which we are involved;
- other factors or trends affecting our financial condition or results of operations; and
- the factors discussed under *Risk factors*.

We caution you that forward-looking statements are not guarantees of future performance and involve risks and uncertainties. Actual results may differ materially from those in forward-looking statements as a result of various factors. These risks and uncertainties include factors relating to (a) economic, political and social issues in the countries in which we operate, (b) the global economy, (c) commodity prices, (d) financial and capital markets, (e) the mining and metals businesses, which are cyclical in nature, and their dependence upon global industrial production, which is also cyclical, (f) regulation and taxation, (g) operational incidents or accidents, and (h) the high degree of global competition in the markets in which we operate. For additional information on factors that could cause our actual results to differ from expectations reflected in forward-looking statements, see *Risk factors*. Forward-looking statements speak only as of the date they are made, and we do not undertake any obligation to update them in light of new information or future developments. All forward-looking statements attributed

to us or a person acting on our behalf are expressly qualified in their entirety by this cautionary statement, and you should not place undue reliance on any forward-looking statement.

Vale S.A. is a stock corporation, or sociedade por ações*, that was organized on January 11, 1943 under the laws of the Federative Republic of Brazil for an unlimited period of time. Its head office is located at Avenida das Américas, 700 bloco 8 loja 318 Barra da Tijuca, Rio de Janeiro, RJ, Brazil, and its telephone number is 55-21-3485-5000.*

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

Unless otherwise specified, we use metric units.

References to "real," "reais" or "R$" are to the official currency of Brazil, the real (singular) or reais (plural). References to "U.S. dollars" or "US$" are to United States dollars. References to "CAD" are to Canadian dollars, and references to "A$" are to Australian dollars.

Table of Contents

RISK FACTORS

Risks relating to our business

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

As a mining company, we are a supplier of industrial raw materials. Industrial production tends to be the most cyclical and volatile component of global economic activity, which affects demand for minerals and metals. At the same time, investment in mining requires a substantial amount of funds in order to replenish reserves, expand and maintain production capacity, build infrastructure and preserve the environment. Sensitivity to industrial production, together with the need for significant long-term capital investments, are important sources of risk for our financial performance and growth prospects.

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

China has been the main driver of global demand for minerals and metals over the last few years. In 2015, Chinese demand represented 69% of global demand for seaborne iron ore, 51% of global demand for nickel and 46% of global demand for copper. The percentage of our net operating revenues attributable to sales to customers in China was 35.5% in 2015. Therefore, any contraction of China's economic growth could result in lower demand for our products, leading to lower revenues, cash flow and profitability. Poor performance in the Chinese real estate sector, the largest consumer of carbon steel in China, would also negatively impact our results.

Our business may be adversely affected by declines in demand for and prices of the products our customers produce, including steel (for our iron ore and coal business), stainless steel (for our nickel business), copper wire (for copper) and agricultural commodities (for our fertilizer nutrients business).

Demand for our iron ore, coal and nickel products depends on global demand for steel. Iron ore and iron ore pellets, which together accounted for 62.2% of our 2015 net operating revenues, are used to produce carbon steel. Nickel, which accounted for 18.3% of our 2015 net operating revenues, is used mainly to produce stainless and alloy steels. Demand for steel depends heavily on global economic conditions, but it also depends on a variety of regional and sectorial factors. The prices of different steels and the performance of the global steel industry are highly cyclical and volatile, and these business cycles in the steel industry affect demand and prices for our products. In addition, vertical backward integration of the steel and stainless steel industries and the use of scrap could reduce the global seaborne trade of iron ore and primary nickel. The demand for copper is affected by the demand for copper wire, and a sustained decline in the construction industry could have a negative impact on our copper business. The demand for fertilizers is affected by prices of agricultural commodities in the international and Brazilian markets, and a sustained decline in the price of one or more agricultural commodities could negatively impact our fertilizer nutrients business.

The prices we charge, including prices for iron ore, nickel, copper, coal and fertilizers, are subject to volatility.

Our iron ore prices are based on a variety of pricing options, which generally use spot price indices as a basis for determining the customer price. Our prices for nickel and copper are based on reported prices for these metals on commodity exchanges such as the London Metal Exchange ("LME") and the New York Mercantile Exchange ("NYMEX"). Our prices and revenues for these products are consequently volatile, which may adversely affect our cash flow. Global prices for metals are subject to significant fluctuations and are affected by many factors, including actual and expected global macroeconomic and political conditions, levels of supply and demand, the availability and cost of substitutes, inventory levels, investments by commodity funds and others and actions of participants in the commodity markets. A continuous decrease in the market prices for the products we sell may result in the suspension of certain of our projects and operations, decrease in our mineral reserves and the impairment of assets, and it would adversely affect our financial position and results of operations.

Table of Contents

In 2015, prices of steelmaking raw materials, such as iron ore, coal and nickel, decreased as supply grew more than demand. Additionally, copper prices dropped as a result of lower demand, in spite of some disruptions in supply.

We are most exposed to movements in iron ore prices. For example, a price reduction of US$1 per dry metric ton unit ("dmt") in the average iron ore price would have reduced our operating income for the year ended December 31, 2015 by approximately US$320 million. Average iron ore prices decreased 59% in the last two years, from US$135 per dmt in 2013 to US$97 per dmt in 2014 and US$55.5 per dmt in 2015, according to the average Platts IODEX (62% Fe CFR China). On February 29, 2016 the year to date average Platts IODEX iron ore price was US$44.10 per dmt. In addition to reduced demand for iron ore, an excess in supply has adversely affected our prices since 2014 and may grow with the expected conclusion of certain iron ore projects in coming years.

World nickel prices have also been adversely affected by lower demand and by strong supply growth in the nickel industry, especially in China. Nickel refining in China, primarily using imported nickel ores and related raw materials, increased by an estimated 417,000 metric tons from 2006 to 2015, with Chinese nickel pig iron production representing 19% of global nickel output. Chinese nickel pig iron production has been adversely affected by export restrictions in feed-producing countries, and prices could be further affected if these restrictions are revoked.

For additional information about the average realized prices for the products we sell, see *Operating and financial review and prospects Overview Major factors affecting prices*.

The financial performance and economic viability of certain of our operations may be significantly impacted by a continuing decline in the demand for and prices of our products. For instance, in 2015, we suspended certain iron ore and manganese operations, and other operations may be suspended in the future. Also, in the case of our nickel operations in New Caledonia, the impact of lower prices and demand for nickel is heightened due to the stage of the ramp up of that facility. We are considering various options to ensure the continuation of the operations in New Caledonia as it continues to ramp up. If those options are not available and current conditions continue to be adverse, we may consider a reduction or stoppage of production for a period of time.

We may not be able to adjust production volume in a timely or cost-efficient manner in response to changes in demand.

Lower utilization of capacity during periods of weak demand may expose us to higher unit production costs since a significant portion of our cost structure is fixed in the short term due to the high capital intensity of mining operations. In addition, efforts to reduce costs during periods of weak demand could be limited by labor regulations or previous labor or government agreements.

Conversely, during periods of high demand, our ability to rapidly increase production capacity is limited, which could prevent us from meeting demand for our products. Moreover, we may be unable to complete expansions and greenfield projects in time to take advantage of rising demand for iron ore, nickel or other products. When demand exceeds our production capacity, we may meet excess customer demand by purchasing iron ore, iron ore pellets or nickel from joint ventures or unrelated parties and reselling it, which would increase our costs and narrow our operating margins. If we are unable to satisfy excess customer demand in this way, we may lose customers. In addition, operating close to full capacity may expose us to higher costs, including demurrage fees due to capacity restraints in our logistics systems.

Table of Contents

Lower cash flows, resulting from decreased prices of our products, have adversely affected our credit ratings and the cost and availability of financing.

A continuous decrease in the prices of our products and the volatility in the global economy may adversely affect our future cash flows, credit ratings and ability to secure financing at attractive rates. Decreased prices have resulted in lower cash flows, which have also adversely affected our credit rating and our costs to access the capital markets. This may negatively affect our ability to fund our capital investments, pay dividends and comply with the financial covenants in some of our long-term debt instruments.

Also, certain Canadian provinces where we operate require us to provide financial assurances, such as letters of credit, surety bonds or cash collateral, to cover certain closure and remediation costs after we conclude our operations. We may be required to increase the amount of these financial assurances if our credit ratings are downgraded below certain levels. If we are unable to provide these financial assurances, we would need to have discussions with the relevant jurisdictions about other options and ultimately it could impact our ability to operate in these jurisdictions.

The failure of a tailings dam of Samarco Mineração S.A. ("Samarco") in Minas Gerais could negatively impact our business.

On November 5, 2015, one of Samarco's tailings dams (Fundão) failed unexpectedly, releasing muddy tailings downstream, reaching and flooding certain communities and causing environmental damage to the surrounding area. As a result of the failure of the Fundão tailings dam, our Alegria mine, located near the dam, is operating with a dry beneficiation process at a lower mine productivity, and a conveyor belt connecting our Fábrica Nova mine to our Timbopeba beneficiation plant was damaged, decreasing production at the Mariana mining complex in the Brazilian state of Minas Gerais. In addition, we have interrupted the sale of run of mine (ROM) from our Fazendão mine to Samarco. We are still exploring alternatives for these mines; however if we are unable to find adequate alternatives, this may negatively affect our overall production. See *Information on the Company Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*.

We are involved in legal proceedings that could have a material adverse effect on our business in the event of unfavorable outcomes.

We are involved in legal proceedings in which adverse parties have claimed substantial amounts. These include several legal proceedings and investigations relating to the failure of Samarco's Fundão tailings dam. For additional information, see *Additional information Legal proceedings*. Although we are vigorously contesting them, the outcomes of these proceedings are uncertain and may result in obligations that could materially adversely affect our business and the value of our securities.

Our obligations under a settlement agreement arising from the failure of Samarco's tailings dam could have a material impact on our financial condition.

Samarco and its shareholders, Vale and BHPB Brasil Ltda. ("BHPB"), a Brazilian subsidiary of BHP Billiton plc ("BHP Billiton"), entered into a settlement agreement on March 2, 2016 with governmental authorities, including the federal Attorney General of Brazil and the two Brazilian states affected by the failure (Espírito Santo and Minas Gerais). Under the agreement, Samarco, Vale and BHPB will create a foundation to develop and implement remediation and compensation programs in substantial amounts over many years. See *Information on the Company Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*.

Table of Contents

Samarco is currently unable to conduct ordinary mining and processing. Samarco's management is working on a plan that would permit it to resume operations, but the feasibility, timing and scope of restarting remain uncertain. If Samarco does not meet its funding obligations, each of Vale and BHPB is obligated to provide funding to the foundation in proportion to its 50% interest in Samarco. Vale does not currently expect to record a provision in its financial statements in respect of these obligations, but if Samarco is eventually unable to resume operations or to meet its funding obligations, Vale could determine that it should recognize a provision.

Regulatory, political, economic and social conditions in the countries in which we have operations or projects could adversely impact our business and the market price of our securities.

Our financial performance may be negatively affected by regulatory, political, economic and social conditions in countries in which we have significant operations or projects.

In many of these jurisdictions, we are exposed to various risks such as potential renegotiation, nullification or forced modification of existing contracts and licenses, expropriation or nationalization of property, foreign exchange controls, changes in local laws, regulations and policies, political instability, bribery, extortion, corruption, civil strife, acts of war, guerilla activities, piracy in international shipping lanes and terrorism. We also face the risk of having to submit to the jurisdiction of a foreign court or arbitration panel or having to enforce a judgment against a sovereign nation within its own territory.

Actual or potential political or social changes and changes in economic policy may undermine investor confidence, which may hamper investment and thereby reduce economic growth, and otherwise may adversely affect the economic and other conditions under which we operate in ways that could have a materially negative effect on our business.

Political and economic instability in Brazil could adversely impact our business and the market price of our securities.

The Brazilian federal government's economic policies may have important effects on Brazilian companies, including us, and on market conditions and prices of Brazilian securities. Our financial condition and results of operations may be adversely affected by the following factors and the Brazilian federal government's response to these factors:

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

Historically, the country's political situation has influenced the performance of the Brazilian economy, and political crises have affected the confidence of investors and the general public, which resulted in economic deceleration and heightened volatility in the securities issued abroad by Brazilian companies. Ongoing corruption investigations have led to charges against public officials and members of several political parties. Political instability may aggravate economic uncertainties in Brazil and increase volatility in the Brazilian securities markets and securities issued by Brazilian issuers.

Table of Contents

In 2015, Brazil faced an economic recession, adverse fiscal developments and political instability, which have continued in 2016. Brazilian GDP declined by 3.85% in 2015 and unemployment increased to 6.9% in 2015 from 4.3% 2014. Inflation for the year of 2015 was 10.67% (as reported by IBGE, the Brazilian Institute of Geography and Statistics), as compared to 6.41% in 2014. The Brazilian Central Bank's base interest rate (SELIC) increased to 14.25% in December 31, 2015 from 11.75% in December 31, 2014. Future economic, social and political developments in Brazil may impair our business, financial condition or results of operations, or cause the market value of our securities to decline.

Disagreements with local communities in which we operate could adversely impact our business and reputation.

Disputes with communities where we operate may arise from time to time. In some instances, our operations and mineral reserves are located on or near lands owned or used by indigenous people or other groups of stakeholders. Some of these indigenous peoples may have rights to review or participate in natural resource management. Some of our mining and other operations are located in territories where title may be subject to disputes or uncertainties, or in areas claimed for agriculture or land reform purposes, which may lead to disagreements with landowners, local communities and the government. We may be required to consult and negotiate with these groups as part of the process to obtain licenses required to operate, to mitigate impact on our operations or to obtain access to their lands.

Disagreements or disputes with local groups, including indigenous groups, could cause delays or interruptions to our operations, adversely affect our reputation or otherwise hamper our ability to develop our reserves and conduct our operations. Protesters have taken actions to disrupt our operations and projects, and they may continue to do so in the future, which may harm our operations and could adversely affect our business. As one of Samarco's shareholders, our reputation, particularly in the affected communities, has been adversely affected by the failure of Samarco's tailings dam in 2015. See *Information on the Company Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*.

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

Mining is subject to government regulation, including taxes and royalties, which can have a significant financial impact on our operations. In the countries where we are present, governments may impose new taxes, raise existing taxes and royalty rates, reduce tax exemptions and benefits, request or force renegotiation of tax stabilization agreements or change the basis on which taxes are calculated in a manner that is unfavorable to us. Governments that have committed to provide a stable taxation or regulatory environment may alter those commitments or shorten their duration.

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

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

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

Table of Contents

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

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

After the failure of Samarco's Fundão tailings dam at its iron ore operations in the Brazilian state of Minas Gerais, Brazilian authorities ordered the suspension of its operations in Minas Gerais and other measures. See *Information on the Company Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*.

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

We are investing to maintain and further increase our production capacity and logistics capabilities and to expand the scope of the minerals we produce. We regularly review the economic viability of our projects. As a result of this review, we may decide to postpone, suspend or interrupt the implementation of certain projects. Our projects are also subject to a number of risks that may adversely affect our growth prospects and profitability, including the following:

- We may encounter delays or higher than expected costs in obtaining the necessary equipment or services and in implementing new technologies to build and operate a project.
- Our efforts to develop projects on schedule may be hampered by a lack of infrastructure, including reliable telecommunications services and power supply.
- Suppliers and contractors may fail to meet their contractual obligations to us.
- We may face unexpected weather conditions or other *force majeure* events.
- We may fail to obtain the required permits and licenses to build a project, or we may experience delays or higher than expected costs in obtaining them.
- Changes in market conditions or regulations may make a project less profitable than expected at the time we initiated work on it.
- There may be accidents or incidents during project implementation.
- We may face shortages of skilled personnel.

Table of Contents

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

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

- Unexpected weather conditions or other *force majeure* events.
- Adverse mining conditions delaying or hampering our ability to produce the expected quantity of minerals and to meet specifications required by customers, which can trigger price adjustments.
- Accidents or incidents involving our mines and related infrastructure, such as dams, plants, railroads, ports and ships.
- Delays or interruptions in the transportation of our products, including with railroads, ports and ships.
- Tropical diseases, HIV/AIDS and other contagious diseases in regions where some of our operations or projects are located, which pose health and safety risks to our employees.
- Labor disputes that may disrupt our operations from time to time.
- Changes in market conditions or regulations may affect the economic prospects of an operation and make it inconsistent with our business strategy.
- Disruptions to or unavailability of critical information technology systems or services resulting from accidents or malicious acts.

Our business could be adversely affected by the failure of our counterparties to perform their obligations.

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

We currently operate important parts of our iron ore, pelletizing, bauxite, nickel, coal, copper, fertilizers and steel businesses through joint ventures. Important parts of our electricity investments and projects are operated through consortia or joint ventures. Our forecasts and plans for these joint ventures and consortia assume that our partners will observe their obligations to make capital contributions, purchase products and, in some cases, provide skilled and competent managerial personnel. If any of our partners fails to observe its commitments, the affected joint venture or consortium may not be able to operate in accordance with its business plans, or we may have to increase the level of our investment to implement these plans.

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

Table of Contents

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

Our operations involve the use, handling, storage, discharge and disposal of hazardous substances into the environment and the use of natural resources, and the mining industry is generally subject to significant risks and hazards, including fire, explosion, toxic gas leaks, spilling of polluting substances or other hazardous materials, rockfall incidents in mining operations and incidents involving mobile equipment or machinery. This could occur by accident or by breach of operating and maintenance standards, and could result in a significant environmental impact, damage to or destruction of mineral properties or production facilities, personal injury or death, environmental damage, delays in production, monetary losses and possible legal liability. Notwithstanding our standards, policies and controls, our operations remain subject to incidents or accidents that could adversely affect our business or reputation.

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

Nearly all aspects of our activities, products, services and projects around the world are subject to environmental regulations and health and safety regulations, which may expose us to increased liability or increased costs. These regulations require us to obtain environmental licenses, permits and authorizations for our operations, and to conduct environmental and social impact assessments in order to get approval for our projects and permission for initiating construction. Significant changes to existing operations are also subject to these requirements. Difficulties in obtaining permits may lead to construction delays, cost increases, and may adversely impact our production volumes. Environmental and health and safety regulations also impose standards and controls on activities relating to mineral research, mining, pelletizing activities, railway and marine services, ports, decommissioning, refining, distribution and marketing of our products. Such regulation may give rise to significant costs and liabilities.

In addition, communities and other stakeholders may increase demands for socially responsible and environmentally sustainable practices, and their efforts may lead to the creation or revision of government regulations and policies, which could entail significant costs and reduce our profitability. Private litigation relating to these or other matters may adversely affect our financial condition or cause harm to our reputation.

Environmental and health and safety regulation in many countries in which we operate has become stricter in recent years, and it is possible that more regulation or more aggressive enforcement of existing regulations will adversely affect us by imposing restrictions on our activities and products, creating new requirements for the issuance or renewal of environmental licenses, raising our costs or requiring us to engage in expensive reclamation efforts. For example, changes in Brazilian legislation for the protection of caves have required us to conduct extensive technical studies and to negotiate compensatory measures with Brazilian environmental regulators in order to continue to operate in certain sites. It is possible that in certain of our iron ore mining operations or projects, we may be required to limit or modify our mining plans or to incur additional costs to preserve caves or to compensate for the impact on them, with potential consequences for production volumes, costs or reserves in our iron ore business. For more information about Brazilian environmental regulations related to caves, see *Information on the Company Regulatory matters Environmental regulations*.

In response to the failure of Samarco's tailings dam in Minas Gerais, additional environmental and health and safety laws and regulations may be forthcoming in Brazil and authorities may impose more stringent conditions in connection with the licensing process of our projects and operations. Also, we may encounter delays in the receipt of environmental operating license for other tailings dams.

National policies and international regulations regarding climate change may affect a number of our businesses in different countries, because we operate worldwide. For example, there is legislation in many countries where we operate that limits greenhouse gas emissions from the mining industry. There is increased pressure from international organizations for establishing a global carbon price, and for companies and governments to adopt carbon pricing strategies, which may adversely affect the coal business.

Table of Contents

Regulatory initiatives at the national and international levels that affect our shipping practices could increase our costs or require us to make new capital expenditures.

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

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

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

Our businesses are generally subject to a number of risks and hazards, which could result in damage to, or destruction of, properties, facilities and equipment. The insurance we maintain against risks that are typical in our business may not provide adequate coverage. Insurance against some risks (including liabilities for environmental pollution or certain hazards or interruption of certain business activities) may not be available at a reasonable cost, or at all. Even when it is available, we may self-insure where we determine that is more cost-effective to do so. As a result, accidents or other negative developments involving our mining, production or transportation facilities could have a material adverse effect on our operations.

Our reserve estimates may materially differ from mineral quantities that we are actually able to recover; our estimates of mine life may prove inaccurate; and market price fluctuations and changes in operating and capital costs may render certain ore reserves uneconomical to mine.

Our reported reserves are estimated quantities of ore and minerals that we have determined can be economically mined and processed under present and assumed future conditions. There are numerous uncertainties inherent in estimating quantities of reserves and in projecting potential future rates of mineral production, including factors beyond our control. Reserve reporting involves estimating deposits of minerals that cannot be measured in an exact manner, and the accuracy of any reserve estimate is a function of the quality of available data, engineering and geological interpretation and judgment. As a result, no assurance can be given that the indicated amount of ore will be recovered or that it will be recovered at the rates we anticipate. Reserve estimates and estimates of mine life may require revisions based on actual production experience, projects and other factors. For example, lower market prices of minerals and metals, reduced recovery rates or increased operating and capital costs due to inflation, exchange rates, changes in regulatory requirements or other factors may render proven and probable reserves uneconomic to exploit and may ultimately result in a restatement of reserves. Such a restatement could affect depreciation and amortization rates and have an adverse effect on our financial performance.

We may not be able to replenish our reserves, which could adversely affect our mining prospects.

We engage in mineral exploration, which is highly uncertain in nature, involves many risks and frequently is non-productive. Our exploration programs, which involve significant expenditures, may fail to result in the expansion or replacement of reserves depleted by current production. If we do not develop new reserves, we will not be able to sustain our current level of production beyond the remaining lives of our existing mines.

Table of Contents

The feasibility of new mineral projects may change over time.

Once mineral deposits are discovered, it can take a number of years from the initial phases of drilling until production is possible, during which the economic feasibility of production may change. Substantial time and expenditures are required to:

- establish mineral reserves through drilling;
- determine appropriate mining and metallurgical processes for optimizing the recovery of metal contained in ore;
- obtain environmental and other licenses;
- construct mining, processing facilities and infrastructure required for greenfield properties; and
- obtain the ore or extract the minerals from the ore.

If a project proves not to be economically feasible by the time we are able to exploit it, we may incur substantial losses and be obliged to take write-downs. In addition, potential changes or complications involving metallurgical and other technological processes arising during the life of a project may result in delays and cost overruns that may render the project not economically feasible.

We face rising extraction costs or investment requirements over time as reserves deplete.

Reserves are gradually depleted in the ordinary course of a given open pit or underground mining operation. As mining progresses, distances to the primary crusher and to waste deposits become longer, pits become steeper, mines may move from being open pit to underground, and underground operations become deeper. In addition, for some types of reserves, mineralization grade decreases and hardness increases at greater depths. As a result, over time, we usually experience rising unit extraction costs with respect to each mine, or we may need to make additional investments, including adaptation or construction of processing plants and expansion or construction of tailings dams. Several of our mines have been operating for long periods, and we will likely experience rising extraction costs per unit in the future at these operations in particular.

Labor disputes may disrupt our operations from time to time.

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

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

Energy costs are a significant component of our cost of production, representing 9.1% of our total cost of goods sold in 2015. To fulfill our energy needs, we depend on the following sources: oil by-products, which represented 43% of total energy needs in 2015, electricity (26%), natural gas (16%), coal (13%) and other energy sources (2%).

Table of Contents

Electricity costs represented 2.8% of our total cost of goods sold in 2015. If we are unable to secure reliable access to electricity at acceptable prices, we may be forced to curtail production or may experience higher production costs, either of which would adversely affect our results of operations. We face the risk of energy shortages in the countries where we have operations and projects, especially Brazil, due to lack of infrastructure or weather conditions, such as floods or droughts. Future shortages, and government efforts to respond to or prevent shortages, may adversely impact the cost or supply of electricity for our operations.

Price volatility relative to the U.S. dollar of the currencies in which we conduct operations could adversely affect our financial condition and results of operations.

A substantial portion of our revenues and our debt is denominated in U.S. dollars, and changes in exchange rates may result in (i) losses or gains on our net U.S. dollar-denominated indebtedness and accounts receivable and (ii) fair value losses or gains on currency derivatives we use to stabilize our cash flow in U.S. dollars. In 2015, 2014 and 2013 we had foreign exchange losses of US$7.2 billion, US$2.1 billion and US$2.8 billion, respectively. In addition, the price volatility of the Brazilian *real*, the Canadian dollar, the Australian dollar, the Indonesian rupiah and other currencies against the U.S. dollar affects our results since most of our costs of goods sold are denominated in currencies other than the U.S. dollar, principally the *real* (49% in 2015) and the Canadian dollar (13% in 2015), while our revenues are mostly U.S. dollar-denominated. We expect currency fluctuations to continue to affect our financial income, expense and cash flow generation.

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

Failures in our information technology systems or difficulties in integrating new enterprise resource planning software may interfere with the normal functioning of our business.

We rely on information technology ("IT") systems for the operation of many of our business processes. Failures in our IT systems, whether caused by accident or malicious acts, may result in the disclosure or theft of sensible information, misappropriation of funds and disruptions to our business operations.

Risks relating to our corporate structure

Our controlling shareholder has significant influence over Vale, and the Brazilian government has certain veto rights.

As of February 29, 2016, Valepar S.A. ("Valepar") owned 53.9% of our outstanding common stock and 33.7% of our total outstanding capital. As a result of its share ownership, Valepar can elect the majority of our board of directors and control the outcome of some actions that require shareholder approval. For a description of our ownership structure and of the Valepar shareholders' agreement, see *Share ownership and trading Major shareholders*.

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

Table of Contents

Our governance and compliance processes may fail to prevent regulatory penalties and reputational harm.

We operate in a global environment, and our activities extend over multiple jurisdictions and complex regulatory frameworks with increased enforcement activities worldwide. Our governance and compliance processes, which include the review of internal control over financial reporting, may not prevent future breaches of legal, accounting or governance standards. We may be subject to breaches of our Code of Ethics and Conduct, anti-corruption policies and business conduct protocols and to instances of fraudulent behavior, corrupt practices and dishonesty by our employees, contractors or other agents. Our failure to comply with applicable laws and other standards could subject us to fines, loss of operating licenses and reputational harm.

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

Our investors may be located in jurisdictions outside Brazil and could seek to bring actions against us or our directors or officers in the courts of their home jurisdictions. The Company is a Brazilian company, and the majority of our officers and directors are residents of Brazil. The vast majority of our assets and the assets of our officers and directors are likely to be located in jurisdictions other than the home jurisdictions of our investors. It might not be possible for investors to effect service of process within their home jurisdictions on us or on our officers or directors who reside outside their home jurisdictions. In addition, a foreign judgment will be enforceable in the courts of Brazil without a re-examination of the merits only if previously confirmed by the Brazilian Superior Court of Justice (*Superior Tribunal de Justiça*), and confirmation will only be granted if the judgment: (a) fulfills all formalities required for its enforceability under the laws of the country where it was issued; (b) was issued by a competent court after due service of process on the defendant, as required under applicable law; (c) was authenticated by a Brazilian consulate in the country in which it was issued and is accompanied by a sworn translation into the Portuguese language; and (d) is not contrary to Brazilian national sovereignty, public policy or good morals. Therefore, investors might not be able to recover against us or our directors and officers on judgments of the courts of their home jurisdictions predicated upon the laws of such jurisdictions.

Risks relating to our depositary shares

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

The custodian for the shares underlying our ADSs and HDSs maintains a registration with the Central Bank of Brazil entitling it to remit U.S. dollars outside Brazil for payments of dividends and other distributions relating to the shares underlying our ADSs and HDSs or upon the disposition of the underlying shares. If an ADR holder or HDR holder exchanges its ADSs or HDSs for the underlying shares, it will be entitled to rely on the custodian's registration for only five business days from the date of exchange. Thereafter, an ADR holder or HDR holder may not be able to obtain and remit foreign currency abroad upon the disposition of, or distributions relating to, the underlying shares unless it obtains its own registration under applicable regulation, which permits qualifying institutional foreign investors to buy and sell securities on the BM&FBOVESPA. For more information regarding these exchange controls, see *Additional information Exchange controls and other limitations affecting security holders*. If an ADR holder or HDR holder attempts to obtain its own registration, it may incur expenses or suffer delays in the application process, which could delay the receipt of dividends or other distributions relating to the underlying shares or the return of capital in a timely manner.

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

Table of Contents

ADR holders and HDR holders may be unable to exercise preemptive rights relating to the shares underlying their ADSs and HDSs.

The ability of ADR holders and HDR holders to exercise preemptive rights is not assured, particularly if the applicable law in the holder's jurisdiction (for example, the Securities Act in the United States or the Companies Ordinance in Hong Kong) requires that either a registration statement be effective or an exemption from registration be available with respect to those rights, as is in the case in the United States, or that any document offering preemptive rights be registered as a prospectus, as is the case in Hong Kong. We are not obligated to extend the offer of preemptive rights to holders of ADRs or HDRs, to file a registration statement in the United States, or to make any other similar filing in any other jurisdiction, relating to preemptive rights or to undertake steps that may be needed to make exemptions from registration available, and we cannot assure holders that we will file any registration statement or take such steps.

ADR holders and HDR holders may encounter difficulties in the exercise of voting rights.

ADR holders and HDR holders do not have the rights of shareholders. They have only the contractual rights set forth for their benefit under the deposit agreements. ADR holders and HDR holders are not permitted to attend shareholders' meetings, and they may only vote by providing instructions to the depositary. In practice, the ability of a holder of ADRs or HDRs to instruct the depositary as to voting will depend on the timing and procedures for providing instructions to the depositary either directly or through the holder's custodian and clearing system. With respect to ADSs for which instructions are not received, the depositary may, subject to certain limitations, grant a proxy to a person designated by us.

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

We are a global company with securities traded in several different markets and investors located in many different countries. The legal regime for the protection of investors varies around the world, sometimes in important ways, and investors in our securities should recognize that the protections and remedies available to them may be different from those to which they are accustomed in their home markets. We are subject to securities legislation in several countries, which have different rules, supervision and enforcement practices. The only corporate law applicable to our parent company is the law of Brazil, with its specific substantive rules and judicial procedures. We are subject to corporate governance rules in several jurisdictions where our securities are listed, but as a foreign private issuer, we are not required to follow many of the corporate governance rules that apply to U.S. domestic issuers with securities listed on the New York Stock Exchange, and we are not subject to the U.S. proxy rules. Similarly, we have been granted waivers and exemptions from certain requirements of the Rules Governing the Listing of Securities on The Stock Exchange of Hong Kong Limited ("HKEx Listing Rules"), the Codes on Takeovers and Mergers and Share Repurchases and the Securities and Futures Ordinance of Hong Kong that are generally applicable to issuers listed in Hong Kong.

Table of Contents

SELECTED FINANCIAL DATA

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

Consolidated statement of income data

	For the year ended December 31,				
	2011	2012	2013	2014	2015
	(US$ million)				
Net operating revenues	60,075	46,553	46,767	37,539	25,609
Cost of products and services	(24,528)	(25,390)	(24,245)	(25,064)	(20,513)
Selling, general and administrative expenses	(2,271)	(2,172)	(1,302)	(1,099)	(652)
Research and evaluation expenses	(1,671)	(1,465)	(801)	(734)	(477)
Pre-operating and operational stoppage and other operating expenses, net	(2,775)	(3,588)	(2,843)	(2,145)	(1,233)
Impairment of non-current assets and onerous contracts		(4,023)	(2,298)	(1,152)	(8,926)
Gain (loss) on measurement or sales of non-current assets	1,494	(506)	(215)	(167)	61
Operating income	30,324	9,409	15,063	7,178	(6,131)
Non-operating income (expenses):					
Financial income (expenses), net	(3,549)	(4,022)	(8,332)	(6,069)	(10,801)
Equity results in associates and joint controlled entities	1,138	645	469	505	(439)
Results on sale of investments from associates and joint ventures			41	(30)	97
Impairment on investments		(1,941)		(31)	(446)
Income (loss) before income taxes	27,913	4,091	7,241	1,553	(17,720)
Income taxes	(5,265)	1,174	(6,833)	(1,200)	5,100
Income (loss) from continuing operations	22,648	5,265	408	353	(12,620)
Income (loss) attributable to non-controlling interests	(233)	(257)	(178)	(304)	(491)
Net income (loss) attributable to Company's shareholders, from continuing operations	22,881	5,522	586	657	(12,129)
Loss from discontinued operations, net of tax	(86)	(68)	(2)		
Net income (loss) attributable to Company's shareholders	22,795	5,454	584	657	(12,129)
Income (loss) attributable to non-controlling interests	(233)	(257)	(178)	(304)	(491)
Net income (loss)	22,562	5,197	406	353	(12,620)
Total cash paid to shareholders(1)	9,000	6,000	4,500	4,200	1,500

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

Earnings per share

	For the year ended December 31,				
	2011	2012	2013	2014	2015
	(US$, except as noted)				
Earnings (loss) per share:					
Per common share	4.34	1.06	0.11	0.13	(2.35)
Per preferred share	4.34	1.06	0.11	0.13	(2.35)

Weighted average number of shares outstanding (in thousands)(1):					
Common shares	3,197,063	3,172,179	3,185,653	3,185,653	3,185,653
Preferred shares	1,984,030	1,933,491	1,967,722	1,967,722	1,967,722
Treasury common shares underlying convertible notes	18,416				
Treasury preferred shares underlying convertible notes	47,285				
Total	5,246,794	5,105,670	5,153,375	5,153,375	5,153,375
Distributions to shareholders per share(2):					
Expressed in US$	1.74	1.17	0.87	0.81	0.29
Expressed in R$	2.89	2.26	1.81	1.89	0.98

(1) Each common ADS represents one common share and each preferred ADS represents one preferred share.

(2) Our distributions to shareholders may be classified as either dividends or interest on shareholders' equity. In many years, part of each distribution has been classified as interest on shareholders' equity and part has been classified as dividends. For information about distributions paid to shareholders, see *Share ownership and trading Distributions.*

Table of Contents

Balance sheet data

	At December 31,				
	2011	2012	2013	2014	2015
	(US$ million)				
Current assets	21,538	22,069	20,611	16,594	11,429
Property, plant and equipment, net and intangible assets	91,863	94,093	88,536	84,942	59,426
Investments in associated companies and joint ventures	8,013	6,384	3,584	4,133	2,940
Other assets	5,502	8,031	11,866	10,820	14,697
Total assets	126,916	130,577	124,597	116,489	88,492
Current liabilities	11,093	12,402	9,164	10,626	10,438
Liabilities associated with assets held for sale and discontinued operations		169	448	111	107
Long-term liabilities(1)	16,470	16,380	22,379	22,043	15,896
Long-term debt(2)	21,538	26,799	27,670	27,388	26,347
Total liabilities	49,101	55,750	59,661	60,168	52,788
Shareholders' equity:					
Capital stock	60,578	60,578	60,578	61,614	61,614
Additional paid-in capital	7	(552)	(552)	(601)	(854)
Mandatorily convertible notes common ADSs	191				
Mandatorily convertible notes preferred ADSs	422				
Retained earnings and revenue reserves	14,902	13,213	3,299	(5,891)	(27,171)
Total Company shareholders' equity	76,100	73,239	63,325	55,122	33,589
Non-controlling interests	1,715	1,588	1,611	1,199	2,115
Total shareholders' equity	77,815	74,827	64,936	56,321	35,704
Total liabilities and shareholders' equity	126,916	130,577	124,597	116,489	88,492

(1) Excludes long-term debt.

(2) Excludes current portion of long-term debt.

Table of Contents

I. INFORMATION ON THE COMPANY

BUSINESS OVERVIEW

Summary

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

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

	Year ended December 31,					
	2013		2014		2015	
	US$ million	% of total	US$ million	% of total	US$ million	% of total
Ferrous minerals:						
Iron ore	27,844	59.6%	19,301	51.4%	12,330	48.2%
Iron ore pellets	6,000	12.8	5,263	14.0	3,600	14.1
Manganese and ferroalloys	523	1.1	392	1.0	162	0.6
Other ferrous products and services	425	0.9	741	2.0	470	1.8
Subtotal ferrous minerals	34,792	74.4	25,697	68.4	16,562	64.7
Coal	1,010	2.2	739	2.0	526	2.0
Base metals:						
Nickel and other products(1)	5,839	12.5	6,241	16.6	4,693	18.3
Copper(2)	1,447	3.1	1,451	3.9	1,470	5.8
Subtotal base metals	7,286	15.6	7,692	20.5	6,163	24.1
Fertilizer nutrients	2,814	6.0	2,415	6.4	2,225	8.7
Other(3)	865	1.8	996	2.7	133	0.5
Total net operating revenues from continued operations	46,767	100.0%	37,539	100.0%	25,609	100.0%

(1) Includes nickel co-products (copper) and by-products (precious metals, cobalt and others).

(2) Does not include copper produced as a nickel co-product.

(3) Includes pig iron and energy.

Table of Contents

- Ferrous minerals:
  - *Iron ore and iron ore pellets*. We operate four systems in Brazil for producing and distributing iron ore, which we refer to as the Northern, Southeastern, Southern and Midwestern Systems. The Northern and the Southeastern Systems are fully integrated, consisting of mines, railroads, maritime terminals and a port. The Southern System consists of three mining complexes and two maritime terminals. We also have iron ore pellet operations in several locations, some of which are conducted through joint ventures. We operate 11 pellet plants in Brazil and two in Oman. The operations of three of our pellet plants in Brazil have been suspended since the fourth quarter of 2012 in response to market conditions, and their capacity was partially replaced by Tubarão VIII, a more efficient plant. Additionally, we have a 50% stake in Samarco, which operates an integrated system in the Brazilian states of Minas Gerais and Espírito Santo. Samarco's operations have been suspended following the failure of its tailings dam in November 2015 (see *Significant Changes in Our Business Failure of Samarco's tailings dam in Minas Gerais*). We also have 25% stakes in two pellet companies in China.
  - *Manganese ore and ferroalloys*. We conduct our manganese mining operations through Vale S.A. and subsidiaries in Brazil, and we produce several types of manganese ferroalloys through a wholly-owned subsidiary in Brazil.
- Base metals:
  - *Nickel*. Our principal nickel mines and processing operations are conducted by our wholly-owned subsidiary Vale Canada Limited ("Vale Canada"), which has operations in Canada and Indonesia. We also have nickel operations in Onça Puma, in the Brazilian state of Pará. We also own and operate, or have interests in, nickel refining facilities in the United Kingdom, Japan, Taiwan, China and South Korea. We are currently ramping up nickel operations in New Caledonia.
  - *Copper*. In Brazil, we produce copper concentrates at Sossego and Salobo, in Carajás, in the Brazilian state of Pará. We are concluding the ramp-up of Salobo operations. In Canada, we produce copper concentrates, copper anodes and copper cathodes in conjunction with our nickel mining operations at Sudbury and Voisey's Bay. In Zambia, our joint venture produces copper concentrates at Lubambe, located in the Zambian Copperbelt.
  - *Cobalt, PGMs and other precious metals*. We produce cobalt as a by-product of our nickel mining and processing operations in Canada and refine the majority of it at our Port Colborne facilities, in the Province of Ontario, Canada. We also produce cobalt as a by-product of our nickel operations in New Caledonia, which we are currently ramping up. We produce PGMs as by-products of our nickel mining and processing operations in Canada. The PGMs are concentrated at our Port Colborne facilities and refined at our precious metals refinery in Acton, England. We produce gold and silver as by-products of our nickel mining and processing operations in Canada, and gold as a by-product of our copper mining in Brazil.
- Coal:
  - We conduct our coal operations primarily in Mozambique, through Vale Moçambique, S.A. ("Vale Moçambique"), where we are ramping up our metallurgical and thermal coal operations. We also have a coal operation in Australia through Rio Doce Australia Pty Ltd ("Vale Australia"), where we produce metallurgical coal in Carborough Downs. We also have minority interests in a Chinese coal and coke producer.

Table of Contents

- Fertilizer nutrients:
  - We conduct our potash operations in Rosario do Catete, in the Brazilian state of Sergipe. We conduct our main phosphate operations through our subsidiary Vale Fertilizantes S.A. ("Vale Fertilizantes"), which holds most of our fertilizer assets in Brazil. Vale Fertilizantes is the largest Brazilian producer of phosphate rock and phosphate fertilizers and the second-largest Brazilian producer of nitrogen fertilizers. We also have a phosphate rock mine operation in Peru.
- Logistics infrastructure:
  - We are a leading operator of logistics services in Brazil and other regions of the world, with railroads, maritime terminals, distribution centers and ports. Two of our four iron ore systems include an integrated railroad network linked to port and terminal facilities. We also have an interest in MRS Logística S.A. ("MRS"), which transports our iron ore products from the Southern System mines to our maritime terminals, and VLI S.A. ("VLI"), which provides integrated logistics solutions to general cargo through railroads, inland and maritime terminals in Brazil. We are ramping up the logistics infrastructure to support our operations in Southeastern Africa. We own and charter dry bulk vessels to transport the products that we sell on a cost and freight ("CFR") basis to customers.

Business strategy

Our mission is to transform natural resources into prosperity and sustainable development. Our vision is to be the number one global natural resources company in creating long-term value through excellence and passion for people and the planet. We are committed to investing mainly in world-class assets, with long life, low cost, potential to expand and high quality output, capable of creating value through different economic cycles. A lean management organization, with teamwork and accountability, excellence in project execution and firm commitment to transparency and shareholder value creation, are principles of paramount importance that guide us towards the achievement of our goals. Health and safety, investment in human capital, a positive work environment and sustainability are also critical to our long-term competitiveness.

We aim to maintain our competitive position in the global iron ore market and to grow through world-class assets while exercising disciplined capital management and maintaining a low cost structure. Iron ore and nickel will continue to be our main businesses while we work to maximize the value of our copper, coal and fertilizer nutrients businesses. To enhance our competitiveness, we will continue to improve our railroads and our global distribution network. We seek opportunities to make strategic partnerships focusing on disciplined capital management. We have also suspended operations of assets in response to market conditions, and disposed of assets that we have determined to be non-strategic or in order to optimize the structure of our business portfolio. The divestiture of assets improves capital allocation and unlocks funds to finance the execution of top priority projects. The preservation of our credit ratings is one of our basic commitments. Below are the highlights of our major business strategies.

Maintaining our competitiveness in the global iron ore market

We are committed to maintaining our competitiveness in the global iron ore market, by focusing our product line to capture industry trends, improving quality and productivity, controlling costs, strengthening our logistics infrastructure of railroads, ports, shipping and distribution centers, and strengthening relationships with customers. Our diversified portfolio of high quality products, strong technical marketing strategy, efficient logistics and long-standing relationships with major customers will help us achieve this goal.

Enhancing our logistics capacity to support our iron ore and coal businesses

We believe that the quality of our railway assets, our extensive experience as a railroad and port operator, and our stakes in MRS and VLI position us as a leader in the logistics business in Brazil. We have been expanding the capacity of our railroads and ports primarily to meet the needs of our iron ore business.

Table of Contents

We continue to satisfy our transportation needs through a fleet of capesize vessels and very large ore carriers of 400,000 deadweight tons ("DWT"), primarily used to transport iron ore from Brazil to Asia, which is owned partly by us and partly by ship owners with which we have contracts of affreightment. To support our commercial strategy for our iron ore business, we operate two distribution centers in Malaysia and Oman, and two floating transfer stations ("FTS") in the Philippines.

In order to position ourselves for the future expansion of our coal production in Mozambique and leverage our presence in Africa, we are currently ramping up the expansion of the local railroad capacity by rehabilitating the existing network and building new railroad tracks to develop the logistics corridor from our mine to the newly constructed port at Nacala-à-Velha, in Mozambique.

Maximizing value in the nickel and copper businesses

We are the world's largest nickel producer, with large-scale, long-life and low-cost operations, a substantial resource base, diversified mining operations producing nickel from nickel sulfides and laterites and advanced technology. We have refineries in North America, Europe and Asia, which produce an array of products for use in most nickel applications. We are a leading producer of high-quality nickel products for non-stainless steel applications, such as plating, alloy steels, high nickel alloys and batteries, which represented 58% of our refined nickel sales in 2015. Our long-term goal is to strengthen our competitiveness in the nickel business. We continue to optimize our operations and to review our asset utilization aiming to increase productivity and improve returns.

We produce copper concentrates from our Sossego and Salobo facilities located in the Carajás region. These copper mines benefit from our infrastructure facilities serving the Northern System. The gold we produce at Sossego and Salobo increases the total aggregated value of those operations. Our strategy for our copper assets in the Carajás region is to develop new mines in order to maintain supply for our existing processing facilities. We also have copper operations at Lubambe, in Zambia, through a joint venture. Copper is recovered as a co-product from our nickel operations, principally at Sudbury and Voisey's Bay, in Canada.

Optimizing the coal business

We have coal operations in Moatize (Mozambique) and Australia, and we hold a minority interest in a joint venture in China. We intend to continue pursuing organic growth in the coal business mainly through the expansion of the Moatize operations in Mozambique, where we have entered into a strategic partnership with Mitsui.

Maintaining growth options in fertilizer nutrients business

We have potash and phosphate rock operations as well as potential investments in greenfield and brownfield projects that we believe will allow us to benefit from certain demographic trends: the growing world population, an increase in per capita income in emerging economies and higher global consumption of proteins. We also take advantage of our strategic position to provide goods to the fertilizer-driven agricultural expansion in Brazil.

Developing our resource base

We are taking advantage of our global presence to develop mineral exploration initiatives. We conduct brownfield exploration to maximize results from existing mining areas and to support both projects and operations. We conduct our greenfield exploration activities in six countries, which are Brazil, Peru, Chile, Canada, Australia and Indonesia. In particular, we seek to identify opportunities and develop deposits with the potential for large scale production at low cost. Our exploration activities include iron ore, nickel, copper, coal, potash and phosphates.

Table of Contents

Optimizing our energy matrix

As a large consumer of electricity, we have invested in power generation projects to support our operations and to reduce our exposure to the volatility of energy prices and regulatory uncertainties. Accordingly, we have developed hydroelectric power generation plants in Brazil, Canada and Indonesia, and we currently generate 51% of our worldwide electricity needs from our own plants. We are seeking to develop a clean energy mix by investing to develop low carbon energy sources such as biofuels and focusing on reducing our carbon footprint.

Integrating sustainability into our business

We are committed to sustainability, as we cannot grow without taking into account the physical limits of our planet or the well-being of communities in which we operate. Since 2013, we have incorporated environmental and social actions directly into our strategic planning, moving away from a stand-alone investment model. We practice sustainable mining by dedicating resources to education and researching the application of technologies to use natural resources efficiently. We are also committed to reducing the consumption of water in our activities and to use it more efficiently, especially through reuse and recirculation of water. We actively support an open dialogue with our main stakeholders (governments, communities, customers, suppliers, employees and others), because we recognize that only by acting together we can achieve sustainable growth and contribute to social welfare. We follow standards for social action and principles on business and human rights, which are based on the guidelines of the United Nations Human Rights Council. We are also committed to reducing greenhouse gas emissions.

Significant changes in our business

We summarize below major events related to our organic growth, divestitures, acquisitions and other significant developments in our business since the beginning of 2015.

Organic growth

We have an extensive program of investments in the organic growth of our businesses. Our main investment projects are summarized under *Capital expenditures*. The most significant projects that have come on stream since the beginning of 2015 are summarized below:

- *Conceição Itabiritos II.* In the second quarter of 2015, we completed the adaptation of the existing plant to process lower grade itabirites from the Conceição mine, located in the Southeastern System in Minas Gerais, Brazil. The nominal capacity is 13 Mtpy of pellet feed and 6 Mtpy of sinter feed.

- *Cauê Itabiritos.* In the fourth quarter of 2015, we concluded the adaptation of the plant to process low-grade itabirites from the Itabira mining complex, located in the Southeastern System in Minas Gerais, Brazil. The nominal capacity is 16.5 Mtpy of pellet feed and 7.2 Mtpy of sinter feed.

- *Nacala Logistics Corridor.* In the fourth quarter of 2014, we began the upgrade of brownfield sections of the railway, which was completed in the fourth quarter of 2015. The project, which consists of a railway and port infrastructure connecting the Moatize site to the Nacala-à-Velha maritime terminal, located in Nacala, Mozambique, successfully transported and discharged 523,000 tons of thermal coal at the Nacala port, having completed four shipments of coal as of January 2016.

Dispositions and asset sales

We are always seeking to optimize the structure of our portfolio of businesses in order to achieve the most efficient allocation of capital. We summarize below our most significant dispositions since the beginning of 2015.

Table of Contents

- *Sale of gold stream from Salobo copper mine* In March 2015, we sold to Silver Wheaton (Caymans) Ltd. ("Silver Wheaton") an additional 25% of the gold produced as a by-product at our Salobo copper mine, in Brazil, for the life of that mine. We had previously sold 25% of such gold in 2013. In consideration for the March 2015 sale, we received an initial cash payment of US$900 million and ongoing payments of the lesser of US$400 per ounce (subject to a 1% annual inflation adjustment after 2017) and the prevailing market price, for each ounce of gold that we deliver under the agreement. We may receive an additional cash payment, ranging from US$88 million to US$720 million, if we expand our capacity to process Salobo copper ores to more than 28 Mtpy before 2036.

- *Sale of minority interest in Minerações Brasileiras Reunidas S.A.* In September 2015, we sold preferred shares representing 36.4% of the total capital of our subsidiary Minerações Brasileiras Reunidas S.A. ("MBR") to an affiliate of Banco Bradesco S.A. for R$4.0 billion, or US$1.089 billion. After the sale, Vale holds 61.9% of the total capital and 98.3% of its voting capital. Vale has an option to repurchase the shares after an initial period.

- *Sale of Isaac Plains Coal mine* In November 2015, we completed the sale of our 50% stake in the Isaac Plains joint venture and all associated assets to Stanmore Coal Limited ("Stanmore"). Under this agreement, we will pay A$21.6 million in 12 installments to Stanmore, which will assume our liabilities under the joint venture agreement. Stanmore has agreed to pay us royalties of A$2.0 per ton on the coal produced and sold at the Isaac Plains coal mine for a period of ten years, subject to a certain price thresholds, up to an aggregate amount of A$21.6 million.

- *Sale of Integra coal operations* In December 2015, we completed the sale of our 68.4% stake in the Integra Coal Joint Venture ("ICJV") and all the associated assets to Glencore Plc ("Glencore"). As consideration, Glencore has agreed to pay us royalties of A$1.50 per ton on the coal produced and sold by ICJV, based on mineral rights currently held by ICJV, proportional to our stake in ICJV prior to the sale and limited to an annual volume of two million metric tons for ten years. As part of the transaction, Glencore has assumed some, but not all, ICJV liabilities, including certain "take or pay" logistics agreements.

- *Sale of very large ore carriers* In 2015, we concluded the sale of 12 very large ore carriers of 400,000 DWT for an aggregate amount of US$1.316 billion. See *Restructuring our investments in iron ore shipping*.

Partnership in coal assets in Mozambique

In December 2014, we entered into an investment agreement with Mitsui, pursuant to which Mitsui will acquire 15% of our stake in Vale Moçambique, which owns 95% of Moatize mine, and half of our equity stake in the companies holding the railroad and port concessions in the Nacala Corridor, in Mozambique and Malawi. The Mitsui investment is subject to conditions precedent, and is expected to close in 2016.

- *Moatize* Mitsui has agreed to acquire a 15% stake in Vale Moçambique, partly in a capital increase and partly from Vale. Mitsui has agreed to pay US$450 million, which may be increased by up to US$30 million or reduced by up to US$120 million, based on certain yield and production targets, through 2021. Mitsui will also provide additional funding, proportional to its 15% stake, to replace part of the funding of capital expenditures for the expansion of the Moatize mine provided by Vale since July 2014. Upon completion of the transaction, we will indirectly own 81% of the Moatize mine.

- *Nacala Corridor* Our equity stake in the companies holding the concessions in the Nacala Corridor will be transferred to a holding company jointly owned (50% each) and controlled by Vale and Mitsui. Mitsui will invest US$313 million in equity and quasi-equity instruments of this holding company. Vale and Mitsui are currently negotiating project financing that would meet one of the conditions to Mitsui's investment and replace part of the financing provided by Vale. See *Lines of Business Infrastructure Railroads*.

Table of Contents

Restructuring our investments in iron ore shipping

Our strategy with respect to maritime shipping for our iron ore includes securing long-term access to shipping capacity for the transportation of our iron ore from Brazil to Asia and protecting against volatility in freight pricing, without incurring the costs relating to building and owning the ships. In 2014, we entered into framework agreements for strategic cooperation in iron ore transportation with three shipping companies and financial institutions based in China and Hong Kong. Pursuant to these framework agreements, we (i) sold a total of 12 of our very large ore carriers of 400,000 DWT for an aggregate amount of US$1.316 billion and (ii) entered into long-term contracts of affreightment with the Chinese ship owners, to secure the long-term transportation capacity to ship our iron ore from Brazil to Asia and to protect against volatility in freight costs. We also sold three of our capesize vessels for approximately US$23 million in 2015.

Obtaining environmental licenses for expansion of N5S ore body in Carajás

In May 2015, we obtained the environmental license for the expansion of our N5S mine pit located in Carajás, Brazil. This license supports our iron ore production growth process, especially the production plan for 2016.

Restructuring our investments in power generation

In 2015, we concluded transactions with CEMIG Geração e Transmissão S.A. ("CEMIG GT") to (i) sell 49% of our 9% stake in Norte Energia S.A. ("Norte Energia"), the company established to develop and operate the Belo Monte hydroelectric plant, in the Brazilian state of Pará, to CEMIG GT, for approximately R$310 million; and (ii) create two distinct joint ventures: Aliança Geração de Energia S.A. ("Aliança Geração"), which holds the participations previously held by us and CEMIG GT in power generation assets and projects, and Aliança Norte Energia Participações S.A. ("Aliança Norte"), which holds our and CEMIG GT's interests in Norte Energia. Our interests in these joint ventures are 55% and 51%, respectively.

Suspension of certain iron ore operations in the Southern System

In July 2015, we temporarily suspended operations at certain iron ore processing plants with higher beneficiation costs and lower quality products in the Paraopeba mining complex and reduced production of lower quality products at certain mines at the Minas Itabiritos mining complex, both in the Southern System. We have resumed some of these operations, although at lower productivity. The decision is consistent with our strategy to improve product quality and increase profit margins.

Failure of Samarco's tailings dam in Minas Gerais

On November 5, 2015, one of Samarco's tailings dams (Fundão) failed unexpectedly, releasing tailings downstream, reaching and flooding certain communities, including Bento Rodrigues, a small district of 600 people. The failure resulted in 18 fatalities, with one person still missing, and caused property and environmental damage to the affected areas, primarily in the state of Minas Gerais.

Immediately after the dam failure, Samarco, together with the Civil Defense, Fire Department, Military Police and other authorities, provided first aid, food, water, housing, social assistance and financial aid to the affected families and individuals, and both Vale and BHPB, Samarco's shareholders, have been actively involved in supporting Samarco during this crisis.

In addition to these emergency actions, Samarco has been monitoring the affected area, performing emergency work to contain any movement of tailings, reinforcing the structures of its dams and dikes to ensure the safety of the region and mitigating the environmental and social impacts of the event.

Table of Contents

Samarco has been cooperating with the investigations being conducted by the Civil Police. Samarco, together with Vale and BHPB hired an external firm to conduct an independent investigation. In order to assess the environmental and socio-economic impacts of the dam failure and assist with the development of a remediation plan, Samarco has also engaged international consulting specialists in engineering, environment and environmental emergencies, health and safety, social and security services.

The dam failure resulted in the immediate stoppage of Samarco's mining operations in the state of Minas Gerais pursuant to order of government authorities. With the exception of two of its dams (the Fundão tailings dam and the Santarém water dam, which was impacted by the overflow of tailings from the Fundão dam), all other Samarco production assets were undamaged.

Vale's operation in the Mariana mining complex, near Samarco's mining area, was also negatively impacted by the failure of Samarco's tailings dam. A major conveyor belt connecting our Fábrica Nova mine to our Timbopeba beneficiation plant was damaged and the Alegria mine is operating with a dry beneficiation process, at lower productivity. These factors caused a decrease in production at the Mariana mining complex in Minas Gerais by 3.0 Mt in 2015, which was offset by increased production from our other mines. The expected impact in 2016 is a decrease of 9 Mt in production at the Mariana mining complex, which we expect to be partially offset by increased production at our other mines. In addition, we have interrupted the sale of run of mine (ROM) from our Fazendão mine to Samarco. We are still exploring alternatives for these mines.

As a consequence of the Fundão dam failure, Samarco incurred expenses, wrote off assets and recognized provisions for remediation, which affected its balance sheet and income statement. Because Samarco is a joint venture, these impacts are reflected on Vale's financial statements under the equity method, limited to its interest in Samarco's capital. Vale's investment in Samarco was reduced to zero and no liability was recognized in Vale's financial statements.

The dam failure had no effect on Vale's cash flow for the year ended December 31, 2015.

Samarco and its shareholders, Vale and BHPB, entered into a settlement agreement on March 2, 2016 with the federal Attorney General of Brazil, the two Brazilian states affected by the failure (Espírito Santo and Minas Gerais) and certain other parties. The settlement agreement, which includes no admission of civil, criminal or administrative liability for the Fundão dam failure, is expected to resolve the lawsuit brought in Brazilian courts by several Brazilian governmental authorities. The settlement agreement is already effective, though the resolution of claims pursuant to the agreement remains subject to judicial approval. See *Additional information Legal proceedings Legal proceedings related to failure of Samarco's tailings dam in Minas Gerais Public civil action by the Brazilian government and others*. There is no assurance as to whether and when the court will approve the resolution of claims. The term of the agreement is 15 years, renewable for successive one-year periods until all obligations under the agreement have been performed.

Under the settlement agreement, Samarco, Vale and BHPB will establish a foundation to develop and implement remediation programs to restore the environment, local communities and the social condition of the affected areas and compensation programs to provide compensation where remediation is not feasible and, in some cases, beyond strictly compensatory measures.

Samarco has agreed to provide funding to the foundation in the amount of R$2.0 billion in 2016, R$1.2 billion in 2017 and R$1.2 billion in 2018. Amounts Samarco has already spent on remediation and compensation will be applied towards its funding obligations. From 2019 to 2021, Samarco has agreed to provide funding based on the amounts needed to complete remaining remediation and compensation projects, subject to an annual minimum of R$800 million and an annual maximum of R$1.6 billion. The foundation will allocate an annual amount of R$240 million over 15 years to the implementation of compensation programs, and these annual amounts are included in the annual contributions described above for the first six years. Through the end of 2018, the foundation will also set aside R$500 million for basic sanitation in the affected areas.

Table of Contents

Samarco is currently unable to conduct ordinary mining and processing. Samarco's management is working on a plan that would permit it to resume operations, but the feasibility, timing and scope of restarting remain uncertain. If Samarco is able to resume operations, we expect that it will be able to generate all or a substantial part of the funding required under the agreement.

To the extent Samarco does not meet its funding obligations, each of Vale and BHPB is obligated to provide funding to the foundation in proportion to its 50% interest in Samarco. Vale does not currently expect to record a provision in its financial statements in respect of these obligations, but if Samarco is eventually unable to resume operations or to meet its funding obligations, Vale could determine that it should recognize a provision.

To comply with the settlement agreement, Samarco will continue to conduct and fund the humanitarian and environmental remediation and compensation works until the foundation is operational, which is likely to occur before the end of 2016.

Vale is subject to a number of other legal and administrative proceedings in connection with the Fundão dam's failure. See *Additional information Legal proceedings Legal proceedings related to failure of Samarco's tailings dam in Minas Gerais*.

Table of Contents

LINES OF BUSINESS

Our principal lines of business consist of mining and related logistics. We also have energy assets to supply part of our consumption. This section presents information about operations, production, sales and competition and is organized as follows.

1. Ferrous minerals

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

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

2. Base metals

2.1 Nickel
- 2.1.1 Operations
- 2.1.2 Production
- 2.1.3 Customers and sales
- 2.1.4 Competition

2.2 Copper
- 2.2.1 Operations
- 2.2.2 Production
- 2.2.3 Customers and sales
- 2.2.4 Competition

2.3 PGMs and other precious metals

2.4 Cobalt

3. Coal

3.1 Operations
3.2 Production
3.3 Customers and sales
3.4 Competition

4. Fertilizer nutrients

4.1 Phosphates and nitrogen
4.2 Potash
4.3 Customers and sales
4.4 Competition

5. Infrastructure

5.1 Logistics
- 5.1.1 Railroads
- 5.1.2 Ports and maritime terminals
- 5.1.3 Shipping

5.2 Energy

6. Other investments

Table of Contents

Table of Contents

1. Ferrous minerals

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

1.1 Iron ore and Iron ore pellets

1.1.1 Iron ore operations

We conduct our iron ore business in Brazil primarily at the parent-company level, through our wholly-owned subsidiary Mineração Corumbaense Reunida S.A. ("MCR") and through our subsidiary MBR. Our mines, all of which are open pit, and their related operations are mainly concentrated in three systems: the Southeastern, Southern and Northern Systems, each with its own transportation capabilities. We also conduct mining operations in the Midwestern System, and we have a 50% stake in Samarco. Samarco's operations have been suspended following the failure of one of its tailings dams located in Minas Gerais in November 2015 (see *Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*). We conduct each of our iron ore operations in Brazil under concessions from the federal government granted for an indefinite period. For more information about these concessions, see *Regulatory matters Mining rights and regulation of mining activities*.

Company/Mining System	Location	Description/History	Mineralization	Operations	Power source	Access/Transportation
Vale						
Northern System	Carajás, state of Pará	Open-pit mines and ore-processing plants. Divided into Serra Norte, Serra Sul and Serra Leste (northern, southern and eastern ranges). Since 1985, we have been conducting mining activities in the northern range, which is divided into three main mining areas (N4W, N4E and N5) and two major beneficiation plants. In 2014, we started a new mine and beneficiation plant in Serra Leste. We expect our operations in Serra Sul, where we are implementing our S11D project, to start in 2016.	High-grade hematite ore type (iron grade of more than 66% on average).	Open-pit mining operations. Beneficiation process consists simply of sizing operations, including screening, hydrocycloning, crushing and filtration. Output from the beneficiation process consists of sinter feed, pellet feed and lump ore.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	EFC railroad transports the iron ore to the Ponta da Madeira maritime terminal in the Brazilian state of Maranhão. Serra Leste iron ore is transported by trucks from the mine site to EFC railroad.
Southeastern System	Iron Quadrangle, state of Minas Gerais	Three mining complexes: Itabira (two mines, with three major beneficiation plants), Minas Centrais (three mines, with three major beneficiation plants and one secondary plant) and Mariana (three mines, with two major beneficiation plants).	Ore reserves with high ratios of itabirite ore relative to hematite ore type. Itabirite ore type has iron grade of 35-60% and requires concentration to achieve shipping grade.	Open-pit mining operations. We generally process the run-of-mine by means of standard crushing, classification and concentration steps, producing sinter feed, lump ore and pellet feed in the beneficiation plants located at the mining complexes.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	EFVM railroad connects these mines to the Tubarão port.

Table of Contents

Company/Mining System	Location	Description/History	Mineralization	Operations	Power source	Access/Transportation
Southern System	Iron Quadrangle, state of Minas Gerais	Three major mining complexes: Minas Itabirito (four mines and three major beneficiation plants); Vargem Grande (three mines and two major beneficiation plants); and Paraopeba (four mines and two major beneficiation plants). Part of these operations is conducted through our subsidiary MBR.	Ore reserves with high ratios of itabirite ore type relative to hematite ore type. Itabirite ore has iron grade of 35-60% and requires concentration to achieve shipping grade.	Open-pit mining operations. We generally process the run-of-mine by means of standard crushing, classification and concentration steps, producing sinter feed, lump ore and pellet feed in the beneficiation plants located at the mining complexes.	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	MRS transports our iron ore products from the mines to our Guaíba Island and Itaguaí maritime terminals in the Brazilian state of Rio de Janeiro. EFVM railroad connects certain mines to the Tubarão port.
Midwestern System	State of Mato Grosso do Sul	Open-pit mining operations. Two mines and two plants located in the city of Corumbá.	Hematite ore type, which generates lump ore predominantly.	Open-pit mining operations. The beneficiation process for the run of mine consists of standard crushing and classification steps, producing lump and fines.	Supplied through the national electricity grid. Acquired from regional utility companies.	Part of the sales are transported through barges traveling along the Paraguay river to the ports in Argentina, moving to Europe and Asia markets from there. Another part of the sales is delivered to customers in the ports of Corumbá.
Samarco	Iron Quadrangle, state of Minas Gerais	Integrated system comprised of two mines, three beneficiation plants, three pipelines, four pellet plants and a port.	Itabirite ore type.	Open-pit mining operations. The three beneficiation plants, located at the site, process the run-of-mine by means of standard crushing, milling and concentration steps, producing pellet feed and sinter feed. Samarco's mining operations have been suspended following the failure of one of its tailings dams located in Minas Gerais in November 2015 (see *Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*)	Supplied through the national electricity grid. Acquired from regional utility companies or produced directly by Samarco.	Samarco mines supply Samarco pellet plants using three pipelines extending approximately 400 kilometers. These pipelines transport the iron ore from the beneficiation plants to the pelletizing plants, and from the pelletizing plants to the port in the Brazilian state of Espírito Santo.

Table of Contents

1.1.2 Iron ore production

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

Mine/Plant	Type	Production for the year ended December 31, 2013	2014	2015	2015 process recovery (%)
		(million metric tons)			
Southeastern System					
Itabira	Open pit	34.0	35.5	35.5	55.2
Minas Centrais(1)	Open pit	37.8	33.0	41.2	67.7
Mariana	Open pit	37.6	38.9	35.9	81.8
Total Southeastern System		109.4	107.4	112.6	
Southern System					
Minas Itabirito	Open pit	31.0	33.0	31.6	72.3
Vargem Grande	Open pit	22.0	25.0	29.3	70.7
Paraopeba	Open pit	26.0	28.2	25.8	95.1
Total Southern System		79.0	86.2	86.7	
Northern System					
Serra Norte	Open pit	104.9	117.4	127.6	98.2
Serra Leste	Open pit		2.2	2.0	98.7
Total Northern System		104.9	119.6	129.6	
Midwestern System					
Corumba	Open pit	4.5	3.8	2.8	64.1
Urucum	Open pit	2.0	2.1	1.7	82.6
Total Midwestern System		6.5	5.8	4.5	
Total Vale Systems(2)		299.8	319.0	333.4	
Samarco(3)	Open pit	10.9	13.1	12.7	53.6
Total		310.7	332.1	346.1	

(1) Agua Limpa mine and plants are part of the Minas Centrais operations and are owned by Baovale Mineração S.A. ("Baovale"). We own 100% of the voting shares and 50% of the total shares of Baovale. Production figures for Água Limpa have not been adjusted to reflect our ownership interest.

(2) Production figures do not include third-party ore purchases of 12.5 Mt in 2015, 12.3 Mt in 2014 and 10.6 Mt in 2013.

(3) Production figures for Samarco, in which we have a 50% interest, have been adjusted to reflect our ownership interest.

1.1.3 Iron ore pellets operations

We produce iron ore pellets in Brazil and Oman, directly and through joint ventures, as set forth in the following table. We also have a 25% interest in two iron ore pelletizing plants in China, Zhuhai YPM Pellet Co., Ltd. ("Zhuhai YPM") and Anyang Yu Vale Yongtong Pellet Co., Ltd. ("Anyang"). Our total estimated nominal capacity is 64.7 Mtpy, including the full capacity of our pelletizing plants in Oman, but not including our joint ventures Samarco, Zhuhai YPM and Anyang. Of our total 2015 pellet production, including the production of our joint ventures, 68.6% was blast furnace pellets and 31.4% was direct reduction pellets, which are used in steel mills that employ the direct reduction

process rather than blast furnace technology. We supply all of the iron ore requirements of our wholly-owned pellet plants and part of the iron ore requirements for Samarco and Zhuhai YPM. In 2015, we sold 9.8 million metric tons of run of mine to Samarco and 0.9 million metric tons of pellet feed to Zhuhai YPM. We suspended our sales of run of mine to Samarco following the failure of Samarco's tailings dam in November 2015.

Table of Contents

Company/Plant	Description/History	Nominal capacity (Mtpy)	Power source	Other information	Vale's share (%)	Partners
Brazil:						
Vale						
Tubarão (state of Espírito Santo)	Three wholly owned pellet plants (Tubarão I, II and VIII) and five leased plants. Receives iron ore from our Southeastern System mines and distribution is made though our logistics infrastructure. Tubarão VIII plant started up in the first half of 2014.	36.7(1)	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.	Operations at the Tubarão I and II pellet plants have been suspended since November 13, 2012 in response to changes in steel industry demand for raw materials, and replaced by Tubarão VIII, a newer and more efficient plant.	100.0	
Fábrica (state of Minas Gerais)	Part of the Southern System. Receives iron ore from the João Pereira and Segredo mines. Production is mostly transported by MRS and EFVM.	4.5	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.		100.0	
Vargem Grande (state of Minas Gerais)	Part of the Southern System. Receives iron ore from the Sapecado, Galinheiro, Capitão do Mato and Tamanduá mines and the production is mostly transported by MRS.	7.0	Supplied through the national electricity grid. Produced directly by Vale or acquired through power purchase agreements.		100.0	
São Luís (state of Maranhão)	Part of the Northern System. Receives iron ore from the Carajás mines and production is shipped to customers through our Ponta da Madeira maritime terminal.	7.5	Supplied through the national electricity grid. Produced directly by Vale.	On October 8, 2012, we suspended operations at the São Luís pellet plant for reasons similar to those supporting our suspension of operations at the Tubarão I and II plants.	100.0	
Samarco	Four pellet plants with nominal capacity of 30.5 Mtpy. The pellet plants are located in the Ponta Ubu unit, in Anchieta, state of Espírito Santo. The fourth pellet plant started up in the first half of 2014.	30.5	Supplied through the national electricity grid. Acquired from regional utility companies or produced directly by Samarco.	In 2014, we started up the fourth pellet plant with a capacity of 8.3 Mtpy, increasing Samarco's total nominal pellet capacity to 30.5 Mtpy. In January 2016, Samarco suspended its pelletizing operations as pelletizing feed became unavailable as a result of the suspension of its mining operations in November 2015.	50.0	BHP Billiton Brasil Ltda.

Table of Contents

Company/Plant	Description/History	Nominal capacity (Mtpy)	Power source	Other information	Vale's share (%)	Partners
Oman:						
Vale Oman Pelletizing Company LLC	Vale's industrial complex. Two pellet plants with a total nominal capacity of 9.0 Mtpy. The pelletizing plants are integrated with our distribution center that has a nominal capacity to handle 40.0 Mtpy.	9.0	Supplied through the national electricity grid.	Oman plants are supplied by iron ore from the Iron Quadrangle, state of Minas Gerais through the Tubarão Port.	70.0	Oman Oil Company S.A.O.C.

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

Table of Contents

1.1.4 Iron ore pellets production

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

Company	Production for the year ended December 31, 2013	2014	2015
	(million metric tons)		
Vale(1)	39.0	43.0	46.2
Samarco(2)	10.6	12.1	12.3
Total	49.6	55.1	58.5

(1) Figure indicates actual production, including full production from our pellet plants in Oman, from the four pellet plants we leased in Brazil in 2008 and from the one pellet plant we leased in Brazil in 2012. We signed a 10-year operating lease contract for Itabrasco's pellet plant in October 2008. We signed a five-year operating lease contract for Kobrasco's pellet plant in June 2008, renewed for additional five years in 2013. We signed a 30-year operating lease contract for Nibrasco's two pellet plants in May 2008. On July 1, 2012, we signed a three-year operating lease for Hispanobras' pellet plant, which was renewed for three additional years in 2015, and started to consolidate its output with our production.

(2) Production figures for Samarco have been adjusted to reflect our ownership interest.

1.1.5 Customers, sales and marketing

We supply all of our iron ore and iron ore pellets (including our share of joint-venture pellet production) to the steel industry. Prevailing and expected levels of demand for steel products affect demand for our iron ore and iron ore pellets. Demand for steel products is influenced by many factors, such as global manufacturing production, civil construction and infrastructure spending. For further information about demand and prices, see *Operating and financial review and prospects Major factors affecting prices.*

In 2015 China accounted for 54% of our iron ore and iron ore pellet shipments, and Asia as a whole accounted for 69%. Europe accounted for 15%, followed by Brazil with 11%. Our 10 largest customers collectively purchased 126 million metric tons of iron ore and iron ore pellets from us, representing 38% of our 2015 iron ore and iron ore pellet sales volumes and 35% of our total iron ore and iron ore pellet revenues. In 2015, no individual customer accounted for more than 10.0% of our iron ore and iron ore pellet shipments.

In 2015, the Asian market (mainly Japan, South Korea and Taiwan), the European market and the Brazilian market were the primary markets for our blast furnace pellets, while the Middle East, North America and North Africa were the primary markets for our direct reduction pellets.

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

In 2015, we launched a new iron ore fines blended product to better meet market needs. The Brazilian Blend Fines is a mix of fines from Carajás and the Southern System, and has good metallurgical and sintering performance. It is sold from our Teluk Rubiah Maritime Terminal in Malaysia, which reduces the time to reach Asian markets and increases our distribution capillarity by using smaller vessels.

Table of Contents

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

In 2015, we hedged part of our total exposure to bunker oil prices relating to our owned fleet and long-term contracts of affreightment (used in connection with our CFR sales) under our hedge accounting program and relating to our FOB and domestic sales. Beginning in 2016, we are no longer entering in new bunker oil hedge transactions. Our bunker oil hedge transactions relating to our owned fleet and long-term contracts of affreightment were all settled in 2015, but we still have open hedge positions relating to our FOB and domestic sales.

1.1.6 Competition

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

Our biggest competitors in the Asian market are located in Australia and include subsidiaries and affiliates of BHP Billiton, Rio Tinto Ltd ("Rio Tinto") and Fortescue Metals Group Ltd ("FMG"). We are competitive in the Asian market for two main reasons. First, steel companies generally seek to obtain the types (or blends) of iron ore and iron ore pellets that can produce the intended final product in the most economic and efficient manner. Our iron ore has low impurity levels and other properties that generally lead to lower processing costs. For example, in addition to its high grade, the alumina content of our iron ore is very low compared to Australian ores, reducing consumption of coke and increasing productivity in blast furnaces, which is particularly important during periods of high demand. When market demand is strong, our quality differential generally becomes more valuable to customers. Second, steel companies often develop sales relationships based on a reliable supply of a specific mix of iron ore and iron ore pellets.

Our ownership and operation of logistics facilities in the Northern and Southeastern Systems help us ensure that our products are delivered on time and at a relatively low cost. In addition, we continue to develop a low-cost freight portfolio aimed at enhancing our ability to offer our products in the Asian market at competitive prices on a CFR basis, despite higher transportation costs compared to Australian producers. To support this strategy, we have built two distribution centers, one in Oman and another in Malaysia, and operate two floating transshipment stations ("FTS") in the Philippines. We are party to medium- and long-term freight contracts, and we own or charter vessels, including very large ore carriers. They reduce energy consumption and greenhouse emissions by carrying an increased amount of cargo in a single trip, offering lower shipping costs. These investments improve speed and flexibility for customization, and they shorten the time to market required for our products.

Our principal competitors in the European market are Kumba Iron Ore Limited, Luossavaara Kiirunavaara AB ("LKAB"), Société Nationale Industrielle et Minière ("SNIM") and Iron Ore Company of Canada ("IOC"), a subsidiary of Rio Tinto. We are competitive in the European market for the same reasons as in Asia, but also due to the proximity of our port facilities to European customers.

The Brazilian iron ore market is also competitive, and includes several small iron ore producers. Anglo American is ramping up the Minas-Rio project. Some steel companies, including Gerdau S.A. ("Gerdau"), Companhia Siderúrgica Nacional ("CSN"), Vallourec Tubos do Brasil S.A., Usiminas and Arcelor Mittal, also have iron ore mining operations. Although pricing is relevant, quality and reliability are important competitive factors as well. We believe that our integrated transportation systems, high-quality ore and technical services make us a strong competitor in the Brazilian market.

Table of Contents

With respect to pellets, our major competitors are LKAB, Arcelor Mittal Mines Canada (former Quebec Cartier Mining Co.), Iron Ore Company of Canada (IOC) and Bahrain Steel (former Gulf Industrial Investment Co).

1.2 Manganese ore and ferroalloys

1.2.1 Manganese ore operations and production

We conduct our manganese mining operations in Brazil through Vale S.A. and our wholly-owned subsidiaries Vale Manganês S.A. ("Vale Manganês") and MCR. Our mines produce three types of manganese ore products:

- metallurgical ore, used primarily for the production of manganese ferroalloys, raw material to produce carbon and stainless steel;
- natural manganese dioxide, suitable for the manufacture of electrolytic batteries; and
- chemical ore, used in several industries for the production of fertilizer, water treatment, pesticides and animal feed, and used as a pigment in the ceramics industry.

Mining complex	Company	Location	Description/History	Mineralization	Operations	Power source	Access/ Transportation
Azul	Vale S.A.	State of Pará	Open-pit mining operations and on-site beneficiation plant.	High-grade ores (at least 40% manganese grade).	Crushing and classification steps, producing lumps and fines.	Supplied through the national electricity grid. Acquired from regional utility companies.	Manganese ore is transported by truck and EFC railroad to the Ponta da Madeira maritime terminal.
Morro da Mina	Vale Manganês	State of Minas Gerais	Open-pit mining operations and one major beneficiation plant. In January 2015, we suspended operations due to market conditions.	Low-grade ores (24% manganese grade).	Crushing and screening/dense medium classification steps, producing lumps and fines to the Barbacena and Ouro Preto ferroalloy plants.	Supplied through the national electricity grid. Acquired from regional utility companies.	Manganese ore is transported by trucks to the Ouro Preto and Barbacena ferroalloy plants.
Urucum	MCR	State of Mato Grosso do Sul	Underground mining operations and on-site beneficiation plant.	High-grade ores (at least 40% manganese grade).	Crushing and classification steps, producing lumps and fines.	Supplied through the national electricity grid. Acquired from regional utility companies.	Manganese ore is transported to the port of Rosario (Argentina) by barges traveling along the Paraguay and Paraná rivers.

Table of Contents

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

Mine	Type	Production for the year ended December 31, 2013	2014	2015	2015 process recovery
		(million metric tons)			(%)
Azul	Open pit	1.9	1.7	1.7	54.0
Morro da Mina(1)	Open pit	0.1	0.1		
Urucum	Underground	0.4	0.6	0.7	83.0
Total		2.4	2.4	2.4	

(1) We suspended operations at Morro da Mina Mine in 2015 due to market conditions.

1.2.2 Manganese ferroalloys operations and production

We conduct our manganese ferroalloys business through our wholly-owned subsidiary Vale Manganês.

The production of manganese ferroalloys consumes significant amounts of electricity, representing 2.7% of our total consumption in Brazil in 2015. The electricity supply to our ferroalloy plants is provided through power purchase agreements. For information on the risks associated with potential energy shortages, see *Risk factors*.

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

Plant	Location	Description/History	Nominal capacity	Power source
Minas Gerais Plants	Cities of Barbacena and Ouro Preto	Barbacena has six furnaces, two refining stations and a briquetting plant. Ouro Preto has three furnaces.	74,000 tons per year at Barbacena plant and 65,000 tons per year at Ouro Preto plant.	Supplied through the national electricity grid. Acquired from independent producer through power purchase agreements.
Bahia Plant	City of Simões Filho	Four furnaces, two converters and a sintering plant.	150,000 tons per year.	Supplied through the national electricity grid. Energy acquired from CHESF or through power purchase agreements.

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

Plant	Production for the year ended December 31, 2013	2014	2015
	(thousand metric tons)		
Barbacena	45	50	6
Ouro Preto	48	8	1
Simões Filho	82	113	92
Total	175	171	99

We suspended operations at the Ouro Preto plant in February 2014, due to market conditions. In January 2015, the power purchase agreement pursuant to which we acquire energy for our Barbacena and Ouro Preto plants expired, and we also suspended operations in our Barbacena plant. We are considering alternatives for power supply to these plants, taking into consideration the energy prices and current market

conditions for manganese ferroalloys.

Table of Contents

1.2.3 Manganese ore and ferroalloys: sales and competition

The markets for manganese ore and ferroalloys are highly competitive. Competition in the manganese ore market takes place in two segments. High-grade manganese ore competes on a global seaborne basis, while low-grade ore competes on a regional basis. For some manganese ferroalloys, high-grade ore is mandatory, while for others high- and low-grade ores are complementary. The main suppliers of high-grade ores are located in South Africa, Gabon, Australia and Brazil. The main producers of low-grade ores are located in the Ukraine, China, Ghana, Kazakhstan, India and Mexico.

The manganese ferroalloy market is characterized by a large number of participants who compete primarily on the basis of price. The principal competitive factors in this market are the costs of manganese ore, electricity, logistics and reductants such as coke, coal and charcoal. We compete with both stand-alone producers and integrated producers that also mine their own ore. Our competitors are located principally in countries that produce manganese ore or carbon steel. For further information about demand and prices, see *Operating and financial review and prospects Major factors affecting prices.*

Table of Contents

2. Base metals

2.1 Nickel

2.1.1 Operations

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

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
North Atlantic						
Vale Canada	Canada Sudbury, Ontario	Integrated mining, milling, smelting and refining operations to process ore into finished nickel with a nominal capacity of 66,000 metric tons of refined nickel per year and additional nickel oxide feed for the refinery in Wales. Mining operations in Sudbury began in 1885. Vale acquired the Sudbury operations in 2006.	Primarily underground mining operations with nickel sulfide ore bodies, which also contain some copper, cobalt, PGMs, gold and silver. We also smelt and refine an intermediate product, nickel concentrate, from our Voisey's Bay operations. In addition to producing finished nickel in Sudbury, we ship a nickel oxide intermediate product to our nickel refinery in Wales for processing to final products. We also have capabilities to ship nickel oxide to our Asian refineries. As part of our efforts to reduce sulfur dioxide and other air emissions to meet regulatory changes in Ontario and Manitoba, and to rationalize our smelting and refining assets across Canada, we will modify our processes including switching to a single flash furnace in Sudbury in 2017.	Patented mineral rights with no expiration date; mineral leases expiring between 2016 and 2035; and mining license of occupation with indefinite expiration date(1).	Supplied by Ontario's provincial electricity grid and produced directly by Vale.	Located by the Trans-Canada highway and the two major railways that pass through the Sudbury area. Finished products are delivered to the North American market by truck. For overseas customers, the products are loaded into containers and travel intermodally (truck/rail/containership) through both east and west coast Canadian ports.
Vale Canada	Canada Thompson, Manitoba	Integrated mining, milling, smelting and refining operations to process ore into finished nickel with a nominal capacity of 50,000 metric tons of refined nickel per year. Thompson mineralization was discovered in 1956 and Thompson operations were acquired by Vale in 2006.	Primarily underground mining operations with nickel sulfide ore bodies, which also contain some copper and cobalt. Local concentrate is combined with nickel concentrate from our Voisey's Bay operations for smelting and refining to high quality nickel plate product. Smelting and refining are being	Order in Council leases expiring between 2020 and 2025; mineral leases expiring in 2034.	Supplied by the Provincial utility company.	Finished products are delivered to market by truck in North America. For overseas customers, the products are loaded into containers and travel intermodally (truck/rail/containership) to final destination through both west coast and east coast Canadian ports.

	considered for phase out in Thompson, due to federal sulfur dioxide emission standards that came into effect in 2015. Vale has secured an extension for implementation of its current Pollution Prevention Plan under the Canadian Environmental Protection Act with Environment Canada, which permits smelting and refining through 2018, subject to negotiated emission limits.	

Table of Contents

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
Vale Newfoundland & Labrador Limited	Canada Voisey's Bay and Long Harbour, Newfoundland and Labrador	Integrated open-pit mining, milling, refining of ore into intermediate and finished nickel products and copper concentrates with an expected nominal capacity of approximately 50,000 metric tons of refined nickel per year upon ramp-up of the Long Harbour facility. Voisey's Bay's operations started in 2005 and were purchased by Vale in 2006.	Comprised of the Ovoid open pit mine, and deposits for underground operations at a later stage. We mine nickel sulfide ore bodies, which also contain copper and cobalt. Most nickel concentrates are currently shipped to our Sudbury and Thompson operations for final processing (smelting and refining) while copper concentrate is sold to the market. The Long Harbour facility continued to ramp up in 2015. During commissioning in 2015, Long Harbour processed a blend of Voisey's Bay high-grade nickel concentrates with nickel in matte from PTVI and will transition to Voisey's Bay concentrates in 2016.	Mining lease expiring in 2027, with a right of further renewals for ten year periods.	Power at Voisey's Bay is 100% supplied through Vale owned diesel generators. Power at the Long Harbour refinery is supplied by the provincial utility company.	The nickel and copper concentrates from Voisey's Bay are transported to the port by haulage trucks and then shipped by drybulk vessels to either overseas markets or to our Long Harbour and other Canadian operations for further refining.
Vale Europe Limited	U.K. Clydach, Wales	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 40,000 metric tons per year. Clydach's refinery commenced operations in 1902 and was acquired by Vale in 2006.	Processes a nickel intermediate product, nickel oxide, supplied from either our Sudbury or Matsuzaka operation to produce finished nickel in the form of powders and pellets.		Supplied through the national electricity grid.	Transported to final customer in the UK and continental Europe by truck. Product for overseas customers are trucked to the ports of Southampton and Liverpool and shipped by ocean container.

Table of Contents

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
Asia Pacific						
PT Vale Indonesia Tbk ("PTVI")	Indonesia Sorowako, Sulawesi	Open cast mining area and related processing facility (producer of nickel matte, an intermediate product) with a nominal capacity of approximately 80,000 metric tons of nickel in matte per year. PTVI's shares are traded on the Indonesia Stock Exchange. We indirectly hold 59.2% of PTVI's share capital, Sumitomo Metal Mining Co., Ltd ("Sumitomo") holds 20.2%, Sumitomo Corporation holds 0.1% and the public holds 20.5%. PTVI was established in 1968, commenced its commercial operations in 1978 and was acquired by Vale in 2006.	PTVI mines nickel laterite ore and produces nickel matte, which is shipped primarily to nickel refineries in Japan. Pursuant to life-of-mine off-take agreements, PTVI sells 80% of its production to our wholly-owned subsidiary Vale Canada and 20% of its production to Sumitomo.	Contract of work expiring in 2025, entitled to two consecutive ten-year extensions, subject to approval of the Indonesian government. See *Regulatory matters Mining rights and regulation of mining activities*.	Produced primarily by PTVI's low cost hydroelectric power plants on the Larona River (there are currently three facilities). PTVI has thermal generating facilities in order to supplement its hydroelectric power supply with a source of energy that is not subject to hydrological factors.	Trucked approximately 55 km to the river port at Malili and then loaded onto barges in order to load break-bulk vessels for onward shipment.
Vale Nouvelle-Calédonie S.A.S ("VNC")	New Caledonia Southern Province	Mining and processing operations (producer of nickel oxide, nickel hydroxide and cobalt carbonate). VNC's shares are held by Vale (80.5%), Sumic (14.5%) and Société de Participation Minière du Sud Caledonien SAS ("SPMSC") (5%).(2)	We are currently ramping up our nickel operation in New Caledonia. VNC utilizes a High Pressure Acid Leach ("HPAL") process to treat limonitic laterite and saprolitic laterite ores. We expect to continue to ramp-up VNC over the next two years to reach nominal production capacity of 57,000 metric tons per year of nickel contained in nickel oxide, which will be further processed in our refineries in Asia, and hydroxide cake form (IPNM), and 4,500 metric tons of cobalt in carbonate form.	Mining concessions expiring between 2016 and 2051. VNC has requested a renewal of the only concession that was scheduled to expire in 2015.	Supplied through the national electricity grid and by independent producers.	Products are packed into containers and are trucked approximately 4 km to Prony port and shipped by ocean container.

Table of Contents

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
Vale Japan Limited	Japan Matsuzaka	Stand-alone nickel refinery (producer of intermediate and finished nickel), with nominal capacity of 60,000 metric tons per year. Vale owns 87.2% of the shares, and Sumitomo owns the remaining shares. The refinery was built in 1965 and was acquired by Vale in 2006.	Produces intermediate products for further processing in our refineries in Asia and the UK, and finished nickel products using nickel matte sourced from PTVI.		Supplied through the national electricity grid. Acquired from regional utility companies.	Products trucked over public roads to customers in Japan. For overseas customers, the product is loaded into containers at the plant and shipped from the ports of Yokkaichi and Nagoya.
Vale Taiwan Limited	Taiwan Kaoshiung	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 18,000 metric tons per year. The refinery commenced production in 1983 and was acquired by Vale in 2006.	Produces finished nickel primarily for the stainless steel industry, using intermediate products from our Matsuzaka and New Caledonian operations.		Supplied through the national electricity grid. Acquired from regional utility companies.	Trucked over public roads to customers in Taiwan. For overseas customers, the product is loaded into containers at the plant and shipped from the port of Kaoshiung.
Vale Nickel (Dalian) Co., Ltd	China Dalian, Liaoning	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 32,000 metric tons per year. Vale owns 98.3% of the shares and Ningbo Sunhu Chemical Products Co., Ltd. owns the remaining 1.7%. The refinery commenced production in 2008.	Produces finished nickel for the stainless steel industry, using intermediate products from our Matsuzaka and New Caledonian operations.		Supplied through the national electricity grid. Acquired from regional utility companies.	Product transported over public roads by truck and by railway to customers in China. It is also shipped in ocean containers to overseas and some domestic customers.

Table of Contents

Company/Mining System	Location	Description/History	Operations	Mining title	Power source	Access/Transportation
South Atlantic						
Vale/Onça Puma	Brazil Ourilândia do Norte, Pará	Mining and smelting operation producing a high quality ferronickel for application within the stainless steel industry.	The Onça Puma mine is built on lateritic nickel deposits of saprolitic laterite ore. The operation produces ferronickel via the rotary kiln-electric furnace process. We are currently operating with a single line, with nominal capacity estimated at 25,000 metric tons per year. We will evaluate opportunities to restart the second line operations in light of market outlook and single line furnace performance considerations.	Mining concession for indefinite period.	Supplied through the national electricity grid. Produced directly by Vale or Aliança Geração, or acquired through power purchase agreements.	The ferro-nickel is transported by railroad to the Vila do Conde maritime terminal in the Brazilian state of Pará. It is exported in ocean containers.

(1) In Sudbury, eight leases will expire in 2016. We have submitted applications for renewal of these leases, but the approval process will take a number of years. We can continue to operate while the approval process is ongoing.

(2) Sumic is a joint venture between Sumitomo and Mitsui. Because VNC did not achieve a certain production target by December 2015, Vale Canada will purchase Sumic's entire equity interest in VNC pursuant to the provisions of the VNC shareholders' agreement. The share purchase price is US$135 million and Vale Canada will repay a total amount of US$218 million in debt funding provided by Sumic to VNC. The transaction will conclude in March 2016, but Vale Canada's payment of the share purchase price and repayment of Sumic's debt funding are due in March 2017. After conclusion of the transaction in March 2016, Vale will hold 95% of the shares of VNC. The other shareholder, SPMSC, has an obligation to increase its stake in VNC to 10% within two years after the startup of commercial production.

Table of Contents

2.1.2 Production

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

	2013			2014			2015		
	(thousands of metric tons, except percentages)								
		Grade			Grade			Grade	
	Production	% Copper	% Nickel	Production	% Copper	% Nickel	Production	% Copper	% Nickel
Ontario operating mines									
Copper Cliff North	913	1.32	1.28	1,053	1.45	1.34	1,138	1.42	1.38
Creighton	915	2.01	2.19	903	1.81	2.47	774	2.00	2.33
Stobie	1,887	0.59	0.65	2,089	0.58	0.66	1,471	0.63	0.73
Garson	815	1.42	1.75	678	1.39	1.75	778	1.39	1.94
Coleman	1,515	3.15	1.52	1,385	3.10	1.52	1,309	2.95	1.56
Ellen	109	0.49	1.00	181	0.62	1.07	165	0.70	0.95
Totten	64	1.84	1.92	303	1.98	1.50	528	1.88	1.62
Gertrude	196	0.32	0.89						
Total Ontario operations	6,414	1.61%	1.3%	6,591	1.57%	1.36%	6,164	1.64%	1.46%
Manitoba operating mines									
Thompson	1,175		2.07	1,184		1.95	1,163		1.82
Birchtree	613		1.39	545		1.39	564		1.47
Total Manitoba operations	1,788		1.84%	1,729		1.78%	1,727		1.71%
Voisey's Bay operating mines									
Ovoid	2,318	1.68%	2.89%	2,243	1.54%	2.58%	2,328	1.51%	2.57%
Sulawesi operating mining areas									
Sorowako	4,369		2.00%	4,391		1.99%	4,694		1.99%
New Caledonia operating mines									
VNC	1,860		1.36%	2,134		1.44%	2,561		1.41%
Brazil operating mines									
Onça Puma	263		2.28%	1,358		2.19%	1,024		2.13%

42

Table of Contents

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

Mine	Type	Production for the year ended December 31, 2013	2014	2015
		(thousand metric tons)		
Sudbury(1)	Underground	69.4	64.3	54.4
Thompson(1)	Underground	24.5	26.1	24.8
Voisey's Bay(2)	Open pit	63.0	48.3	53.0
Sorowako(3)	Open cast	78.8	78.7	79.5
Onça Puma(4)	Open pit	1.9	21.4	24.4
New Caledonia(5)	Open pit	16.3	18.7	26.9
External(6)		6.4	17.5	27.6
Total(7)		260.2	274.9	290.6

(1) Primary nickel production only (i.e., does not include secondary nickel from unrelated parties).

(2) Includes finished nickel produced at our Sudbury and Thompson operations but reported on an ore-source basis at Voisey's Bay.

(3) These figures have not been adjusted to reflect our ownership. We have a 59.2% interest in PTVI, which owns the Sorowako mines.

(4) Primary production only. Nickel contained in ferro-nickel.

(5) Nickel contained in nickel hydroxide ("NHC") and nickel oxide ("NiO"). These figures have not been adjusted to reflect our ownership. We have an 80.5% interest in VNC.

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

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

2.1.3 Customers and sales

Our nickel customers are broadly distributed on a global basis. In 2015, 48% of our refined nickel sales were delivered to customers in Asia, 24% to North America, 27% to Europe and 1% to other markets. We have short-term fixed-volume contracts with customers for the majority of our expected annual nickel sales. These contracts generally provide stable demand for a significant portion of our annual production.

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

- nickel content and purity level: (i) intermediates have various levels of nickel content, (ii) nickel pig iron has 1.5-6% nickel, (iii) ferro-nickel has 10-40% nickel, (iv) refined nickel with less than 99.8% nickel, including products such as Tonimet and Utility nickel, (v) standard LME grade nickel has a minimum of 99.8% nickel, and (vi) high purity nickel has a minimum of 99.9% nickel and does not contain specific elemental impurities;
- shape (such as pellets, discs, squares, and strips); and
-

size (which varies with the type of product and range from spherical products such as sub-micron sized powders or 5mm in diameter granules to rectangular shapes such as cathode sheets that are 1,000mm by 750mm by 15 mm).

In 2015, the principal end-use applications for nickel were:

- stainless steel (67% of global nickel consumption);
- non-ferrous alloys, alloy steels and foundry applications (17% of global nickel consumption);

Table of Contents

- nickel plating (7% of global nickel consumption); and
- specialty applications, such as batteries, chemicals and powder metallurgy (9% of global nickel consumption).

In 2015, 58% of our refined nickel sales were made into non-stainless steel applications, compared to the industry average for primary nickel producers of 33%, which brings more stability to our sales volumes. As a result of our focus on such higher-value segments, our average realized nickel prices for refined nickel have typically exceeded LME cash nickel prices.

We offer sales and technical support to our customers on a global basis. We have a well-established global marketing network for finished nickel, based at our head office in Toronto, Canada. We also have sales and technical support offices in St. Prex (Switzerland), Saddle Brook, New Jersey (United States), Tokyo (Japan), Shanghai (China), Singapore and Kaohsiung (Taiwan). For information about demand and prices, see *Operating and financial review and prospects Major factors affecting prices*.

2.1.4 Competition

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

Our nickel deliveries represented 15% of global consumption for primary nickel in 2015. In addition to us, the largest suppliers in the nickel industry (each with its own integrated facilities, including nickel mining, processing, refining and marketing operations) are Mining and Metallurgical Company Norilsk Nickel, Jinchuan Nonferrous Metals Corporation, Glencore and South 32. Together with us, these companies accounted for about 46% of global refined primary nickel production in 2015.

While stainless steel production is a major driver of global nickel demand, stainless steel producers can use nickel products with a wide range of nickel content, including secondary nickel (scrap). The choice between primary and secondary nickel is largely based on their relative prices and availability. Between 2012 and 2015, secondary nickel has accounted for about 40-43% of total nickel used for stainless steels, and primary nickel has accounted for about 57-60%. Nickel pig iron, a low-grade nickel product made primarily in China from imported lateritic ores, is suitable for use in stainless steel production. In recent years, Chinese domestic production of nickel pig iron accounted for the majority of world nickel supply growth. From January 2014 onwards, Chinese nickel pig iron production was adversely affected by export restriction of unprocessed ores from Indonesia. As a result, nickel pig iron production is estimated to have declined 20% year-over-year to approximately 360,000 metric tons, representing 19% of world primary nickel supply. Significant stockpiles of Indonesian ores within China, as well as increased ore exports from the Philippines, mitigated the effect of this decrease in nickel pig iron production in 2015. We anticipate that Chinese nickel pig iron production will decline further in 2016 and 2017, with the depletion of high-grade ore stockpiles in China.

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

Table of Contents

2.2 Copper

2.2.1 Operations

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

Mining complex/Location	Location	Description/History	Mineralization/Operations	Mining title	Power source	Access/Transportation
Brazil						
Vale/Sossego	Carajás, state of Pará.	Two main copper ore bodies, Sossego and Sequeirinho and a processing facility to concentrate the ore. Sossego was developed by Vale, started production in 2004 and has a nominal capacity of 100,000 tpy of copper in concentrates.	The copper ore is mined using the open-pit method, and the run-of-mine is processed by means of standard primary crushing and conveying, SAG milling (a semi-autogenous mill that uses a large rotating drum filled with ore, water and steel grinding balls to transform the ore into a fine slurry), ball milling, copper concentrate flotation, tailings disposal, concentrate thickening, filtration and load out.	Mining concession for indefinite period.	Supplied through the national electricity grid. Produced directly by Vale or Aliança Geração, or acquired through power purchase agreements.	We truck the concentrate to a storage terminal in Parauapebas and then transport it via the EFC railroad to the Itaqui Port in São Luís, in the Brazilian state of Maranhão. We constructed an 85-kilometer road to link Sossego to Parauapebas.
Vale/Salobo	Carajás, state of Pará.	Salobo I processing plant started production in 2012 and has a total capacity of 100,000 tpy of copper in concentrates. The open pit mine and mill are concluding their ramp up to a capacity of 200,000 tpy of copper in concentrates with the full implementation of Salobo II expansion.	Our Salobo copper and gold mine is mined using the open-pit method, and the run-of-mine is processed by means of standard primary and secondary crushing, conveying, roller press grinding, ball milling, copper concentrate flotation, tailings disposal, concentrate thickening, filtration and load out.	Mining concession for indefinite period.	Supplied through the national electricity grid. Acquired through power purchase agreements.	We truck the concentrate to a storage terminal in Parauapebas and then transport it via the EFC railroad to the Itaqui Port in São Luís, in the Brazilian state of Maranhão. We constructed a 90-kilometer road to link Salobo to Parauapebas.

Table of Contents

Mining complex/Location	Location	Description/History	Mineralization/Operations	Mining title	Power source	Access/Transportation
Canada						
Vale Canada	Canada Sudbury Ontario	See *Base metals Nickel Operations*	We produce two intermediate copper products, copper concentrates and copper anodes, and we also produce final copper product, electrowon copper cathode as a by-product of our nickel refining operations. As part of our efforts to reduce sulfur dioxide and other air emissions to meet regulatory changes in Ontario and Manitoba, and to rationalize our smelting and refining assets across Canada, we will modify our processes including switching to a single flash furnace in Sudbury in 2017. To prepare for this change, we will shut down our Sudbury copper anode production facility in 2016 resulting in increased production of copper concentrate and copper intermediate.	See *Base metals Nickel Operations*		
Vale Canada/ Voisey's Bay	Canada Voisey's Bay, Newfoundland and Labrador	See *Base metals Nickel Operations*	At Voisey's Bay, we produce copper concentrates.	See *Base metals Nickel Operations*		
Zambia						
Lubambe	Zambian Copperbelt	Lubambe copper mine, which includes an underground mine, plant and related infrastructure. Teal Minerals ("TEAL") (our 50/50 joint venture with African Rainbow Minerals ("ARM")) has an 80% indirect stake in Lubambe. ZCCM Investments Holdings PLC holds the remaining (20%) stake.	Nominal production capacity of 45,000 metric tons per year of copper in concentrates. Production started in October 2012.	Mining concessions expiring in 2033.	Long-term energy supply contract with Zesco (Zambian state owned power supplier).	Copper concentrates are transported by truck to local smelters.

Table of Contents

2.2.2 Production

The following table sets forth information on our copper production.

Mine	Type	Production for the year ended December 31, 2013	2014	2015
		(thousand metric tons)		
Brazil:				
Salobo	Open pit	65	98	155
Sossego	Open pit	119	110	104
Canada:				
Sudbury	Underground	103	98	98
Voisey's Bay	Open pit	36	33	32
Thompson	Underground	2	2	1
External(1)		24	29	23
Chile:				
Tres Valles(2)	Open pit and underground	11		
Zambia:				
Lubambe(3)	Underground	9	10	10
Total		370	380	424

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

(2) We sold the Tres Valles mine in December 2013. The 2013 production level in the table is through the end of October.

(3) Vale's attributable production capacity of 40%, which represents 80% of indirect interest through our 50% participation.

2.2.3 Customers and sales

We sell copper concentrates from Sossego and Salobo under medium and long-term contracts to copper smelters in Europe, India and Asia. We have medium-term copper supply agreements with Glencore Canada Corporation for the sale of copper anodes and most of the copper concentrates produced in Sudbury. We sell copper concentrates from Voisey's Bay under medium-term contracts to customers in Europe. We sell electrowon copper from Sudbury in North America under short-term sales agreements.

2.2.4 Competition

The global refined copper market is highly competitive. Producers are integrated mining companies and custom smelters, covering all regions of the world, while consumers are principally wire rod and copper-alloy producers. Competition occurs mainly on a regional level and is based primarily on production costs, quality, reliability of supply and logistics costs. The world's largest copper cathode producers are Corporación Nacional del Cobre de Chile ("Codelco"), Freeport McMoRan Copper & Gold Inc. ("Freeport-McMoRan"), Aurubis AG, Jiangxi Copper Corporation Ltd. and Glencore, operating at the parent-company level or through subsidiaries. Our participation in the global refined copper cathodes market is marginal as we position ourselves more competitively in the copper concentrate market.

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

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

share in 2015 was about 4% of the total custom copper concentrate market.

Table of Contents

The copper anode/blister market is very limited; generally, anodes are produced to supply each company's integrated refinery. The trade in anodes/blister is limited to those facilities that have more smelting capacity than refining capacity or to those situations where logistics cost savings provide an incentive to source anodes from outside smelters. The largest competitors in the copper anode market in 2015 included Glencore, Codelco, and China Nonferrous Metals, operating at the parent-company level or through subsidiaries.

2.3 PGMs and other precious metals

As by-products of our Sudbury nickel operations in Canada, we recover significant quantities of PGMs, as well as small quantities of gold and silver. We operate a processing facility in Port Colborne, Ontario, which produces PGMs, gold and silver intermediate products using feed from our Sudbury operation. We have a refinery in Acton, England, where we process our intermediate products, as well as feeds purchased from unrelated parties and toll-refined materials. In 2015, PGM concentrates from our Canadian operations supplied about 60% of our PGM production, which also includes metals purchased from unrelated parties. Our base metals marketing department sells our own PGMs and other precious metals, as well as products from unrelated parties and toll-refined products, on a sales agency basis. Our copper concentrates from our Salobo and Sossego mines in Carajás, in the Brazilian state of Pará, also contain gold, the value of which we realize in the sale of those products.

In February 2013, we sold to Silver Wheaton 25% of the gold produced as a by-product at our Salobo copper mine, in Brazil, for the life of that mine, and 70% of the gold produced as a by-product at our Sudbury nickel mines, in Canada, for 20 years. In March 2015, we sold to Silver Wheaton an additional 25% of the gold produced as a by-product at our Salobo copper mine. See *Business overview Significant changes in our business.* Pursuant to the gold stream contract, Silver Wheaton received 141,879 oz. of gold in 2015.

The following table sets forth information on our precious metals production.

Mine	Type	2013	2014	2015
		(thousand troy ounces)		
Sudbury:				
Platinum	Underground	145	182	154
Palladium	Underground	352	398	341
Gold(1)	Underground	91	83	89
Salobo:				
Gold(1)	Open pit	117	160	251
Sossego:				
Gold	Open pit	78	78	80

(1) Figures represent 100% of Salobo and Sudbury gold production and do not deduct the portion of the gold sold to Silver Wheaton.

2.4 Cobalt

We recover significant quantities of cobalt as a by-product of our nickel operations. In 2015, we produced 1,448 metric tons of refined cobalt metal at our Port Colborne refinery, 2,926 metric tons of cobalt in a cobalt-based intermediate product at our nickel operations in Canada and New Caledonia, and our remaining cobalt production consisted of 159 metric tons of cobalt contained in other intermediate products (such as nickel concentrates). As a result of the ramp-up of VNC operations in New Caledonia, our production of cobalt intermediate as a by-product of our nickel production is increasing. We sell cobalt on a global basis. Our cobalt metal is electro-refined at our Port Colborne refinery and has very high purity levels (99.8%), which is superior to the LME contract specification. Cobalt metal is used in the production of various alloys, particularly for aerospace applications, as well as the manufacture of cobalt-based chemicals.

Table of Contents

The following table sets forth information on our cobalt production.

Mine	Type	Production for the year ended December 31, 2013	2014	2015
			(metric tons)	
Sudbury	Underground	853	833	751
Thompson	Underground	292	489	365
Voisey's Bay	Open pit	1,256	952	849
New Caledonia	Open pit	1,117	1,384	2,391
External sources(1)		13	84	177
Total		3,532	3,743	4,533

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

Table of Contents

3. Coal

3.1 Operations

We produce metallurgical and thermal coal through our subsidiaries Vale Moçambique, which operates the Moatize mine, and Vale Australia, which operates the Carborough Downs mine. We also have a minority interest in a Chinese company, Henan Longyu Energy Resources Co., Ltd. ("Longyu").

In December 2014, we entered into an investment agreement providing for Mitsui to acquire 15% of our stake in Vale Moçambique. Our equity stake in Vale Moçambique will be transferred to a holding company controlled by Vale (85%) and Mitsui (15%). The value attributed to Mitsui's 15% stake in Vale Moçambique is US$450 million, and Mitsui will be responsible for 15% of the capital expenditures incurred since the signing of the agreement. The transaction is subject to certain conditions precedent, and closing is expected for 2016.

Company/Mining complex	Location	Description/History	Mineralization/ Operations	Mining title	Power source	Access/ Transportation
Vale Moçambique						
Moatize	Tete, Mozambique	Open-cut mine, which was developed directly by Vale. Operations started in August 2011 and are expected to reach a nominal production capacity of 22 Mtpy, considering the Moatize expansion, comprised of metallurgical and thermal coal and the Nacala Logistics Corridor ramp up. Vale has an indirect 95.0% stake, and the remaining is owned by Empresa Moçambicana de Exploração Mineira, S.A. Upon conclusion of the agreement signed in December 2014, Mitsui will acquire 15% of Vale's stake in Vale Moçambique.	Produces metallurgical and thermal coal. Moatize's main branded product is the Chipanga premium hard coking coal, but there is operational flexibility for multiple products. The optimal product portfolio will come as a result of market trials. Coal from the mines is currently processed at a coal handling and processing plant ("CHPP") with a capacity of 4,000 metric tons per hour. An additional CHPP is under construction, which will increase capacity by additional 4,000 metric tons per hour.	Mining concession expiring in 2032, renewable thereafter.	Supplied by local utility company. Back up supply on site.	The coal is transported from the mine to the Beira Port by the Linha do Sena railway and, starting in January 2016, to the port at Nacala-à-velha via the Nacala Corridor.
Vale Australia						
Carborough Downs	Bowen Basin, Queensland	Acquired from AMCI in 2007. Carborough Downs mining leases overlie the Rangal Coal Measures of the Bowen Basin with the seams of Leichardt and Vermont. Both seams have coking properties and can be beneficiated to produce coking coal and pulverized coal injection ("PCI") products. Vale has a 90.0% stake and the remaining is owned by JFE and Posco.	Metallurgical coal mined by longwall methods. The Leichardt seam is currently our main target for development and constitutes 100% of the current reserve and resource base. Carborough Downs coal is processed at the Carborough Downs CHPP, which is capable of processing 1,000 metric tons per hour.	Mining tenements expiring in 2035 and 2039.	Supplied through the national electricity grid. Acquired from local utility companies.	The product is loaded onto trains at a rail loadout facility and transported 163 kilometers to the Dalrymple Bay Coal Terminal, Queensland, Australia.

Table of Contents

3.2 Production

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

Operation	Mine type	Production for the year ended December 31, 2013	2014	2015
		(thousand metric tons)		
Metallurgical coal:				
Vale Australia				
Integra Coal(1)(4)	Underground and open-cut	1,410	715	
Isaac Plains(2)(4)	Open-cut	656	746	
Carborough Downs(3)	Underground	2,447	1,857	2,383
Vale Moçambique				
Moatize(5)	Open-cut	2,373	3,124	3,401
Total metallurgical coal		6,885	6,443	5,784
Thermal coal:				
Vale Australia				
Integra Coal(1)	Open-cut	87	92	
Isaac Plains(2)	Open-cut	347	326	
Vale Moçambique				
Moatize(5)	Open-cut	1,444	1,784	1,560
Total thermal coal		1,878	2,202	1,560

(1) These figures correspond to our 64.8% equity interest in Integra Coal, as of the sale of our equity interest in December 2015.

(2) These figures correspond to our 50.0% equity interest in Isaac Plains, as of the sale of our equity interest in November 2015.

(3) The figures for 2013 and 2014 correspond to our 85.0% equity interest in Carborough Downs. Our equity interest in Carborough Downs increased to 90% in December 2014 ; the figures for 2015 correspond to our 90% equity interest in Carborough Downs.

(4) Operations at Integra Coal and Isaac Plains have been suspended since May and November 2014, respectively, and our stake in each mine, as well as associated assets was sold in December and November 2015, respectively.

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

3.3 Customers and sales

Coal sales from our Australian operations are primarily focused on Asia. Coal sales from our Moatize operations, in Mozambique, target global steel and energy markets, including Asia, Africa, Europe and the Americas. Our Chinese coal joint venture directs its sales into the Chinese domestic market.

3.4 Competition

The global coal industry comprises markets for black (metallurgical and thermal) and brown (lignite) coal, and is highly competitive.

The demand for steel, especially in Asia, underpins demand for metallurgical coal, while demand for electricity underpins demand for thermal coal. We expect robust supply and low prices for metallurgical coal in the next few years, which will reduce investments in new greenfield projects and may result in supply imbalances in the long term. Port and rail constraints in certain supply regions, which cannot be

solved without significant capital expenditures, could lead only to limited availability of incremental metallurgical coal production.

Competition in the coal industry is based primarily on the economics of production costs, coal quality and transportation costs. Our key competitive strengths are completion of a new and competitive transportation corridor, the proximity to the Atlantic and Indian markets (as compared to our main competitors) and the size and quality of our reserves.

Table of Contents

Major participants in the seaborne coal market are subsidiaries, affiliates and joint ventures of BHP Billiton, Glencore Xstrata, Anglo American, Rio Tinto, Teck Cominco, Peabody, Walter Energy and the Shenhua Group, among others.

4. Fertilizer nutrients

4.1 Phosphates and nitrogen

We operate our phosphates business through subsidiaries and joint ventures, as set forth in the following table.

Company	Location	Our share of capital		Partners
		Voting	Total	
		(%)		
Vale Fertilizantes	Uberaba, Brazil	100.0	100.0	
Compañia Minera Miski Mayo S.R.L., located in Bayóvar, Peru.	Bayóvar, Peru(1)	51.0	40.0	Mosaic, Mitsui

(1) Our participation in Compañia Minera Miski Mayo S.R.L is held through MVM Resources International, B.V.

Vale Fertilizantes is a producer of phosphate rock, phosphate ("P") fertilizers (e.g., monoammonium phosphate ("MAP"), triple superphosphate ("TSP") and single superphosphate ("SSP")), dicalcium phosphate ("DCP") and nitrogen ("N") fertilizers (e.g., ammonia and ammonium nitrate). It is the largest producer of phosphate and nitrogen crop nutrients in Brazil. Vale Fertilizantes operates the following phosphate rock mines, through concessions for indefinite period: Catalão, in the Brazilian state of Goiás, Tapira, Patos de Minas and Araxá, all in the Brazilian state of Minas Gerais, and Cajati, in the Brazilian state of São Paulo. In addition, Vale Fertilizantes has nine processing plants for the production of phosphate and nitrogen nutrients, located in Catalão in the Brazilian state of Goiás; Araxá, Patos de Minas and Uberaba, which are all in the Brazilian state of Minas Gerais; and Guará, Cajati and three plants in Cubatão, which are all in the Brazilian state of São Paulo.

Since 2010 we have also operated the Bayóvar phosphate rock mine in Peru, with nominal capacity of 3.9 Mtpy, through a concession for indefinite period.

The following table sets forth information about our phosphate rock production.

Mine	Type	Production for the year ended December 31,		
		2013	2014	2015
		(thousand metric tons)		
Bayóvar	Open pit	3,546	3,801	3,881
Catalão	Open pit	1,057	1,055	1,000
Tapira	Open pit	1,869	2,005	1,970
Patos de Minas(1)	Open pit	53	73	23
Araxá	Open pit	1,111	883	707
Cajati	Open pit	640	605	581
Total		8,277	8,421	8,163

(1) Patos de Minas operation was suspended in the third quarter of 2015 due to market conditions.

Table of Contents

The following table sets forth information about our phosphate and nitrogen nutrients production.

Product	Production for the year ended December 31, 2013	2014	2015
	(thousand metric tons)		
Monoammonium phosphate (MAP)	1,128	1,065	1,097
Triple superphosphate (TSP)	905	910	866
Single superphosphate (SSP)	2,102	1,854	1,953
Dicalcium phosphate (DCP)	444	502	480
Ammonia(1)	347	178	138
Urea(2)	219		
Nitric acid	416	469	475
Ammonium nitrate	419	485	515

(1) After the sale of Araucária in June 2013, we only produce ammonia in our Cubatão plant.

(2) After the sale of Araucária in June 2013, we no longer produce urea.

4.2 Potash

We conduct potash operations in Brazil at the parent-company level, with mining concessions of indefinite duration. We have leased Taquari-Vassouras, the only potash mine in Brazil (in Rosario do Catete, in the Brazilian state of Sergipe), from Petrobras since 1992. In April 2012, we extended the lease for 30 more years. The following table sets forth information on our potash production.

Mine	Type	Production for the year ended December 31, 2013	2014	2015	2015 process recovery
		(thousand metric tons)			(%)
Taquari-Vassouras	Underground	492	492	481	82.9

4.3 Customers and sales

All potash sales from the Taquari-Vassouras mine are to the Brazilian market. In 2015, our sales represented approximately 5% of total potash delivered in Brazil. We have a strong presence and long-standing relationships with the major market participants in Brazil, with more than 50% of our sales in 2015 generated from four long-term customers.

Our phosphate products (MAP, TSP, SSP) are mainly sold to fertilizer blenders. In 2015, our sales represented approximately 31% of total phosphate delivered in Brazil. In the high-concentration segment, our production represented 86% of total Brazilian production. In the low-concentration phosphate nutrients segment our production represented 38% of total Brazilian production, with products like SSP.

Our nitrogen segment produces 100% of the ammonium nitrate produced in Brazil. Additionally we are a leading supplier of explosive-grade ammonium nitrate in the Brazilian market.

4.4 Competition

The industry is divided into three major nutrients: potash, phosphate and nitrogen. There are limited resources of potash around the world, with Canada, Russia and Belarus being the most important sources, each of them having only a few producers. The industry requires a high level of investment and a long time for a project to mature. In addition, the potash industry is highly concentrated, with the five major producers accounting for 69% of total world production capacity.

Table of Contents

Phosphate rock is more available, but the major exporters are located in Morocco, Algeria, Jordan, Egypt and Peru. The top five phosphate rock producing countries (China, Morocco, United States, Russia and Jordan) accounted for 78% of global production in 2015, of which roughly 10% was exported. However, higher value-added products such as MAP and DAP are usually traded instead of phosphate rock due to cost efficiency.

Brazil is one of the largest agribusiness markets in the world due to its high production, exports and consumption of grains and biofuels. It is the fourth-largest consumer of fertilizers in the world and one of the largest importers of potash, phosphates and nitrogen. Brazil imports 95% of its potash consumption, which amounted to approximately 5.1 Mtpy of equivalent K2O (potassium oxide) in 2015, 8% lower than in 2014, from Canadian, Belarusian, Russian, German, Chilean and Israeli producers, in descending order. In terms of global consumption, China, the United States, Brazil and India represented 58% of the total, with Brazil alone representing 14% of total global consumption. Our potash operation and projects are highly competitive in terms of cost and logistics to supply the Brazilian market.

Most phosphate rock concentrate is consumed locally by downstream integrated producers, with the seaborne market corresponding to 14% of total phosphate rock production. Major phosphate rock exporters are concentrated in North Africa, mainly through state-owned companies, with Moroccan OCP Group holding 29% of the total seaborne market. The seaborne trade of phosphate rock supplies non-integrated producers of phosphate fertilizer products such as SSP, TSP and MAP. Brazil imports 54% of its phosphate consumption, which amounted to approximately 2.6 Mtpy of equivalent P2O5 (phosphorus pentoxide) in 2015, 17% lower than in 2014, being the main sources: Morocco, Russia, USA and China, in descending order. Our phosphate operations are highly competitive in terms of cost and logistics to supply the Brazilian market.

Nitrogen-based fertilizers are derived primarily from ammonia (NH3), which, in turn, is made from nitrogen present in the air and natural gas, making this an energy-intensive nutrient. Ammonia is the main component of nitrogen-based fertilizers like ammonium nitrate and urea. Production of nitrogen-based fertilizers has a regional profile due to the high cost associated with transportation and storage of ammonia, which requires refrigerated and pressurized facilities. As a result, only 10% of the ammonia produced worldwide is traded in global markets. Asia receives the largest volume of imports, accounting for 34% of global trade. The main exporting countries are Russia, Trinidad and Canada. Our nitrogen operation is highly competitive in terms of cost and logistics to supply the Brazilian market.

5. Infrastructure

5.1 Logistics

We have developed our logistics business based on the transportation needs of our mining operations and we also provide transportation services for other customers.

Table of Contents

We conduct our logistics businesses at the parent-company level and through subsidiaries and joint ventures, as set forth in the table below.

Company	Business	Location	Our share of capital (%)		Partners
			Voting	Total	
Vale	Railroad (EFVM and EFC), port and maritime terminal operations	Brazil			
VLI(1)	Railroad, port, inland terminal and maritime terminal operations. Holding of certain general cargo logistics assets	Brazil	37.6	37.6	FI-FGTS, Mitsui and Brookfield
MRS	Railroad operations	Brazil	47.1	48.2	CSN, Usiminas Participações e Logísticas and Gerdau
CPBS	Port and maritime terminal operations	Brazil	100	100	
PTVI	Port and maritime terminal operations	Indonesia	59.2	59.2	Sumitomo, public investors
Vale Logística Argentina	Port operations	Argentina	100	100	
CEAR(2)(4)	Railroad	Malawi	43.4	43.4	Portos e Caminhos de Ferro de Moçambique, E.P.
CDN(3)(4)	Railroad and maritime terminal operations	Mozambique	43.4	43.4	Portos e Caminhos de Ferro de Moçambique, E.P.
CLN(4)	Railroad and port operations	Mozambique	80.0	80.0	Portos e Caminhos de Ferro de Moçambique, E.P.
Vale Logistics Limited(4)	Railroad operations	Malawi	100	100	
Transbarge Navegación	Paraná and Paraguay Waterway System (Convoys)	Paraguay	100	100	
VNC(5)	Port and maritime terminal operations	New Caledonia	80.5	80.5	Sumic, SPMSC
VMM	Port and maritime terminal operations	Malaysia	100	100	
Vale Newfoundland & Labrador Limited	Port operations	Voisey's Bay and Long Harbour, in Newfoundland and Labrador	100	100	
Vale Oman Distribution Center LLC	Port and maritime terminal operations	Oman	100	100	

(1) BNDES holds debentures issued by Vale that are exchangeable into part of Vale's stake in VLI. Vale's equity interests in VLI may be reduced by up to 8% if BNDES exercises its rights under those debentures.

(2) Vale controls its interest in CEAR through an 85% interest in SDCN, which owns 51% of CEAR.

(3) Vale controls its interest in CDN through an 85% interest in SDCN, which owns 51% of CDN.

(4) Upon completion of the transaction with Mitsui, we will hold indirectly 21.7% of the voting and total capital of CEAR, 21.7% of the voting and total capital of CDN, 40% of the voting and total capital of CLN and 50% of the voting and total capital of VLL.

(5) After the conclusion of the sale of Sumic's 10.5% stake in VNC to Vale in March 2016, Vale will hold 95% of the shares of VNC.

Table of Contents

5.1.1 Railroads

Brazil

Vitória a Minas railroad ("*EFVM*"). The EFVM railroad links our Southeastern System mines in the Iron Quadrangle region in the Brazilian state of Minas Gerais to the Tubarão Port, in Vitória, in the Brazilian state of Espírito Santo. We operate this 905-kilometer railroad under a 30-year renewable concession, which expires in 2027. The EFVM railroad consists of two lines of track extending for a distance of 601 kilometers to permit continuous railroad travel in opposite directions, and single-track branches of 304 kilometers. Industrial manufacturers are located in this area and major agricultural regions are also accessible to it. VLI has rights to use railroad transportation capacity on our EFVM railroad. In 2015, the EFVM railroad transported a daily average of 341.6 metric tons of iron ore, or a total of 80.2 billion ntk of iron ore and other cargo. The EFVM railroad also carried 967 thousand passengers in 2015. In 2015, we had a fleet of 333 locomotives and 15,263 wagons at EFVM.

Carajás railroad ("*EFC*"). The EFC railroad links our Northern System mines in the Carajás region in the Brazilian state of Pará to the Ponta da Madeira maritime terminal, in São Luis, in the Brazilian state of Maranhão. We operate the EFC railroad under a 30-year renewable concession, which expires in 2027. EFC extends for 892 kilometers from our Carajás mines to our Ponta da Madeira maritime terminal complex facilities located near the Itaqui Port. Its main cargo is iron ore, principally carried for us. VLI has rights to use railroad transportation capacity on our EFC railroad. In 2015, the EFC railroad transported a daily average of 357.9 metric tons of iron ore. In 2015, the EFC railroad carried a total of 120.3 billion ntk of iron ore and other cargo. EFC also carried 301 thousand passengers in 2015. EFC supports the largest train, in terms of capacity, in Latin America, which measures 3.5 kilometers, weighs 42.01 gross metric tons when loaded and has 330 cars. In 2015, EFC had a fleet of 284 locomotives and 17,125 wagons.

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

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

We charge market prices for customer freight, including iron ore pellets originating from joint ventures and other enterprises in which we do not have a 100% equity interest. Market prices vary based on the distance traveled, the type of product transported and the weight of the freight in question, and are regulated by the Brazilian transportation regulatory agency, ANTT (*Agência Nacional de Transportes Terrestres*).

VLI. VLI provides integrated logistics solutions through 7,920 kilometers of railroads in Brazil (FCA and FNS), eight inland terminals with a total storage capacity of 730,000 tons and three maritime terminals and ports operations. We hold a 37.6% stake in VLI, and are party to a shareholders' agreement with FI-FGTS, Mitsui and Brookfield, which hold the remaining equity interests in VLI. VLI's main assets are:

- *Ferrovia Centro-Atlântica ("FCA").* Central-east regional railway network of the Brazilian national railway system, held under a 30-year renewable concession, which expires in 2026. The central east network has 7,220 kilometers of track, extending into the states of Sergipe, Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro, Goiás and the Federal District of Brazil;

Table of Contents

- *Ferrovia Norte-Sul railroad ("FNS").* A 30-year renewable subconcession for the commercial operation of a 720-kilometer stretch of the North-South railroad in Brazil, between the cities Açailandia, in the Brazilian state of Maranhão, and Porto Nacional, in the Brazilian state of Tocantins. This railway is connected to EFC railroad, and creates a new corridor for the transportation of general cargo, mainly for the export of soybeans, rice and corn produced in the center-northern region of Brazil; and

- Right to use capacity of our EFVM and EFC railroads for general cargo.

- Right to use capacity of our Tubarão e Praia Mole terminals for general cargo.

In 2015, VLI transported a total of 34.8 billion ntk of general cargo, including 21.3 billion ntk from FCA and FNS and 13.5 billion ntk through operational agreements with Vale.

MRS Logística S.A. ("*MRS*"). The MRS railroad is 1,643 kilometers long and links the Brazilian states of Rio de Janeiro, São Paulo and Minas Gerais. In 2015, the MRS railroad carried a total of 167 million metric tons of cargo, including 80.7 million metric tons of iron ore and other cargo from Vale.

Africa

We are ramping up the Nacala Corridor, which connects the Moatize mine to the Nacala-à-velha maritime terminal, located in Nacala, Mozambique, and which crosses into the Republic of Malawi. The Nacala Corridor consists of railway and port infrastructure, including greenfield and rehabilitation of existing railways in Mozambique and Malawi and a new coal port terminal in Mozambique. The Nacala Corridor will allow for the expansion of the Moatize mine and support our operations in Southeastern Africa. In Mozambique, we are operating under two concession agreements, one related to the Mozambican greenfield railway and another related to the newly constructed coal port, both held by our subsidiary Corredor Logístico Integrado de Nacala S.A. ("CLN"), which will expire in 2042, subject to renewal. We are also rehabilitating existing railroads under a concession held by our subsidiary Corredor de Desenvolvimento do Norte S.A. ("CDN"), which will expire in 2035. In Malawi, we are operating under a concession held by our subsidiary Vale Logistics Limited ("VLL"), which will expire in 2044, subject to renewal, and we are rehabilitating existing railroads under a concession held by our subsidiary, Central East African Railway Company Limited ("CEAR"), which was extended in 2013 for a 30-year period from the commencement of rail services under VLL's greenfield railway concession.

In December 2014, we entered into an investment agreement providing for Mitsui to acquire half of our stake in the Nacala Corridor. Our equity stake in CLN, CDN, VLL and CEAR will be transferred to a holding company jointly owned (50% each) and controlled by Vale and Mitsui. Mitsui will invest US$313 million in this holding company, in equity and quasi-equity instruments. Vale and Mitsui are seeking project financing to replace part of the financing provided by Vale. The transaction is subject to certain conditions precedent, and closing is expected for 2016.

5.1.2 Ports and maritime terminals

Brazil

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

Table of Contents

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

- The iron ore maritime terminal has two piers. Pier I can accommodate two vessels at a time, one of up to 170,000 DWT on the southern side and one of up to 210,000 DWT on the northern side. Pier II can accommodate one vessel of up to 405,000 DWT at a time, limited at 23 meters draft. In Pier I there are two ship loaders, which can load up to 13,500 metric tons per hour each. In Pier II there are two ship loaders that work alternately and can each load up to 16,000 metric tons per hour continuously. In 2015, 105.4 million metric tons of iron ore and iron ore pellets were shipped through the terminal for us. The iron ore maritime terminal has a storage yard with a capacity of 3.4 million metric tons.

- The *Terminal de Produtos Diversos* handled 8.1 million metric tons of grains and fertilizers in 2015. VLI has the right to use the capacity of the *Terminal de Produtos Diversos*.

- The *Terminal de Granéis Líquidos* handled 614.6 thousand metric tons of fuel in 2015. VLI has the right to use the capacity of the *Terminal de Granéis Líquidos*.

- The Praia Mole terminal is principally a coal terminal and handled 12.3 million metric tons of coal in 2015. VLI has the right to use the capacity of the Praia Mole terminal.

Ponta da Madeira maritime terminal. Our Ponta da Madeira maritime terminal is located near the Itaqui Port, in the Brazilian state of Maranhão. Pier I can accommodate vessels of up to 420,000 DWT and has a maximum loading rate of 16,000 tons per hour. Pier III, which has two berths and three shiploaders, can accommodate vessels of up to 200,000 DWT at the south berth and 180,000 DWT at the north berth (or two vessels of 180,000 DWT simultaneously), subject to tide conditions, and has a maximum loading rate of 8,000 metric tons per hour in each shiploader. Pier IV (south berth) is able to accommodate vessels of up to 420,000 DWT and have two ship loaders that work alternately with a maximum loading rate of 16,000 tons per hour. Cargo shipped through our Ponta da Madeira maritime terminal consists of our own iron ore and manganese production. In 2015, 124.7 million metric tons of iron ore were handled through the terminal. The Ponta da Madeira maritime terminal has a storage yard with a static capacity of 8.9 million tons, which will be expanded to 10.7 million tons. VLI currently handles and stores fertilizers, grain, pig iron and manganese ore, which are then shipped through the Itaqui Port.

Itaguaí maritime terminal Cia. Portuária Baía de Sepetiba ("CPBS"). CPBS is a wholly-owned subsidiary that operates the Itaguaí terminal, at the Itaguaí Port, in Sepetiba in the Brazilian state of Rio de Janeiro, which is leased from Companhia Docas do Rio de Janeiro CDRJ. The Itaguaí port terminal has a pier with one berth that allows the loading of ships up to 17.8 meters of draft and approximately 200,000 DWT of capacity. In 2015, the terminal loaded 22.0 million metric tons of iron ore.

Guaíba Island maritime terminal. We operate a maritime terminal on Guaíba Island in the Sepetiba Bay, in the Brazilian state of Rio de Janeiro. The iron ore terminal has a pier with two berths that allows the loading of ships of up to 350,000 DWT. In 2015, the terminal loaded 47.3 million metric tons of iron ore.

VLI also operates Inácio Barbosa maritime terminal (TMIB), owned by Petrobras, in the Brazilian state of Sergipe; Santos maritime terminal (TIPLAM), in the Brazilian state of São Paulo, which is jointly owned by VLI and Vale Fertilizantes; and Pier II in the Itaqui Port, which can accommodate vessels of up to 155,000 DWT and has a maximum loading rate of 8,000 tons per hour.

Table of Contents

Argentina

Vale Logística Argentina S.A. ("Vale Logística Argentina") operates a terminal at the San Nicolas port located in the province of Buenos Aires, Argentina, where Vale Logística Argentina has a permit to use a storage yard covering 20,000 square meters until October 2016 and an agreement with third parties for an extra storage yard of 15,000 square meters. We handled 2.7 million metric tons of iron and manganese ore through this port in 2015, which came from Corumbá, Brazil, via the Paraguay and Paraná rivers, for shipment to Brazilian, Asian and European markets. The loading rate of this port is 24,000 tons per day and the unloading rate is 13,200 tons per day.

Canada

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

Oman

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

Indonesia

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

- The Balantang Special Port is located in Balantang Village, South Sulawesi, and has two types of piers, with total capacity of 10,000 DWT, two barge slips for barges with capacity of up to 4,000 DWT each for dry bulk cargo, and a general cargo wharf for vessels of up to 2,000 DWT.

- The Tanjung Mangkasa Special Port is located in Lampia Village, South Sulawesi, with mooring buoys that can accommodate vessels with capacity of up to 20,000 DWT, and a terminal that can accommodate fuel tanker vessels with capacity of up to 2,000 DWT, totaling capacity of 22,000 DWT. Recently the jetty terminal of 2,000 DWT has been expanded to increase its capacity by 5,000 DWT and the commissioning is expected to occur in June 2016. By July 2016, Tanjung Mangkasa is expected to have a total capacity of 25,000 DWT.

New Caledonia

We own and operate a port in Prony Bay, Province Sud, New Caledonia. This port has three terminals, including a passenger ferry terminal able to berth two ships up to 50m long, a dry bulk wharf where vessels of up to 55,000 DWT can unload at a rate of 8,000 tons per day and a general cargo wharf where vessels up to 215m long can berth. The general cargo wharf can move containers at a rate of 10 per hour and liquid fuels (LPG, HFO, Diesel) at a rate of 350 cubic meters per hour, and break-bulk. The port's container yard, covering an area of approximately 13,000 square meters, can receive up to 1,000 units. A bulk storage yard is linked to the port by a conveyor and has a storage capacity of 94,000 tons of limestone, 95,000 tons of sulfur, and 60,000 tons of coal.

Table of Contents

Malaysia

Teluk Rubiah Maritime Terminal ("TRMT"). TRMT is located in the Malaysian state of Perak and has a pier with two berths that allows the unloading of vessels of approximately 400,000 DWT of capacity and the loading of vessels up to 220,000 DWT of capacity. In 2015, the terminal unloaded 15.2 million metric tons of iron ore and loaded 14.2 million metric tons of iron ore.

5.1.3 Shipping

We operate a low-cost fleet of vessels, comprised of our own ships and ships chartered pursuant to medium and long-term contracts to transport our cargoes from Brazil to our markets. We have 18 vessels in operation, including seven very large ore carriers, with a capacity of 400,000 DWT each, and 11 capesize vessels with capacities ranging from 150,000 to 250,000 DWT. We have 27 very large ore carriers under long-term contracts. To support our iron ore delivery strategy, Vale owns and operates two floating transfer stations in Subic Bay, Philippines that transfer iron ore from very large ore carriers to smaller vessels that deliver the cargo to its destinations. We expect this service to enhance our ability to offer our iron ore products in the Asian market at competitive prices. In 2015, we shipped approximately 188 million metric tons of iron ore and pellets on a CFR and Cost, Insurance & Freight (CIF) basis.

In 2014, we entered into framework agreements for strategic cooperation in iron ore transportation with shipping companies and financial institutions based in China and Hong Kong. Pursuant to these framework agreements, we (i) sold 12 of our very large ore carriers of 400,000 for an aggregate amount of US$1.316 billion in December 2015 and (ii) negotiated long-term contracts of affreightment with Chinese ship owners to secure the long-term transportation capacity to ship our iron ore from Brazil to Asia and to protect against volatility in freight costs. In addition, we sold three of our capesize vessels for approximately US$23 million in 2015.

In the Paraná and Paraguay waterway system, we transport iron ore and manganese ores through our subsidiary Transbarge Navegación, which transported 3.86 million tons through the waterway system in 2015, and other chartered convoys. The barges are discharged in our local customers' terminals, in contracted terminals in Argentina or in the facilities of our subsidiary Vale Logística Argentina, which load the ore into ocean-going vessels. Vale Logística Argentina loaded 2.1 million tons of ore, of a total loading capacity of 3 million tons, at San Nicolas port into ocean-going vessels in 2015.

We manage a fleet of 25 tugboats in total, of which we own. We directly operate nine tugboats, which are operated in the ports of Vitória and Mangaratiba, in the Brazilian states of Espírito Santo and Rio de Janeiro, respectively. Four tug boats, operated in the ports of São Luís and Aracaju, in the Brazilian states of Maranhão and Sergipe respectively, are operated by consortium companies, in which we have a 50% stake. Twelve other tug boats are freighted to and operated by third parties, under their responsibility, in other ports in Brazil.

5.2 Energy

We have developed our energy assets based on the current and projected energy needs of our operations, with the goal of reducing our energy costs and minimizing the risk of energy shortages.

Table of Contents

Brazil

Energy management and efficient supply in Brazil are priorities for us, given the uncertainties associated with changes in the regulatory environment and the risk of rising electricity prices. In 2015, our installed capacity in Brazil was 1.2 GW. We use the electricity produced by these plants for our internal consumption needs. We currently own direct stakes in three hydroelectric power plants and four small hydroelectric power plants in operation. The hydroelectric power plant of Candonga is located in the Southeastern region, Machadinho is located in the Southern region, and Estreito is located in the Northern region. The small hydroelectric power plants of Ituerê, Melo, Glória and Nova Maurício are located in the Southeastern region. We also have indirect stakes in the hydroelectric power plants of Igarapava, Porto Estrela, Funil, Candonga, Aimorés, Capim Branco I, Capim Branco II, through our 55% participation in Aliança Geração. These hydroelectric power plants are located in the Southeastern region and part of its generated electricity are directed to Vale's operations through a power purchase agreement with Aliança Geração. See *Business overview Significant changes in our business*.

We also have a 4.59% indirect stake in Norte Energia, the company established to develop and operate the Belo Monte hydroelectric plant in the Brazilian state of Pará, which is expected to start operations in the first quarter of 2016. In April 2015, we sold 49% of our 9% stake in Norte Energia to CEMIG GT for approximately R$310 million, reducing our stake to 4.59%. Our participation in the Belo Monte project gives us the right to purchase 9% of the electricity generated by the plant, which has already been contracted through a long-term power purchase agreement entered into with Norte Energia. This power purchase agreement has not been affected by the transactions described in *Business overview Significant changes in our business Restructuring our investments in power generation*.

We also produce, through our subsidiary Biopalma da Amazônia S.A. ("Biopalma"), palm oil in the Brazilian state of Pará, with the main objective to produce biodiesel in the future through an extraction plant to be installed by Biopalma. The biodiesel will be blended with regular diesel to produce a fuel called B20 (containing 20% biodiesel), which will be used to power our fleet of mining trucks, heavy machinery and locomotives in the Northern System operations.

Canada

In 2015, our wholly-owned and operated hydroelectric power plants in Sudbury generated 17% of the electricity requirements of our Sudbury operations. The power plants consist of five separate generation stations with an installed generator nameplate capacity of 56 MW. The output of the plants is limited by water availability, as well as by constraints imposed by a water management plan regulated by the provincial government of Ontario. Over the course of 2015, average demand for electrical energy was 195 MW to all surface plants and mines in the Sudbury area.

In 2015, diesel generation provided 100% of the electric requirements of our Voisey's Bay operations. We also have six diesel generators on-site, with capacity ranging from 12 to 14 MW, in order to meet seasonal demands.

Indonesia

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

Table of Contents

6. Other investments

We have a 25% stake in two iron ore pelletizing plants in China, Zhuhai YPM and Anyang. The remaining stake in Zhuhai YPM is owned by Zhuhai Yueyufeng Iron and Steel Co. Ltd. and Halswell Enterprises Limited, and the remaining stake in Anyang is owned by Anyang Iron & Steel Co., Ltd.

We have a 25% stake in Longyu (in the Henan province) coal operations in China. Longyu produces metallurgical and thermal coal and other related products, and the remaining interests are owned by Yongmei Group Co., Ltd. (former Yongcheng Coal & Electricity (Group) Co. Ltd.), Shanghai Baosteel International Economic & Trading Co., Ltd. and other minority shareholders. In April 2015, we concluded the divestment of our 25% ownership in Yankuang International Coking Company Limited ("Yankuang"), which we held since 2004, with no impact in our cash flow or indebtedness.

We have a 25% indirect stake in Korea Nickel Corporation, which operates a nickel refinery in South Korea. The remaining stake is held by Korea Zinc Co., Ltd, Posteel Co., Ltd., Young Poong Co., Ltd., Pohang Technology College and a number of individual investors. Korea Nickel Corporation produces finished nickel for the stainless steel industry using intermediate products from our Matsuzaka and New Caledonia operations.

We own a 50% stake in California Steel Industries, Inc. ("CSI"), a producer of flat-rolled steel and pipe products located in California, United States. The remainder is owned by JFE Steel. CSI's annual production capacity is approximately 2.8 million metric tons of flat and pipe products. In addition, we have a 26.9% stake in the ThyssenKrupp Companhia Siderúrgica do Atlântico ("TKCSA") integrated steel slab plant in the Brazilian state of Rio de Janeiro. The plant started operations in 2010, and produced 4.0 Mt of slabs in 2015. TKCSA production capacity is 5.0 Mtpy of slabs and will consume 8.5 million metric tons of iron ore and iron ore pellets per year, when at full capacity, supplied exclusively by Vale. We are also involved in two other steel projects in Brazil: Companhia Siderúrgica do Pecém ("CSP"), which is currently under construction, and Aços Laminados do Pará ("Alpa"), which is under review pending discussions with the Brazilian government.

We own minority interests in two bauxite mining businesses that are both located in Brazil: Mineração Rio do Norte S.A. ("MRN") and Mineração Paragominas S.A. ("Paragominas"). We have agreed to transfer our interests in Paragominas to Norsk Hydro ASA ("Hydro"). In 2014, we sold part of our interest in Paragominas to Hydro, and we will sell the remaining 13.63% indirect interest to Hydro in 2016. We expect to conclude the sale in 2016. We are also currently negotiating a potential sale of our 40% interest in MRN to Hydro.

We have agreed to sell our onshore hydrocarbon exploration licenses in Peru, subject to regulatory approvals. We also have offshore exploration licenses in Brazil, which are being relinquished, subject to regulatory approvals.

Table of Contents

RESERVES

Presentation of information concerning reserves

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

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

We periodically revise our reserve estimates when we have new geological data, economic assumptions or mining plans. During 2015, we performed an analysis of our reserve estimates for certain projects and operations, which is reflected in new estimates as of December 31, 2015. Reserve estimates for each operation assume that we either have or expect to obtain all of the necessary rights and permits to mine, extract and process ore reserves at each mine. For some of our operations, the projected exhaustion date includes stockpile reclamation. Where we own less than 100% of the operation, reserve estimates have not been adjusted to reflect our ownership interest. Certain figures in the tables, discussions and notes have been rounded. For a description of risks relating to reserves and reserve estimates, see *Risk factors*.

Table of Contents

Our reserve estimates are based on certain assumptions about future prices. We have determined that our reported reserves could be economically produced if prices for the products identified in the following table were equal to the three-year average historical prices through December 31, 2015. For this purpose, we used the three-year historical average prices set forth in the following table.

Commodity	Three-year average historical price	Pricing source
Iron ore:		
Vale(1)	US$96.1 per dry metric ton	Average Platts IODEX (62% Fe CFR China)
Coal(2)*:*		
Metallurgical Moatize	US$114.9 per metric ton	Average hard metallurgical coal realized price
Metallurgical Carborough Downs	US$108.58 per metric ton	Average hard metallurgical coal realized price
PCI Carborough Downs	US$94.27 per metric ton	Average PCI realized price
Thermal Moatize	US$66.3 per metric ton	Average thermal realized price
Base metals:		
Nickel(3)	US$6.61 per lb	LME Ni
Copper	US$2.98 per lb	LME Cu
Nickel by-products:		
Platinum	US$1,308 per oz	Average realized price
Palladium	US$740 per oz	Average realized price
Gold	US$1,279 per oz	Average realized price
Cobalt(3)	US$12.81 per lb	99.3% low cobalt metal (source: Metal Bulletin)
Fertilizer nutrients:		
Phosphate	US$125.14 per dry metric ton	Average benchmark price for phosphate concentrate, FOB Morocco (source: Fertilizer Week)
Potash	US$326.7 per dry metric ton	Average benchmark price for potash, FOB Vancouver (source: Fertilizer Week)
Manganese ore(4):		
Manganese lump ore	US$158.6 per dry metric ton	Average realized price
Manganese sinter feed	US$122.8 per dry metric ton	Average realized price

(1) The economic assessment of our iron ore reserves is based on the average Platts IODEX prices, as adjusted to reflect the effects of freight, moisture and the quality premium for our iron ore.

(2) As received basis (8% moisture).

(3) Premiums (or discounts) are applied to the nickel and cobalt spot prices at certain operations to derive realized prices. These premiums (or discounts) are based on product form, long-term contracts, packaging and market conditions.

(4) Prices on a Delivery Duty Unpaid (DDU) and CIF China basis.

Iron ore reserves

The following tables set forth our iron ore reserves and other information about our iron ore mines. We have changed the presentation of our reserve table to better reflect our production and operational plans, which are based on the facilities (consisting of both mines and processing plants) within each system, rather than the individual mines.

The decrease in total iron ore reserves from 2014 to 2015 is mainly due to depletion by mine production. We periodically review the economic viability of our iron ore reserves in light of changes in the iron ore industry. In our most recent annual review, we determined that our previously reported reserves at Urucum and Corumba are no longer economically viable based on expected long-term prices, and we are accordingly not reporting reserves at those facilities. We might further revise our reported reserves in the future as we continue to reassess the effects of changing price expectations.

Table of Contents

Following the failure of the Fundão tailings dam in November 2015 and the shutdown of its operations, Samarco is reviewing the operation's reserves. Under these circumstances, Vale is currently not in a position to report reserves for Samarco as of December 31, 2015.

	Iron ore reserves(1)							
	Proven		Probable		2015 Total		2014 Total	
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Southeastern System(2)								
Itabira(3)	605.5	47.0	141.2	48.3	746.7	47.2	800.3	47.3
Minas Centrais(4)	232.4	51.0	858.7	54.0	1,091.1	53.3	1,123.1	53.2
Mariana(5)	833.3	44.5	2,343.8	43.6	3,177.1	43.8	3,216.7	43.9
Total Southeastern System	**1,671.3**	**46.3**	**3,343.6**	**46.5**	**5,014.9**	**46.4**	**5,140.1**	**46.5**
Southern System(6)								
Minas Itabirito(7)	1,315.6	43.7	1,571.4	42.8	2,887.0	43.2	2,931.2	43.2
Vargem Grande(8)	554.4	46.1	1,887.5	44.0	2,441.9	44.5	2,479.4	44.7
Paraopeba(9)	129.9	62.5	24.9	59.2	154.8	62.0	171.1	62.1
Total Southern System	**1,999.9**	**45.6**	**3,483.8**	**43.5**	**5,483.7**	**44.3**	**5,581.7**	**44.5**
Northern System(10)								
Serra Norte(11)	1,408.4	66.6	1,018.0	66.9	2,426.4	66.7	2,535.4	66.7
Serra Sul (S11)(12)	3,045.8	66.8	1,193.7	66.7	4,239.6	66.7	4,239.6	66.7
Serra Leste	140.4	65.7	163.1	65.2	303.5	65.4	305.6	65.4
Total Northern System	**4,594.6**	**66.7**	**2,374.8**	**66.6**	**6,969.4**	**66.7**	**7,080.6**	**66.6**
Midwestern System(13)								
Urucum							28.9	62.4
Corumba(MCR)							310.8	62.2
Total Midwestern System							**339.7**	**62.2**
Total Vale Systems	**8,265.7**	**57.5**	**9,220.3**	**50.1**	**17,468.0**	**53.8**	**18,142.3**	**54.0**
Samarco(14)								
Alegria(15)							2,829.4	39.6
Germano							80.2	39.8
Total Samarco							**2,909.7**	**39.6**
Total	**8,265.7**	**57.5**	**9,220.3**	**50.1**	**17,468.0**	**53.8**	**21,052.0**	**52.0**

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following in-situ moisture contents: Itabira 1.5%; Minas Centrais 6.0%; Mariana 3.0%; Minas Itabirito 5.0%; Vargem Grande 3.0%; Paraopeba 5.0%; Corumbá and Urucum 8.0%; Serra Norte 8.3%; Serra Sul 4.6%; Serra Leste 4.3%; Samarco 6.50%.

(2) Approximate drill hole spacing used to classify the reserves was: 100m × 100m for proven reserves and 200m × 200m for probable reserves. Average product recovery (tonnage basis) is: 57% for Itabira, 71% for Minas Centrais and 54% for Mariana.

(3) The Itabira mining complex includes Conceição and Minas do Meio mines.

(4) The Minas Centrais mining complex includes Brucutu and Agua Limpa mines and Apolo project. Vale's equity interest in Agua Limpa is 50.0% and the reserve figures have not been adjusted to reflect our ownership interest.

(5) The Mariana mining complex includes Alegria, Fábrica Nova and Fazendão mines and Capanema and Conta História projects.

(6) Approximate drill hole spacing used to classify the reserves was: 100m × 100m for proven reserves and 200m × 200m for probable reserves. Average product recovery (tonnage basis) is: 48% for Minas Itabirito, 49% for Vargem Grande and 91% for Paraopeba.

(7) The Minas Itabirito mining complex includes Sapecado, Galinheiro, João Pereira and Segredo mines.

(8) The Vargem Grande mining complex includes Tamanduá, Capitão do Mato and Abóboras mines.

(9) The Paraopeba mining complex includes Capão Xavier and Jangada mines.

(10) Approximate drill hole spacing used to classify the reserves was: 150m × 100m for proven reserves and 300m × 200m for probable reserves, except Serra Leste which is 100m × 100m for proven reserves and 200m × 200m for probable reserves. Average product recovery (tonnage basis) for Serra Norte, Serra Sul and Serra Leste is 100% .

(11) The Serra Norte mining complex includes N4W, N4E and N5 mines.

(12) The Serra Sul mining complex includes S11 C and D deposits.

(13) Approximate drill hole spacing used to classify the 2014 reserves was: 70m × 70m for proven reserves and 140m × 140m for probable reserves. Average product recovery (tonnage basis) is 64.1% for Corumba and 82.6% for Urucum.

(14) Approximate drill hole spacing used to classify the reserves was: Alegria Norte/Centro, 150m × 100m for proven reserves and 300m × 200m for probable reserves; Alegria Sul, 100m × 100m for proven reserves and 200m × 200m for probable reserves. Samarco recovery was 82% (metal basis). Vale's equity interest in Samarco mines is 50.0% and the reserve figures have not been adjusted to reflect our ownership interest.

(15) The Alegria mining complex includes Alegria Norte/Centro and Alegria Sul mines.

Table of Contents

The mine exhaustion schedule has been adjusted due to our new production plan and our revision of project capacity. As a result of the Fundão dam failure, the Alegria and Germano operations' projected exhaustion dates are currently being reevaluated as part of Samarco's general review of its iron ore resources and reserves.

	Iron ore integrated operations			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Southeastern System				
Itabira	Open pit	1957	2025	100.0
Minas Centrais(1)	Open pit	1994	2051	100.0
Mariana	Open pit	1976	2083	100.0
Southern System				
Minas Itabirito	Open pit	1942	2050	100.0
Vargem Grande	Open pit	1993	2079	100.0
Paraopeba	Open pit	2001	2027	100.0
Northern System				
Serra Norte	Open pit	1984	2034	100.0
Serra Sul (S11CD)	Open pit		2065	100.0
Serra Leste (SL1)	Open pit	2014	2066	100.0
Midwestern System				
Urucum	Open pit	1994		100.0
Corumba (MCR)	Open pit	1978		100.0
Samarco				
Alegria	Open pit	2000		50.0
Germano	Open pit	2000		50.0

(1) Agua Limpa mine and plants are part of the Minas Centrais operations and are owned by Baovale. We own 100% of the voting shares and 50% of the total shares of Baovale.

Table of Contents

Manganese ore reserves

The following tables set forth manganese ore reserves and other information about our mines. In our most recent annual review, we determined that our previously reported manganese reserves at Urucum are no longer economically viable based on expected long-term prices, and we are accordingly not reporting reserves at this facility. Azul reserves decreased from 2014 to 2015 due to mine production depletion. Morro da Mina ore reserves decreased due to the revision of the mining design following new geotechnical studies.

	Manganese ore reserves(1)(2)							
	Proven		Probable		Total		Total	
	2015		2015		2015		2014	
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Azul	41.5	29.5	2.2	25.7	43.6	29.3	47.0	29.4
Urucum							11.2	46.4
Morro da Mina(3)	5.8	31.0	2.8	29.7	8.6	30.6	14.3	25.4
Total	47.3	29.7	5.0	27.9	52.2	29.6	72.4	31.2

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture contents: Azul 16.2%, Urucum 4.2%, Morro da Mina 3.4%. Manganese grade is reported on a dry basis. Approximate drill hole spacing used to classify the reserves was: 100m × 100m for proven reserves and 200m × 200m for probable reserves.

(2) The average recovery of the manganese ore reserves is: Azul 54%, Urucum 83%, Morro da Mina 58%.

(3) Morro da Mina mine reserves decreased 40% due to new geotechnical studies developed in 2014.

	Manganese ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Azul	Open pit	1985	2029	100.0
Urucum	Underground	1976		100.0
Morro da Mina	Open pit	1902	2050	100.0

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

Coal reserves

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

			Coal ore reserves(1)							
			ROM(2)						Marketable reserves(3)	
		Coal type	Proven 2015 (tonnage)	Probable 2015 (tonnage)	Total 2015 (calorific value)	2015 (tonnage)	Total 2014 (calorific value)	2014 (tonnage)	2015 (tonnage)	2014 (tonnage)
Carborough Downs	Underground(4)	Metallurgical & PCI	4.0	4.0	31.2 (PCI)	13.7	31.2 (PCI)	13.7	3.0	15.7
Moatize		Metallurgical & thermal	264.3	1,144.5	28.3 (thermal)	1,434.8	28.3 (thermal)	1,434.8	505.6	510.5
Total			268.3	1,148.5		1,448.2		1,448.2	508.6	526.2

(1) The reserves stated above by deposit are on a 100% shareholding basis. Vale's ownership interest in accordance with the table below should be used to calculate the portion of reserves directly attributable to Vale.

(2) Tonnage is stated in millions of metric tons. Carborough Downs reserves were reported on air dry basis. Moatize is reported on in situ 6.5% moisture basis. Calorific value of product coal derived from beneficiation of ROM coal is typically stated in MJ/kg. Calorific value is used in marketing thermal (th) and PCI coals.

(3) Tonnage is stated in millions of metric tons.

(4) In calculating reserves, gas drainage is assumed to have been completed in accordance with the mine plan.

Table of Contents

Reserves at Carborough Downs reduced based on updated economic price forecasts and Moatize decreased in 2015 due to production depletion.

	Coal mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Carborough Downs	Underground	2006	2017	90.0
Moatize(1)	Open pit	2011	2042	95.0

(1) Vale's stake in Moatize will decrease to 81% upon completion of the transaction with Mitsui.

Nickel ore reserves

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

	Nickel ore reserves(1)									
	Proven		Probable		Total 2015		Total 2014		Recovery range (%)	
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade		
Canada										
Sudbury	41.4	1.32	35.0	1.21	76.4	1.27	85.2	1.26	75	85
Thompson	6.5	1.86	14.1	1.64	20.6	1.71	21.8	1.76	85	90
Voisey's Bay	17.9	2.66	18.2	1.82	36.1	2.24	14.7	2.37	80	90
Indonesia										
PTVI	96.9	1.80	22.3	1.73	119.3	1.78	125.4	1.79	85	90
New Caledonia										
VNC							122.3	1.42	80	90
Brazil										
Onça Puma	57.5	1.67	40.0	1.39	97.4	1.56	98.7	1.56	85	90
Total	220.2	1.75	129.6	1.49	349.8	1.65	468.1	1.57		

(1) Tonnage is stated in millions of dry metric tons. Grade is % of nickel.

Table of Contents

In Canada, our Sudbury operations mineral reserves decreased due to mining depletions, the reclassification of mineral reserves to mineral resource at Garson, downgrading of mineral reserve to exploration target at Stobie and a decrease of mineral reserves at Copper Cliff due to re-interpretation and planning changes. Mineral reserves at Thompson decreased mainly due to mining depletion. The Voisey's Bay operations mineral reserves increased due to the addition of the Underground Project mineral reserves. The mineral reserves at PTVI decreased due to mining depletion, pit redesigns, reclassification to mineral resource, decreases at Petea to reflect the production reconciliation data, and sterilization related to the establishment of waste disposal areas. We are not reporting reserves of VNC as of December 31, 2015, because the mineral reserves for our operations in New Caledonia would not be economically viable at the three-year historical average price, due to the decline in nickel prices in the past three years. However, based on our expectations about future prices, our operations in New Caledonia continue to be economically viable. VNC continues to operate and is currently conducting studies to identify measures to reduce its costs of production.

	Nickel ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2039	100.0
Thompson	Underground	1961	2032	100.0
Voisey's Bay	Open pit	2005	2032	100.0
Indonesia				
PTVI	Open pit	1977	2035	59.2
New Caledonia				
VNC	Open pit	2011		80.5
Brazil				
Onça Puma	Open pit	2011	2056	100.0

Copper ore reserves

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

	Copper ore reserves(1)									
	Proven		Probable		2015 Total		2014 Total		Recovery range (%)	
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade		
Canada										
Sudbury	41.4	1.83	35.0	1.36	76.4	1.61	85.2	1.61	90	95
Voisey's Bay	17.9	1.29	18.2	0.81	36.1	1.05	14.7	1.32	90	95
Brazil										
Sossego	103.9	0.66	13.9	0.70	117.8	0.67	126.6	0.70	90	95
Salobo	654.5	0.71	502.3	0.61	1,156.8	0.67	1,179.1	0.67	80	90
Zambia										
Lubambe	5.1	2.27	43.5	2.25	48.6	2.25	43.1	2.24	85	90
Total	822.8	0.78	612.9	0.78	1,435.7	0.78	1,448.7	0.78		

(1) Tonnage is stated in millions of dry metric tons. Grade is % of copper.

Table of Contents

In Canada, our Sudbury operations mineral reserves decreased due to mining depletions, the reclassification of mineral reserves to mineral resource at Garson, downgrading of mineral reserve to exploration target at Stobie and a decrease of mineral reserves at Copper Cliff due to re-interpretation and planning changes. The Voisey's Bay operations mineral reserves increased due to the addition of the Underground Project mineral reserves. In Brazil, the Sossego operations mineral reserves decreased due to mining depletion, partially offset by the addition of mineral reserves located in the bottom of the pits. The mineral reserve estimates at the Salobo operation decreased due to mining depletion. The Lubambe mineral reserves increased due to re-interpretation and changes in certain factors relating to mining recovery and dilution.

	Copper ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2039	100.0
Voisey's Bay	Open pit	2005	2032	100.0
Brazil				
Sossego	Open pit	2004	2024	100.0
Salobo	Open pit	2012	2065	100.0
Zambia				
Lubambe	Underground	2013	2038	40.0

PGMs and other precious metals reserves

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

	Precious metals reserves(1)								
	Proven		Probable		Total 2015		Total 2014		Recovery range (%)
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	
Canada									
Sudbury									
Platinum	41.4	1.0	35.0	1.2	76.4	1.1	85.2	1.0	80 90
Palladium	41.4	1.1	35.0	1.1	76.4	1.1	85.2	1.2	80 90
Gold	41.4	0.4	35.0	0.4	76.4	0.4	85.2	0.4	80 90
Brazil									
Sossego									
Gold	103.9	0.2	13.9	0.2	117.8	0.2	126.6	0.2	75 80
Salobo									
Gold	654.5	0.4	502.3	0.4	1,156.8	0.4	1,179.1	0.4	60 70
Total Pt + Pd(2)	41.4	2.1	35.0	2.3	76.4	2.2	85.2	2.2	
Total Gold	799.8	0.4	551.2	0.4	1,351.0	0.4	1,390.9	0.4	

(1) Tonnage is stated in millions of dry metric tons. Grade is grams per dry metric ton.

(2) Pt+Pd is the sum of Platinum and Palladium grades.

Table of Contents

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

	Precious metals mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2039	100.0
Brazil				
Sossego	Open pit	2004	2024	100.0
Salobo	Open pit	2012	2065	100.0

Cobalt ore reserves

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

	Cobalt ore reserves(1)								
	Proven		Probable		Total		Total		Recovery range
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	(%)
Canada									
Sudbury	41.4	0.04	35.0	0.03	76.4	0.04	85.2	0.04	20 40
Voisey's Bay	17.9	0.15	18.2	0.11	36.1	0.13	14.7	0.11	70 80
New Caledonia									
VNC							122.3	0.11	80 90
Total	59.3	0.07	53.2	0.06	112.5	0.07	222.2	0.08	

(1) Tonnage is stated in millions of metric tons. Grade is % of cobalt.

Our cobalt reserve estimates decreased in 2015 for the same reasons discussed above in connection with the nickel mineral reserves.

	Cobalt ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2039	100.0
Voisey's Bay	Open pit	2005	2032	100.0
New Caledonia				
VNC	Open pit	2011		80.5

Table of Contents

Phosphate reserves

Our phosphate reserves estimates are of in-place material after adjustments for depletion and mining dilution. The total phosphate reserves have decreased due to production and the reclassification of 40.2 million dmt of mineral reserves of secondary ore to mineral resources at Araxá. The remaining phosphate reserves decreased due to mine production depletion.

	Phosphate reserves(1)(2)							
	Proven	2015	Probable	2015	Total	2015	Total	2014
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Bayóvar(3)	153.1	16.2	248.9	14.9	402.0	15.4	409.3	15.4
Catalão	63.3	10.5	30.3	10.6	93.5	10.5	97.9	10.5
Tapira	288.6	7.8	378.1	7.4	666.6	7.6	679.2	7.6
Araxá	84.5	11.9	2.1	8.4	86.6	11.9	130.6	11.6
Cajati	59.3	5.6	45.5	4.7	104.8	5.2	109.6	5.2
Patrocinio project(4)	183.8	13.7	302.3	11.1	486.1	12.1	486.1	12.1
Total	832.5	11.1	1,007.2	10.3	1,893.6	10.7	1,912.5	10.7

(1) Tonnage is stated in millions of dry metric tons. Grade is % of P_2O_5.

(2) Average mass recoveries (tonnage basis) are: 14.7% for Araxá, 11.7% for Cajati, 14.0% for Catalão, 22.9% for Patrocínio, 14.6% for Tapira and 37.0% for Bayóvar.

(3) Vale holds 51% of the voting capital and 40% of the total capital of MVM Resources International, B.V., the entity that controls Bayóvar. The reserves figures have not been adjusted to reflect our ownership interest.

(4) Reserves reflect the original scope of the Patrocinio project. Due to the macroeconomic scenario, we recently modified the scope of this project in order to integrate it with the Araxá operation.

	Phosphate rock ore mine			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Bayóvar	Open pit	2010	2045(1)	40.0
Catalão	Open pit	1982	2033	100.0
Tapira	Open pit	1979	2054	100.0
Araxá	Open pit	1977	2024	100.0
Cajati	Open pit	1970	2035	100.0
Patrocinio project	Open pit		2045(1)	100.0

(1) Projected exhaustion date limited to economic feasibility study. The expected mine life is longer than indicated above.

Potash ore reserves

The total potash reserves of the Taquari-Vassouras mine have decreased mainly due to mine production depletion and as result of a mine planning revision. The reserve estimates are of in-place material after adjustments for depletion, mining losses and recoveries, with no adjustments made for metal losses due to processing.

	Potash ore reserves(1)(2)							
	Proven	2015	Probable	2015	Total	2015	Total	2014
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Taquari-Vassouras(3)	3.2	25.6	4.5	22.4	7.7	23.7	10.6	24.2

Carnalita Project	247.1	12.2	54.5	12.2	301.6	12.2	301.6	12.2
Total	250.3	12.4	59.0	13.0	309.3	12.5	312.2	12.6

(1) Tonnage is stated in millions of dry metric tons. Grade is % of KCl.

(2) Tonnage is before processing recovery.

(3) Silvinite potash reserves.

Table of Contents

	Potash ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Taquari-Vassouras(1)	Underground	1986	2018	100.0
Carnalita Project(2)	Solution mining		2042	100.0

(1) We have a 30-year lease with Petrobras, which was signed in 2012.

(2) The Carnalita project is subject to approval by our Board of Directors.

Table of Contents

CAPITAL EXPENDITURES

We have an extensive program of investments in the organic growth of our businesses. The figures discussed in this section are for project execution and sustaining existing operations and replacement projects.

The 2016 investment budget approved by our Board of Directors is US$3.172 billion for project execution, reflecting a 50.1% decrease compared to the 2015 investment budget, and US$2.995 billion for sustaining existing operations and replacement projects, reflecting a 21.3% decrease compared to 2015. This is the fifth consecutive year of lower capital expenditures, maintaining capital discipline and focusing only on world class projects.

In February 2016, our Board of Directors approved a contingency plan for 2016, pursuant to which we target reducing the investment budget for 2016 to US$5.561 billion, being US$3.130 billion for project execution and US$2.431 billion for sustaining existing operations and replacement projects.

Most of the capital expenditures budget for project execution will be invested in Brazil (90%) and in Mozambique (10%).

	2014 expenditures (US$ million)	**2015 expenditures (US$ million)**	**2016 budget (US$ million)**	**(% of total)**
Project execution	7,920	5,548	3,172	51%
Investments to sustain existing operations and replacement projects	4,059	2,853	2,995	49%
Total	US$11,979	US$8,401	US$6,167	100%

We are developing a focused organic growth portfolio with fewer projects, but higher expected rates of return. Our main initiative, the S11D project, accounts for 72.3% of the US$3.172 billion budgeted for project execution in 2016.

Table of Contents

The following table sets forth total expenditures in 2015 for our main investment projects and expenditures budgeted for those projects in 2016, together with estimated total expenditures for each project and the estimated start-up date of each project as of December 31, 2015.

			Executed CAPEX		Expected CAPEX	
Business area	**Main projects(1)**	**Actual or estimated start-up**	**2015(2)**	**Total executed(3)**	**2016(4)**	**Total expected(5)**
				(US$ million)		
Iron ore	Carajás Serra Sul S11D(6)	2H16	1,163	4,655	921	6,405
	CLN S11D(7)	1H14 to 2H18	1,814	4,467	1,372	7,850
	Conceição Itabiritos II(8)	1H15	153	1,016	34	1,137
	Cauê Itabiritos(8)(9)	2H15	240	926	85	1,066
Coal mining and logistics	Moatize II	1H16	558	1,942	105	2,068
	Nacala Corridor(8)	2H14 to 2H15	902	3,795	225	4,444
Steelmaking	CSP(10)	1H16		1,055	188	1,224
Fertilizers	Phosphate ROM(11)	1H17	2	66	115	209
Base Metals	Voisey's Bay Underground(11)	1H20			74	1,904

(1) Projects approved by our Board of Directors.

(2) All figures are presented on a cash basis.

(3) Total executed CAPEX through December 31, 2015, including capital expenditures in prior periods.

(4) All figures are presented on a cash basis and correspond to the figures approved in the US$6.167 billion investment budget.

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

(6) Original expected CAPEX for S11D was US$8.089 billion.

(7) Original expected CAPEX for CLN S11D was US$11.582 billion.

(8) Projects delivered in 2015.

(9) Original expected CAPEX for Cauê Itabiritos was US$1.317 billion.

(10) Expected CAPEX and funding is relative to Vale's stake in the project.

(11) Replacement projects.

The paragraphs below describe the status of each project as of December 31, 2015 and have not been updated to reflect any developments after that date.

Ferrous minerals and logistics projects

Iron ore mining and logistics projects:

- *Carajás Serra Sul S11D.* Development of a mine and processing plant, located in the southern range of Carajás, in the Brazilian state of Pará. The project has a nominal capacity of 90 Mtpy. The project is 80% complete, with total realized expenditures of US$4.655 billion. In 2015, we concluded the assembly and transportation of all modules in the plant, and the transmission line connecting Carajás to Cannã was energized. In the beginning of 2016, we started the commissioning and testing of the long-distance conveyor belt. The start-up is expected for the second half of 2016.

CLN S11D. Increase in the logistics capacity of the Northern System to support the S11D project, including the duplication of approximately 570 km of railway (106 km of which we have already built), construction of a rail spur of 101 km, acquisition of wagons and locomotives and port expansion (onshore and offshore expansions at Ponta da Madeira maritime terminal). This project is expected to increase EFC's nominal logistics capacity to approximately 230 Mtpy. Railway duplication was 41% complete and construction of the railway spur was 81% complete. Regarding the port expansion, physical progress was about 76%. The project is 57% complete, with total realized expenditures of US$4.467 billion. The start-up is expected to continue through the second half of 2018.

Table of Contents

Base metals projects

- *Voisey's Bay Underground.* We completed, in March 2015, the study to replace the depletion of the open pit mine at Voisey's Bay with an underground mine. The project was approved to commence execution in 2016, and the first ore is expected to be delivered from the Reid Brook Deposit in 2020. The total expenditures in 2016 are expected to be US$74 million. When complete, the underground mine will produce an average of 46 ktpy contained nickel and extend the operational life until 2032.

Fertilizers projects

- *Phosphate ROM.* Development of a mine to increase the production of phosphate ROM in the municipality of Patrocínio. The ore will be transported to the Araxá plant, which is located approximately 200 kilometers from Patrocínio, through an existing railroad operated by VLI. The project capacity is 6.5 Mtpy of ROM. The phosphate concentrate produced in Araxá will be used in chemical plants located in Araxá and Uberaba to produce phosphate fertilizers. The start-up is expected for the first half of 2017.

Coal mining and logistics projects:

- *Moatize II.* New pit and duplication of the Moatize coal handling processing plant (CHPP), as well as all related infrastructure, located in Tete, Mozambique. The project will increase Moatize's total nominal capacity to 22 Mtpy. Moatize II was 99% complete in the fourth quarter of 2015 with total realized expenditures of US$1.942 billion. The commissioning on the handling system and cargo testing on one line of the CPP (Coal Preparation Plant) has been initiated. The start-up is expected for the first half of 2016.

Steel projects

- *Companhia Siderúrgica do Pecém* ("*CSP*"). Construction of an integrated steel slab plant in the Brazilian state of Ceará in partnership with Dongkuk Steel Mill Co. ("Dongkuk") and Posco, two major steel producers in South Korea. We own 50% of the joint venture, while Dongkuk owns 30% and Posco owns 20%. The project will have a nominal capacity of 3.0 Mtpy. Assembly of the steel structure reached 97% physical progress and civil works reached 99% physical progress. We have realized US$1.055 billion of expenditures, and the start-up is expected for the first half of 2016.

Table of Contents

REGULATORY MATTERS

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

Mining rights and regulation of mining activities

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

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

Location	Mining title	Approximate area covered (in hectares)	Expiration date
Brazil	Mining concessions (including under applications)	682,913	Indefinite
Canada(1)	Mining concessions (terminology varies among provinces)	330,560	2016 2036
Indonesia(2)	Contract of work	118,435	2025
Australia	Mining leases	11,135	2021 2041
New Caledonia	Mining concessions	21,269	2016 2051
Peru(3)	Mining concessions	199,398	Indefinite
Argentina(4)	Mining concessions	33,866	Indefinite
Mozambique(5)	Mining concessions	23,780	2032

(1) The expiration date of our leases in Sudbury is subject to current renewal applications. The approval process for these applications is in progress, but may take a number of years.

(2) Entitled to two 10-year extensions, subject to approval of the Indonesian government.

(3) Non-producing concessions have expiration dates between 2023 and 2028.

(4) We returned part of our mining rights in Argentina, due to market conditions. We have been and will keep honoring our commitments related to the Rio Colorado potash concession and reviewing alternatives to enhance the prospects for the project.

(5) Entitled to 25-year extensions, subject to approval by the Government of Mozambique.

In addition to the concessions listed above, we have exploration licenses and exploration applications covering 4.8 million hectares in Brazil and 1.7 million hectares in other countries.

There are several proposed or recently adopted changes in mining legislation and regulations in the jurisdictions where we have operations that could materially affect us. In 2013, the Brazilian government sent to Congress a bill with proposed changes to the Brazilian mining law. This bill provides for the preservation of the main provisions applicable to the existing mining rights as of the date of its enactment, a new royalties regime, a new regime for mining concessions and the creation of a mining agency. The bill is under discussion in Congress.

Table of Contents

Additionally, in New Caledonia, a mining law passed in 2009 requires mining projects to obtain authorization from governmental authorities, rather than a declaration, as required under the former statute. We submitted an updated application for this authorization in October 2015 and the official response is expected by December 2016. Our existing mining declaration will remain valid and effective until our application is approved. Although we believe it is unlikely that our application will be rejected, the authorities may impose new conditions in connection with the authorization. Also, in 2014, the local authorities of New Caledonia created a protected wetland area, which covers 27% of the surface area of the total VNC tenements and could affect potential mining activities. Part of this protected wetland area is adjacent to the location of VNC's next tailings storage facility, and may impact the design of the facility, which, in turn may result in additional capital costs.

Royalties and other taxes on mining activities

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

- *Brazil.* We pay a royalty known as the CFEM (*Compensação Financeira pela Exploração de Recursos Minerais*) on the revenues from the sale of minerals we extract, net of taxes, insurance costs and costs of transportation. The current rates on our products are: 2% for iron ore, copper, nickel, fertilizers and other materials; 3% for bauxite, potash and manganese ore; and 1% for gold. In 2013, the Brazilian government sent to Congress a bill with proposed changes to the Brazilian mining law that could affect royalty rates.

- *Brazilian states.* Several Brazilian states impose a tax on mineral production (*Taxa de Fiscalização de Recursos Minerais* TFRM), which is assessed at rates ranging from R$0.50 to R$3.025 per metric ton of minerals produced in or transferred from the state.

- *Canada.* The Canadian provinces in which we operate charge us a tax on profits from mining operations. Profit from mining operations is generally determined by reference to gross revenue from the sale of mine output and deducting certain costs, such as mining and processing costs and investment in processing assets. The statutory mining tax rates are 10% in Ontario; with graduated rates up to 17% in Manitoba; and a combined mining and royalty tax rate of 16% in Newfoundland and Labrador. The mining tax paid is deductible for corporate income tax purposes.

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

- *Australia.* Royalties are payable on revenues from the sale of minerals. In the state of Queensland, the applicable royalty for coal is 7% of the value (net of freight, late dispatch and other certain costs) up to A$100 per ton; 12.5% of the value between A$100 and A$150 per ton; and 15% thereafter.

Table of Contents

- *Zambia.* In 2015, Zambia's government implemented a series of changes in the fiscal regime applicable to the mining industry. For the period from January 1, 2015 to June 30, 2015, the government eliminated the corporate income taxes applicable to mining operations (with the exception of taxes associated with mineral processing) and increased mineral royalties applicable to underground mining operations, like our joint venture's operations, from 6% to 9%. In July 2015, the government (i) decreased mineral royalties on underground operations back to 6%, (ii) re-introduced a previously abolished 15% variable profit tax on income, applicable when taxable earnings exceed 8% of gross sales, and (iii) re-introduced tax on income at a 30% rate for income earned from mining operations and at a 35% rate for income earned from mineral processing.

Environmental regulations

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

We are taking several steps to improve the efficiency of the licensing process, including stronger integration of our environmental and project development teams, the implementation of a Best Practices Guide for Environmental Licensing and the Environment, the deployment of highly-skilled specialist teams, closer interaction with environmental regulators and the creation of an executive committee to expedite internal decisions regarding licensing.

Environmental regulations affecting our operations relate, among other matters, to emissions into the air, soil and water; recycling and waste management; protection and preservation of forests, coastlines, caves, watersheds and other features of the ecosystem; water use; financial provisions and closure plans needed since the mining license; climate change and decommissioning and reclamation. Environmental legislation is becoming stricter worldwide, which could lead to greater costs for environmental compliance. In particular, we expect heightened attention from various governments to reducing greenhouse gas emissions as a result of concern over climate change, especially following the Paris Climate Conference in late 2015. There are several examples of environmental regulation and compliance initiatives that could affect our operations.

- *Canada.* In Canada, more stringent water effluent and a greenhouse gas cap and trade regime regulations are being proposed, which may affect our operations. In Canada, we are making significant capital investments to ensure compliance with air emission regulations that address, among other things, sulfur dioxide, greenhouse gas emissions, particulates and metals.

- *Indonesia.* Under the 2014 Indonesia Government Regulation on B3 waste, PTVI's slag is classified as hazardous waste and PTVI is implementing plans to achieve compliance.

- *China.* An amendment to the environment protection law was approved in April 2014, imposing stricter pollution prevention and control obligations on companies and providing for more severe penalties. This amendment may adversely impact our coal exports from Mozambique to China.

- *New Caledonia.* A law enacted by the South Province of New Caledonia in February 2014 imposes stricter limits on emissions of nitrogen oxide and sulfur oxide and particulates from large combustion power stations, which will affect the power station that supplies electricity to VNC. To meet these standards, this 100 MW power station will need to be upgraded, which is expected to result in the increase in the price of power paid by VNC.

Table of Contents

- *Brazil.* Under applicable Brazilian regulations for the protection of caves, we are required to conduct extensive technical studies and negotiate compensatory measures with Brazilian environmental regulators in order to continue to operate in certain sites. In certain of our iron ore mining operations or projects, we may be required to limit or modify our mining plans or to incur additional costs to preserve caves or to compensate for the impact on them, with potential consequences for production volumes, costs or reserves in our iron ore business. Also, a Brazilian regulation for the protection of indigenous people, which was enacted in 2011 and revised in 2015, requires us to conduct specific studies of impact and sponsor mitigation programs in connection with operations and projects close to indigenous people's lands.

Regulation of other activities

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

- *Brazilian railway regulation.* Our Brazilian railroad business operates pursuant to concession contracts granted by the federal government, and our railroad concessions are subject to regulation and supervision by the Brazilian Ministry of Transportation and the regulatory agency for ground transportation (ANTT). The concessions for EFC and EFVM expire in 2027 and may be renewed at the federal government's discretion. VLI has also been awarded a subconcession contract for commercial operation of a 720-kilometer segment of the FNS railroad in Brazil, which expires in 2037, and FCA and MRS concessions expire in 2026. Rail transportation prices can be negotiated directly with the users of such services, subject to tariff ceilings approved by ANTT for each of the concessionaires and each of the different products transported. ANTT regulations also require concessionaires to give trackage rights to other railway operators, to make investments in the railway network, and to meet certain productivity and safety requirements, among other obligations.

- *Brazilian port regulation.* Port operations in Brazil are subject to regulation and supervision by ANTAQ, the federal agency in charge of maritime transportation services, and the Secretary of Ports of the Federal Government (SEP). In 2014, we renewed the agreements pursuant to which the SEP grants us rights to operate our private terminals, with the exception of the agreement with CPBS, which will expire in 2026. These renewed agreements will be effective until 2039.

- *Regulation of chemicals.* Some of our products are subject to regulations applicable to the marketing, distribution and use of chemical substances present in their composition. For example, the European Commission has adopted a European Chemicals Policy, known as REACH ("Registration, Evaluation and Authorization of Chemicals"). Under REACH, European manufacturers and importers are required to register substances prior to their entry into the European market and in some cases may be subject to an authorization process. A company that fails to comply with the REACH regulations could face fines and penalties.

- *Regulation of the seaborne transport on bulk materials.* We are subject to health, safety and environmental rules issued by the International Maritime Organization ("IMO") governing shipping of products, including iron ore. The IMO is currently discussing further technical and operational measures for enhancing the energy efficiency of international shipping including developing a global monitoring, reporting and verification system, which will eventually enable market-based measures to curb greenhouse gas emissions. These measures may increase our freight cost in the future.

Table of Contents

II. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

OVERVIEW

Our financial performance in 2015 was strongly affected by declining commodity prices. Despite this impact, we had record annual production of iron ore, nickel and copper, we succeeded in reducing costs and expenses, we advanced our major capital expenditure projects, we proceeded with planned asset dispositions, and we maintained a stable net debt position. We reduced our capital expenditures for the fifth consecutive year, from US$11.979 billion in 2014 to US$8.401 billion in 2015.

We had a net loss of US$12.129 billion in 2015 in spite of these achievements. The result was significantly affected by two primarily non-cash impacts: (i) US$9.372 billion in impairment charges on non-current assets and investments and provisions for onerous contracts, driven primarily by the use of lower price assumptions in our impairment testing, and (ii) US$7.480 billion due to exchange rate loss and US$2.916 billion due to loss on derivatives, driven primarily by the effect of a 47% decline during the year in the value of the Brazilian *real* against the U.S. dollar. These generally did not affect our short-term cash generation, and they could be reversed in part in the future if commodity prices recover or the Brazilian *real* recovers against the U.S. dollar.

Our cash proceeds from asset sales in 2015 consisted of US$1.316 billion from the sale of 12 very large ore carriers to Chinese shipowners, US$900 million from the gold stream transaction and US$97 million from the sale of energy assets. Additionally, we received US$1.089 billion from our sale of preferred shares representing a 36.4% stake of MBR. The aggregate proceeds from these transactions totaled US$3.402 billion.

Our accomplishments in a very challenging macro-economic environment were overshadowed by the tragic failure in early November 2015 of one of the tailings dams at Samarco, a 50-50 joint venture between Vale and BHPB. The failure resulted in 18 fatalities, with one person still missing, and caused property and environmental damage to the affected areas, primarily in the state of Minas Gerais. The full consequences of these events for the people of the region, and for Samarco and its shareholders, are not yet known for certain. See *Information on the Company Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*.

Major factors affecting prices

Iron ore and iron ore pellets

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

Demand for our iron ore and iron ore pellets is a function of global demand for carbon steel. Demand for carbon steel, in turn, is strongly influenced by real estate and infrastructure construction and global industrial production. Demand from China has been the principal driver of world demand and prices. We expect China's economic growth to slow down in 2016 principally due to lower fixed asset investment growth, especially in the real estate and manufacturing sectors, which will be partially offset by infrastructure investments.

Prices are also influenced by the supply of iron ore and iron ore pellets in the international market. In 2015, an excess in the iron ore supply had a negative impact on prices. The expected conclusion of certain iron ore projects in the coming year, especially in Australia and in Brazil, may result in additional pressures on prices, posing additional challenges for higher cost producers of iron ore.

Table of Contents

Our iron ore prices are based on a variety of pricing options, which generally use spot price indices as a basis for determining the customer price. Our pricing is generally based on published indexes and uses a variety of mechanisms, including current spot prices and average prices over an agreed period (quarter-lagged) and future prices on delivery. In cases where the final price is only determinable on a future date after shipment, we recognize the sale based on a provisional price at the time of shipment with a subsequent adjustment reflecting the final price.

Coal

Demand for metallurgical coal is driven by steel demand, and future growth continues to be expected in Asia. Asia, including India, accounts for more than half of the steel market and consumes approximately 70% of seaborne metallurgical coal. Chinese seaborne demand decreased by 22% to 48 million metric tons in 2015 compared to 62 million metric tons imported in 2014. This was partially offset by a 14% increase in Indian demand from 40 million metric tons in 2014 to approximately 46 million metric tons in 2015.

A 4% drop in global metallurgical imports in 2015 resulted in oversupply and continuous price depression. Seaborne exports were steady, with Australian exports holding a 65% global market share. In 2015, there was little growth in volume from Indonesia and Mozambique, offset by decreases in the United States, Canada and Russia due to mine closures, supply problems and political instability in Ukraine. Due to market conditions, there is no incentive to expand metallurgical coal supply in the short term beyond existing projects. We expect that there will be further supply adjustments before prices begin to recover.

Demand for thermal coal is closely related to electricity consumption, which continues to be driven by global economic growth and urbanization, with the highest levels of growth found in Asia and emerging markets. Coal fired generation capacity growth in India drove thermal coal imports up in 2015, but did not offset the decline in China's imports. Preliminary data from China show a decrease of almost 33% in its imports by sea, while India's imports increased 10%. Improvement in the transmission infrastructure to coastal regions in China has contributed to a weaker thermal coal demand in the country. Additionally, there is an increased pressure from international organizations for establishing a global carbon price and for companies and governments to adopt carbon pricing strategies. This increased pressure, as well as the mid-term rise in non-coal fired power generation sources, has also contributed to weaker import thermal coal demand in China. Global seaborne demand decreased by approximately 5% in 2015 for the first time since 2008. The depreciation of the Chinese yuan and domestic protectionist policies put further downward pressure on the seaborne market.

Various other factors influence coal prices. The depreciation of commodity currencies (such as the Australian dollar, Canadian dollar, Russian ruble and South African rand) against the U.S. dollar throughout 2015 provided ongoing relief to producers and sustained the low price environment.

Nickel

Nickel is an exchange-traded metal, listed on the LME and, as of 2015, the Shanghai Futures Exchange. Most nickel products are priced using a discount or premium to the LME price, depending on the nickel product's physical and technical characteristics. Demand for nickel is strongly affected by stainless steel production, which represents, on average, 67% of global nickel consumption.

We have short-term fixed-volume contracts with customers for the majority of our expected annual nickel sales. These contracts, together with our sales for non-stainless steel applications (alloy steels, high nickel alloys, plating and batteries), provide stable demand for a significant portion of our annual production. In 2015, 58% of our refined nickel sales were made for non-stainless steel applications, compared to the industry average for primary nickel producers of 33%, bringing more stability to our sales volumes. As a result of our focus on such higher-value segments, our average realized nickel prices for refined nickel have typically exceeded LME cash nickel prices.

Table of Contents

Primary nickel (including ferro-nickel, nickel pig iron and nickel cathode) and secondary nickel (i.e., scrap) are competing nickel sources for stainless steel production. The choice between different types of primary and secondary nickel is largely driven by their relative price and availability. Between 2012 and 2015, secondary nickel has accounted for about 40-43% of total nickel used for stainless steels, and primary nickel has accounted for about 57-60%. In 2015, Chinese nickel pig iron production was estimated at approximately 360,000 metric tons, representing 19% of world primary nickel supply, compared to 23% and 25% of the world's supply in 2014 and 2013, respectively. The implementation of a mining law in Indonesia that restricts the export of unprocessed ores has adversely affected Chinese nickel pig iron production since 2014. We anticipate that Chinese nickel pig iron production will decline in 2016, as previously imported stockpiles of Indonesian ores within China are depleted. Development of processing plants, primarily smelters, in Indonesia to process ore is ongoing with a number of plants completed in 2015. We expect this increased development in Indonesia to impact the supply of nickel to the market in the future.

Copper

Copper demand in recent years has been driven primarily by China, given the important role copper plays in construction in addition to electrical and consumer applications. Copper prices are determined on the basis of (i) prices of copper metal on terminal markets, such as the LME and the NYMEX, and (ii) in the case of intermediate products such as copper concentrate (which comprise most of our sales) and copper anode, treatment and refining charges negotiated with each customer. Under a pricing system referred to as MAMA ("month after month of arrival"), sales of copper concentrates and anodes are provisionally priced at the time of shipment, and final prices are settled on the basis of the LME price for a future period, generally one to three months after the shipment date.

Demand for refined copper grew by an estimated 2% in 2015, and China was responsible for an equivalent of 46% of worldwide consumption. The supply of refined copper increased with a 3% growth in global mine output in 2015, as a result of the ramp up of new projects. During the year of 2015, prices remained under pressure. For 2016, we expect to see continued ramping up of production at mines where recent capital investments have been made.

Fertilizers

Demand for fertilizers is based on market fundamentals similar to those underlying global demand for minerals, metals and energy. Rapid per capita income growth in emerging economies generally causes dietary changes marked by an increase in the consumption of proteins, which ultimately contributes to increased demand for fertilizer nutrients, including potash and phosphates, as they help boost production of grains to feed more livestock. Demand is also driven by the demand for bio-fuels, which have emerged as an alternative source of energy to reduce world reliance on sources of climate-changing greenhouse gases, because key inputs for the production of biofuels sugar cane, corn and palm are intensive in the use of fertilizers.

Sales of fertilizers are mainly on a spot basis using international benchmarks, although some large importers in China and India often sign annual contracts. Seasonality is an important factor for price determination throughout the year, since agricultural production in each region depends on climate conditions for crop production.

In 2015, global fertilizer market conditions were weak due to lower agriculture commodities prices. Demand in Brazil was further undermined by the depreciation of the Brazilian *real* against the U.S. dollar, and the shortage of credit to farmers.

Table of Contents

Impairment charges

In recent years we have recognized significant impairments of our assets and investments, attributable to a variety of factors. In 2015, the most important factor was the changing price environment, which affected our long-term pricing assumptions for iron ore, nickel and coal. As a result, in 2015 we recognized impairments on assets and investments, and a provision for losses on onerous contracts, in a total amount of US$8.926 billion, plus impairments of investments in associates and joint ventures of US$446 million.

The main impairment charges we recognized in 2015 were:

- US$3.460 billion on assets of our nickel operations in Newfoundland and Labrador, in Canada, and US$1.462 billion on assets of our nickel operations in New Caledonia, due to lower nickel prices;
- US$2.403 billion on assets of our coal operations in Mozambique, due to lower coal prices and increased logistics costs;
- US$635 million charge on assets of our coal operations in Australia, due to lower coal prices and the revision of mining plans in the Australian coal mines;
- US$522 million on assets of our Midwestern iron ore system, as a result of lower iron ore prices and related production plan revision; and a US$357 million provision for losses associated with long-term river freight agreements for iron ore produced in our Midwestern system; and
- US$548 million due to lower expectations on the recovery of amounts invested in the Rio Colorado potash project in Argentina.

These amounts were partially offset by impairment reversals resulting from the recovery of Onça Puma's nickel production, in the amount of US$252 million, and from the devaluation of the Brazilian *real* against the U.S. dollar, which benefited the Brazilian phosphate operations (US$391 million).

Impairments of investments in associates and joint ventures totaled US$446 million in 2015, of which US$132 million related to our investment in Samarco and US$314 million related to our investment in TEAL, the joint venture of Vale with ARM, which holds an 80% stake in the Lubambe copper operation in Zambia.

Failure of Samarco's Fundão tailings dam

Vale owns a 50% interest in Samarco and accounts for it under the equity method. As a result of the November 2015 failure of Samarco's Fundão tailings dam, Samarco incurred expenses, wrote off assets and recognized provisions for remediation. Because Samarco is a joint venture, these impacts were accounted for under the equity method by Vale, limited to its interest in Samarco's capital. Vale's investment in Samarco was reduced to zero and no liability was recognized in Vale's financial statements.

It is still possible, however, that the consequences of the dam failure could have a direct financial impact on Vale. Samarco and its shareholders, Vale and BHPB, entered into a settlement agreement on March 2, 2016 with governmental authorities, including the federal Attorney General of Brazil and the two Brazilian states affected by the failure (Espírito Santo and Minas Gerais). Under the agreement, Samarco, Vale and BHPB will create a foundation to develop and implement remediation and compensation programs in substantial amounts over many years. See *Information on the Company Business overview Significant changes in our business Failure of Samarco's tailings dam in Minas Gerais*.

Table of Contents

Samarco is currently unable to conduct ordinary mining and processing. Samarco's management is working on a plan that would permit it to resume operations, but the feasibility, timing and scope of restarting remain uncertain. If Samarco is able to resume operations, we expect that it will be able to generate all or a substantial part of the funding required under the agreement. If Samarco does not meet its funding obligations, each of Vale and BHPB is obligated to provide funding to the foundation in proportion to its 50% interest in Samarco.

Vale does not currently expect to record a provision in its financial statements in respect of these obligations, but if Samarco is eventually unable to resume operations or to meet its funding obligations, Vale could determine that it should recognize a provision.

Effect of lower oil prices

Global freight rates declined in 2015, primarily because of lower fuel costs, but our freight cost is not perfectly correlated with the freight spot market. We have a portfolio of short-, medium- and long-term affreightment agreements, in addition to our own fleet, and our freight cost is impacted by changes in routes, resulting from sales to different geographical areas. Our freight cost is also impacted by the time lag between the date of the spot contract and the date of recognition of the expenditure, which is booked when the revenue from the sale of the iron ore cargo is recognized.

The effect of lower prices for bunker oil, the fuel used in ships, on our performance in 2015 was partially offset by the results of our hedge positions. The impact is recognized in two ways.

- The hedge of bunker oil exposure associated with our CFR sales, which primarily use our owned fleet and long-term affreightment agreements, is designated as a cash flow hedge. The positions are marked to market, and a gain or loss is recorded under other comprehensive income, impacting our cost of goods sold when the hedge transaction is settled. In 2015, we recognized US$439 million in costs in connection with our cash flow hedge.

- The hedge of bunker oil exposure associated with our FOB and domestic sales is accounted for as an economic hedge. The positions are marked to market and gain or loss is recognized in financial results. In 2015, we had a US$742 million fair value loss in connection with our hedge of bunker oil exposure accounted for as economic hedge.

Beginning in 2016, we are no longer hedging our exposure to bunker oil prices relating to our owned fleet and long-term affreightment agreements, but we still have open hedge positions relating to our FOB and domestic sales.

Effect of devaluation of Brazilian currency

Our results of operations are affected in several ways by changes in currency exchange rates. In 2015, the Brazilian *real* depreciated 47% against the U.S. dollar, from an exchange rate of R$2.66 to US$1.00 on December 31, 2014 to R$3.90 to US$1.00 on December 31, 2015. The most important effects are described below.

- Most of our revenues are denominated in U.S. dollars, while most of our costs of goods sold are denominated in other currencies, including the Brazilian *real* (49% in 2015) and the Canadian dollar (13% in 2015). In 2015, 34% of our costs of goods sold were denominated in U.S. dollars. As a result, changes in exchange rates, particularly with respect to the U.S. dollar, affect our operating costs and operating margins.

Table of Contents

- Most of our long-term debt (US$22.977 billion at December 31, 2015, not including accrued charges) is denominated in currencies other than the Brazilian *real*, principally the U.S. dollar. Because the functional currency of our parent company for accounting purposes is the Brazilian *real*, changes in the value of the U.S. dollar against the Brazilian *real* result in exchange gain or loss on our net liabilities.

- We had *real*-denominated debt of US$5.252 billion at December 31, 2015, excluding accrued charges. Since most of our revenues are in U.S. dollars, we may use swaps to convert our debt service from Brazilian *reais* to U.S. dollars. Changes in the value of the U.S. dollar against the Brazilian *real* result in fair value variation on these derivatives, affecting our financial results. For more information on our use of derivatives, see *Risk management*.

An increase in the value of the U.S. dollar, such as occurred in 2015, adversely affects our financial results due to exchange losses on our net U.S. dollar-denominated liabilities (US$7.166 billion in 2015) and fair value losses on our currency derivatives (US$1.502 billion in 2015). It also generally has a positive effect on our operating costs, as it did in 2015.

Table of Contents

RESULTS OF OPERATIONS

Consolidated Revenues

In 2015, our net operating revenues decreased 31.8% to US$25.609 billion, primarily resulting from lower prices for iron ore fines (an impact of US$8.614 billion on net revenues), iron ore pellets (US$2.030 billion), nickel (US$1.394 billion) and other commodities. This was partially offset by higher sales volume (an impact of US$2.239 billion on net revenues) of iron ore fines, iron ore pellets and nickel, mainly due to increases in the capacity of our facilities resulting from our capital expenditures for expansion of mine life. Net operating results of each segment are discussed below under *Results of operations by segment*.

Our revenue depends, among other factors, on the volume of production at our facilities and the prices for our products. We publish a quarterly production report that is available on our website and furnished to the SEC on Form 6-K. Increases in the capacity of our facilities resulting from our capital expenditure program have an important effect on our performance. Our production is also affected by acquisitions and dispositions.

Net operating revenue by product

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

	Year ended December 31,				
	2013	% change	2014	% change	2015
	(US$ million, except for %)				
Ferrous minerals:					
Iron ore	US$27,844	(30.7)	US$19,301	(36.1)	US$12,330
Iron ore pellets	6,000	(12.3)	5,263	(31.6)	3,600
Ferroalloys and manganese	523	(25.1)	392	(58.7)	162
Other ferrous products and services	425	74.4	741	(36.6)	470
Subtotal	34,792	(26.1)	25,697	(35.5)	16,562
Coal	1,010	(26.8)	739	(28.8)	526
Base metals:					
Nickel and other products(1)	5,839	6.9	6,241	(24.8)	4,693
Copper concentrate(2)	1,447	0.3	1,451	1.3	1,470
Subtotal	7,286	5.6	7,692	(19.9)	6,163
Fertilizers:					
Potash	201	(23.4)	154	(14.3)	132
Phosphates	2,065	(11.9)	1,820	(4.8)	1,733
Nitrogen	469	(25.6)	349	(13.2)	303
Other fertilizer products	79	16.5	92	(38.0)	57
Subtotal	2,814	(14.2)	2,415	(7.9)	2,225
Other products and services(3)	865	15.1	996	(86.6)	133
Net operating revenues	US$46,767	(19.7)	US$37,539	(31.8)	US$25,609

(1)

(2) Includes nickel co-products (copper) and by-products (precious metals, cobalt and others).

(3) Does not include copper produced as a nickel co-product.

(4) Includes pig iron (2013 and 2014) and energy.

Table of Contents

Sales volumes

The following table sets forth, for our principal products, the total volumes we sold in each of the periods indicated.

	Year ended December 31,		
	2013	**2014**	**2015**
	(thousand metric tons)		
Ferrous minerals:			
Iron ore fines	251,029	255,877	276,393
Iron ore pellets	40,991	43,682	46,284
Manganese	2,115	1,879	1,764
Ferroalloys	183	150	69
Coal:			
Thermal coal	726	1,152	892
Metallurgical coal	7,353	6,330	5,614
Base metals:			
Nickel	261	272	292
Copper	352	353	397
PGMs (oz)	510	577	519
Gold (oz)	297	351	425
Silver (oz)	2,154	1,889	2,303
Cobalt	2,939	3,188	3,840
Fertilizers:			
Potash	531	475	463
Phosphates:			
MAP	1,133	1,040	1,081
TSP	681	749	744
SSP	1,969	2,091	1,847
DCP	461	493	459
Phosphate rock	3,154	3,259	3,193
Nitrogen	890	680	641

Table of Contents

Average realized prices

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

	Year ended December 31,		
	2013	2014	2015
	(US$ per metric ton, except where indicated)		
Ferrous minerals:			
Iron ore	112.05	75.43	44.61
Iron ore pellets	150.22	124.17	77.78
Manganese	157.37	120.28	56.44
Ferroalloys	1,303.92	1,453.33	904.16
Coal:			
Thermal coal	81.17	67.65	52.42
Metallurgical coal	129.34	104.37	85.55
Base metals:			
Nickel	14,900.24	16,426.47	11,684.30
Copper	6,709.18	6,015.47	4,363
Platinum (US$/oz)	1,469.78	1,261.87	1,020.14
Gold (US$/oz)	1,339.37	1,192.51	1,123.07
Silver (US$/oz)	20.02	19.42	12.63
Cobalt (US$/lb)	10.95	10.67	9.95
Fertilizers:			
Potash	417.32	355.79	318.32
Phosphates:			
MAP	571.86	542.44	511.70
TSP	472.51	428.98	398.05
SSP	271.88	212.61	204.45
DCP	611.54	591.51	554.88
Phosphate rock	90.68	70.88	82.55
Nitrogen	610.27	604.41	554.32

Table of Contents

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

	Net operating revenues by destination					
	2013		2014		2015	
	(US$ million)	(% of total)	(US$ million)	(% of total)	(US$ million)	(% of total)
North America						
Canada	US$1,043	2.2%	1,393	3.7%	1,122	4.4%
United States	1,311	2.8	1,368	3.6	855	3.3
	2,354	5.0	2,761	7.3	1,977	7.7
South America						
Brazil	6,190	13.2	5,927	15.8	3,967	15.5
Other	776	1.7	685	1.8	298	1.1
	6,966	14.9	6,612	17.6	4,255	16.6
Asia						
China	18,920	40.5	12,657	33.7	9,095	35.5
Japan	4,035	8.6	3,627	9.7	1,959	7.7
South Korea	1,795	3.8	1,555	4.1	790	3.1
Taiwan	982	2.1	721	1.9	620	2.4
Other	825	1.8	1,029	2.8	904	3.5
	26,558	56.8	19,589	52.2	13,368	52.2
Europe						
Germany	3,285	7.0	2,111	5.6	1,433	5.6
United Kingdom	1,003	2.1	709	1.9	399	1.6
Italy	1,055	2.3	849	2.3	461	1.8
France	977	2.1	565	1.5	331	1.3
Other	2,442	5.2	2,463	6.5	2,032	7.9
	8,762	18.7	6,697	17.8	4,656	18.2
Rest of the world	2,128	4.6	1,880	5.1	1,353	5.3
Total	US$46,767	100.0%	37,539	100.0%	25,609	100.0%

Consolidated operating costs and expenses

Our cost of goods sold declined by US$4.551 billion in 2015, reflecting an impact of US$4.152 billion due to the positive effect of exchange rate variation and other cost reductions of US$1.370 billion, including US$1.183 billion in lower freight expenses mainly due to lower fuel prices. In 2015, we successfully implemented measures that resulted in a reduction of our costs, including the ramp-up of the N4WS and N5S extension mines in Carajás, and Vargem Grande, Conceição I and II itabirites projects in Minas Gerais. These effects were partially offset by US$971 million of higher costs associated mainly with higher volume of iron ore sold and the recognition of bunker oil hedge costs totaling US$439 million.

Our selling, general and administrative and other expenses (net of revenues) decreased by 33.9% in 2015, on a constant currency basis, mostly due to reduction in personnel expenses, conclusion of some IT projects (particularly the implementation of our SAP system) and other cost-cutting measures. We reduced our research and evaluation expenses by 35%, to US$477 million in 2015 from US$734 million in 2014. Our pre-operating and stoppage expenses reduced by US$61 million in 2015, primarily because the ramp-up of our nickel operation in New Caledonia is approaching the operational targets, partially offset by higher pre-operating expenses in Long Harbour and Nacala. Other operating expenses declined mainly due to a reversal of provisions for asset retirement obligations in the amount of US$331 million, as a result of mining plan revisions, which extended the life of some assets and the scope of work used to determine asset retirement costs.

Impairment of non-current assets was US$8.926 billion in 2015 and US$1.152 billion in 2014. In 2015, we recognized impairment charges in connection with certain of our iron ore, nickel, coal and potash assets, primarily due to revised price assumptions, while in 2014 we recorded an impairment in connection with our iron ore project in Simandou, in Guinea. See *Impairment.*

Table of Contents

Cost of goods sold by product

The following table presents, for each indicated period, our cost of goods sold by product and the percentage change from year to year. The percentage change is presented both as reported in our financial statements and as adjusted to remove the effects of exchange rate variation (constant currency basis).

	Year ended December 31,						
	2013 Cost of goods sold (US$ million)	Change As reported (%)	Change Constant currency (%)	2014 Cost of goods sold (US$ million)	Change As reported (%)	Change Constant currency (%)	2015 Cost of goods sold (US$ million)
Ferrous minerals:							
Iron ore	9,067	5.2	11.5	9,532	(20.2)	(6.0)	7,604
Iron ore pellets	2,299	17.7	26.6	2,705	(21.6)	(2.0)	2,121
Ferroalloys and manganese	317	(17.7)	(10.6)	261	(33.0)	(6.9)	175
Other ferrous products and services	166	240.4	279.2	565	(39.6)	(11.4)	341
Subtotal	11,849	10.3	17.4	13,063	(21.6)	(5.4)	10,241
Coal	1,147	(6.6)	(3.0)	1,071	(21.7)	(15.3)	839
Base metals:							
Nickel and other products(1)	3,657	1.4	4.6	3,710	(8.5)	0.6	3,393
Copper (2)	1,008	(13.0)	(5.4)	877	3.0	45.9	903
Subtotal	4,665	(1.7)	2.5	4,587	(6.3)	7.7	4,296
Fertilizers:							
Potash	127	4.7	13.7	133	(33.1)	(5.3)	89
Phosphates	1,681	(9.9)	(5.7)	1,514	(22.5)	(5.6)	1,173
Nitrogen	382	(37.7)	(35.1)	238	(13.0)		207
Other fertilizer products							
Subtotal	2,190	(13.9)	(9.8)	1,885	(22.1)	(4.8)	1,469
Other(3)	669	(10.2)	(5.1)	601	(76.9)	(71.6)	139
Total (excluding depreciation)	20,520	3.3	9.2	21,207	(19.9)	(4.8)	16,984
Depreciation	3,724	3.5	5.3	3,856	(8.5)	15.1	3,529

(1) Includes nickel co-products (copper) and by-products (precious metals, cobalt and others).

(2) Does not include copper produced as a nickel co-product.

(3) Includes pig iron (2013 and 2014) and energy.

Table of Contents

Expenses by product (excluding impairment charges)

The following table summarizes, for each indicated period, our expenses (including selling, general and administrative, research and evaluation, pre-operating, stoppage and other expenses, net of other revenues) by product and the percentage change from year to year. The percentage change is presented both as reported in our financial statements and as adjusted to remove the effects of exchange rate variation (constant currency basis). The table excludes the effect of impairment charges. See *Impairment*.

	Year ended December 31,						
	2013	Change		2014	Change		2015
	Expenses	As reported	Constant currency	Expenses	As reported	Constant currency	Expenses
	(US$ million)	(%)	(%)	(US$ million)	(%)	(%)	(US$ million)
Ferrous minerals:							
Iron ore	1,819	(4.5)	(11.6)	1,737	(63.0)	(46.3)	643
Iron ore pellets	252	(76.6)	(77.7)	59	(67.8)	(60.4)	19
Ferroalloys and manganese	47	(23.4)	(28.0)	36	(50.0)	(33.3)	18
Other ferrous products and services	(3)			7			(3)
Subtotal	2,115	(13.0)	(19.2)	1,839	(63.2)	(47.1)	677
Coal	358	2.0	1.1	365	(38.9)	(37.5)	223
Base metals:							
Nickel and other products(2)	1,049	(47.5)	(47.8)	551	21.2	27.5	668
Copper (3)	177	(81.4)	(81.9)	33	24.2	70.8	41
Other base metal products	(244)						(230)
Subtotal	982	(40.5)	(41.2)	584	(18.0)	(12.6)	479
Fertilizers:							
Potash	439	(87.2)	(87.4)	56	26.8	31.5	71
Phosphates	205	(16.1)	(22.9)	172	(38.4)	(19.7)	106
Nitrogen	32	(25.0)	(29.4)	24	(50.0)	(29.4)	12
Other fertilizer products	2						
Subtotal	678	(62.8)	(64.0)	252	(25.0)	(6.9)	189
Other(4)	388	30.7	23.1	507	(42.0)	(16.9)	294
Total (excluding depreciation)	4,521	(21.5)	(25.2)	3,547	(47.5)	(32.1)	1,862
Depreciation	425	1.4	(2.0)	431	16.0	0.4	500
Total with depreciation	4,946	(19.6)	(23.3)	3,978	(40.6)	(27.1)	2,362

(1) Excluding impairment charges.

(2) Includes nickel co-products (copper) and by-products (precious metals, cobalt and others).

(3) Does not include copper produced as a nickel co-product.

(4) Includes pig iron (2013 and 2014) and energy.

Results of operations by segment

Our management uses adjusted earnings before interest, taxes, depreciation and amortization, or adjusted EBITDA, to assess each segment's contribution to our performance and to support decisions about resource allocation. Adjusted EBITDA is a non-GAAP measure, calculated for each segment using operating income or loss plus dividends received from joint ventures and associates, and adding back the amounts charged as (i) depreciation, depletion and amortization, (ii) impairment of non-current assets and onerous contracts and (iii) results on measurement or sale of non-current assets. For more information and a reconciliation of our operating income or loss to adjusted EBITDA, see Note 3 to our consolidated financial statements.

Table of Contents

The following table summarizes operating income or loss and Adjusted EBITDA for each of our segments.

	Year ended December 31,								
	2013			2014			2015		
	Operating income (loss)	Adjustments (1)	Adjusted EBITDA	Operating income (loss)	Adjustments (1)	Adjusted EBITDA	Operating income (loss)	Adjustments (1)	Adjusted EBITDA
	(US$ million)								
Ferrous minerals:									
Iron ore	15,565	1,456	17,021	1,383	2,693	8,076	1,794	2,311	4,105
Iron ore pellets	3,083	1,018	4,101	2,225	756	2,981	1,075	610	1,685
Ferroalloys and manganese	130	29	159	63	32	95	(54)	23	(31)
Other ferrous products and services	122	140	262	59	110	169	35	105	140
Subtotal	18,900	2,643	21,543	3,730	3,591	11,321	2,850	3,049	5,899
Coal	(668)	213	(455)	(1,160)	491	(669)	(3,766)	3,258	(508)
Base metals:									
Nickel and other products(2)	(459)	1,592	1,133	1,575	405	1,980	(5,712)	6,344	632
Copper(3)	(127)	389	262	367	174	541	297	229	526
Other	244		244				230		230
Subtotal	(342)	1,981	1,639	1,942	579	2,521	(5,185)	6,573	1,388
Fertilizers:									
Potash	(2,525)	2,160	(365)	(61)	26	(35)	(607)	579	(28)
Phosphates	(133)	312	179	(1,264)	1,398	134	587	(133)	454
Nitrogen	(20)	75	55	39	48	87	63	21	84
Other fertilizer products	77	0	77	92		92	57		57
Subtotal	(2,601)	2,547	(54)	(1,194)	1,472	278	100	467	567
Other(4)	(226)	113	(113)	(140)	42	(98)	(130)	(135)	(265)
Total	15,063	7,497	22,560	7,178	6,175	13,366	(6,131)	13,212	7,081

(1) Adding dividends received from associates and joint ventures and excluding (i) depreciation, depletion and amortization, (ii) impairment of non-current assets and onerous contracts and (iii) results on measurement or sale of non-current assets. See Note 3(a) to our consolidated financial statements.

(2) Includes nickel co-products (copper) and by-products (precious metals, cobalt and others).

(3) Does not include copper produced as a nickel co-product.

(4) Includes pig iron and energy.

We discuss below, for each segment, the changes in our net operating revenues, cost of goods sold (excluding depreciation, depletion and amortization), expenses (excluding depreciation, depletion and amortization and excluding impairment charges), adjusted EBITDA and operating income.

Ferrous minerals

2015 compared to 2014.

Our net operating revenues from sales of ferrous minerals decreased by 35.5%, from US$25.697 billion in 2014 to US$16.562 billion in 2015, reflecting lower iron ore and iron ore pellet prices, partially offset by higher sale volumes of iron ore and iron ore pellets. Our average realized prices in 2015 were 40.8% and 35.4% lower than our average realized prices in 2014 for iron ore and iron ore pellets, respectively,

reflecting the decline in the average reference price index Platt's IODEX 62% CFR China. Our iron ore sales volume increased by 8.0% in 2015, due to the ramp-up of the Carajás plant 2, Vargem Grande and Conceição I and II Itabirites projects, and improvement of our distribution logistics, while the volume of our iron ore pellets sales increased by 6.0% due to the ramp-up of the Tubarão VIII pelletizing plant.

Table of Contents

Our cost of goods sold from ferrous minerals, excluding depreciation, decreased by 5.4% on a constant currency basis, mainly as a result of (i) a decrease in our freight costs, in the amount of US$1.246 billion, (ii) a reduction in the railroad transportation fees paid to MRS in the amount of US$104 million, (iii) US$233 million reduction in the cost of acquisition of iron ore, mainly due to lower prices, and (iv) a decrease in pellet plants leasing, in the amount of US$46 million mainly due to the decline in prices. These effects were partially offset by increased costs associated with the increase in volume sold, in the amount of US$1.173 billion. In addition, we implemented general cost-cutting measures, including the renegotiation and termination of contracts.

Our net expenses from ferrous minerals, excluding depreciation and impairment charges, decreased by 47.1% on constant currency basis, from US$1.839 billion in 2014 to US$677 million in 2015, mainly due to a reversion of provisions for asset retirement obligations in the amount of US$322 million and a US$201 million reduction in research and evaluation expenses.

Our adjusted EBITDA from ferrous minerals was US$5.899 billion in 2015, 47.9% lower than in 2014, for the reasons described above, partially offset by the positive impact of exchange rate variation, in the amount of US$2.794 billion. Dividends received from joint ventures and associates operating in the ferrous minerals segment totaled US$255 million in 2015 compared to US$525 million in 2014, reflecting lower dividends from Samarco.

Our operating income from ferrous minerals was US$2.850 billion in 2015 and US$7.730 billion in 2014. This 63.1% decrease reflects, in addition to the effects discussed above, the effect of the US$992 million impairment charge on our Corumbá mines, provisions for losses associated with long-term river freight agreements in the Paraná and Paraguay waterway systems and stoppage of our pelletizing plants in the Northern System.

2014 compared to 2013.

Our net operating revenues from sales of ferrous minerals decreased 26.1%, from US$34.792 billion in 2013 to US$25.697 billion in 2014, reflecting lower prices, partially offset by higher sale volumes of iron ore and iron ore pellets. In 2014, our average realized prices were 32.2% lower for iron ore and 17.3% lower for iron ore pellets, reflecting the decrease in the average reference price index of Platt's IODEX 62% CFR China in 2014. The volume of our iron ore sales in 2014 increased by 2.0%, due to the ramp-up of Carajás plant 2 (formerly known as Carajás Additional 40 Mtpy), Serra Leste and Conceição Itabiritos, while the volume of our iron ore pellets sales increased by 6.6% due to the start-up of Tubarão VIII pelletizing plant and the ramp-up of the Oman pellet plants.

Our cost of goods sold from ferrous minerals, excluding depreciation, increased 17.4% on a constant basis, basically as a result of higher costs of maintenance materials in iron ore, due to early incurrence of maintenance costs to prepare for additional increases in iron ore production volumes (particularly in connection with the N4WS mine pit in Carajás), increase in wages by 6%, higher freight costs due to an increase of CFR volume sales and leasing fees related to our joint-venture pelletizing assets, in the amount of US$199 million.

Our net expenses from ferrous minerals, excluding depreciation and impairment charges, decreased 19.2% on constant currency basis, as a result of a reduction of pre-operating and stoppage expenses in the amount of US$166 million, as some of our projects were concluded during the year of 2014, such as Conceição Itabiritos. During 2014, we registered expenses related to pre-operating and stoppage expenses of our pellet plants in the amount of US$38 million, while in 2013 we registered US$130 million.

Our adjusted EBITDA from ferrous minerals was US$11.321 billion in 2014, 47.4% lower than in 2013, for the reasons discussed above, partially offset by the depreciation of the Brazilian *real* against the U.S. dollar. Dividends received from joint ventures and associates operating in the ferrous minerals segment totaled US$525 million in 2014 compared to US$715 million in 2013, reflecting lower dividends from Samarco.

Table of Contents

Our operating income from ferrous minerals was US$7.730 billion in 2014 and US$18.900 billion in 2013. The 59.1% decrease reflects, in addition to the effects discussed above, the impairment of Vale's equity stake in VBG's operations in Guinea in the amount of US$1.135 billion.

Coal

2015 compared to 2014.

Our net operating revenues from sales of coal decreased to US$526 million in 2015, from US$739 million in 2014. This 28.8% decrease primarily reflected lower prices and sales volume for both thermal and metallurgical coal. Our sales volumes decreased due to lower sales from our Isaac Plains and Integra Coal mines operations, which we suspended in May 2014, and eventually sold in the last quarter of 2015.

Our cost of goods sold from coal, excluding depreciation, decreased to US$839 million in 2015, or 15.3% on a constant currency basis, due to the stoppage of our Isaac Plains and Integra Coal mines, partially offset by additional costs in our operations in Mozambique driven by higher sales volumes.

Our net expenses from coal, excluding depreciation and impairment charges, decreased by 37.5% on a constant currency basis, from US$365 million in 2014 to US$223 million in 2015, due to (i) reduced selling, general and administrative expenses in Australia, (ii) the receipt of insurance proceeds of US$36 million in connection with a flood that occurred in Australia in 2010 and (iii) lower effects of inventory adjustments on thermal coal in Mozambique in 2015, as compared to 2014.

Our adjusted EBITDA from coal was a loss of US$508 million in 2015, while in 2014 we had a loss of US$669 million, reflecting the decline in coal prices and lower sales volume due to the suspension of the Isaac Plains and Integra Coal mines in Australia. Dividends received from joint ventures and associates operating in the coal segment amounted to US$28 million in 2015 and US$29 million in 2014.

Our operating loss from coal increased from US$1.160 billion in 2014 to US$3.766 billion in 2015, reflecting, in addition to the negative effects discussed above, (i) a US$635 million impairment charge on our assets in Australia, based on lower expected coal prices, and (ii) a US$2.403 billion impairment charge on our coal assets in Mozambique, due to the decrease in the net recoverable amount as a result of lower expected coal prices and increased logistic costs. In 2014, we recorded an impairment of US$343 million related to our Isaac Plans and Integra Coal mines.

2014 compared to 2013.

Our net operating revenues from sales of coal decreased to US$739 million in 2014, from US$1.010 billion in 2013. This 26.8% decrease primarily reflected lower prices for both thermal and metallurgical coal, and lower volume sold for metallurgical coal, partially offset by higher sales volume of thermal coal.

Our cost of goods sold from coal, excluding depreciation, decreased to US$1.071 billion, or 3.0% on a constant currency basis, due to the increased participation from Mozambique sales and decreased participation from Australia sales.

Our net expenses from coal, excluding depreciation and impairment charges, increased by 1.1% on a constant currency basis, to US$365 million in 2014, due to expenses registered in 2014 related to the suspension of certain operations in Australia and inventory adjustment in Mozambique.

Our adjusted EBITDA from coal was a loss of US$669 million in 2014, 47.0% higher than the US$455 million loss in 2013, reflecting mainly lower prices. Dividends received from joint ventures and associates operating in the coal segment amounted to US$29 million in 2014 and US$40 million in 2013.

Table of Contents

Our operating loss from coal increased by 73.7%, from US$668 million in 2013 to US$1.160 billion in 2014, reflecting, in addition to the negative effects discussed above, a US$343 million impairment charge on our assets in Australia.

Base metals

2015 compared to 2014.

Our net operating revenues from sales of base metals decreased to US$6.163 billion in 2015 from US$7.692 billion in 2014. The 19.9% decrease primarily reflected lower prices for nickel and copper, partially offset by higher nickel sales volumes, resulting from ramp-up of our operations in New Caledonia and of Onça Puma, in Brazil, and higher copper sales volume, resulting from the ramp-up of Salobo operations.

Our cost of goods sold from base metals, excluding depreciation, increased 7.7% on a constant currency basis, due to higher costs related to ramp-up of Onça Puma and Salobo operations and increased allocation of VNC pre-operating expenses to costs of goods sold.

Our net expenses from base metals, excluding depreciation and impairment charges, decreased 12.6% on constant currency basis, mainly due to lower pre-operating expenses and a US$230 million gain on the gold stream transaction in 2015, partly offset by lower insurance proceeds in 2015 of US$212 million (US$64 million in 2015 compared to US$276 million in 2014).

Our adjusted EBITDA from base metals was US$1.388 billion in 2015, 44.9% lower than in 2014. Despite the lower nickel and copper prices, certain non-recurring items contributed to our income generation, such as insurance proceeds received in 2014 and the proceeds received in the gold stream transaction in 2015.

Our operating loss from base metals was US$5.185 billion in 2015, while we generated an operating income of US$1.942 billion in 2014. In 2015, we had a US$4.984 billion impairment charge on our nickel assets in New Caledonia and in Newfoundland and Labrador, in Canada, as a result of the reduction of long term prices projections, partially offset by an additional reversal of the impairment on our Onça Puma nickel assets in the amount of US$252 million. In 2014, we benefited from a reversal of the impairment on our Onça Puma nickel assets in the amount of US$1.617 billion.

2014 compared to 2013.

Our net operating revenues from sales of base metals increased to US$7.692 billion in 2014 from US$7.286 billion in 2013. The 5.6% increase primarily reflected higher nickel prices, resulting from market recovery after a cycle of decrease, and higher nickel sales volume due to the ramp-up of Onça Puma operations.

Our cost of goods sold from base metals, excluding depreciation increased 2.5%, on a constant currency basis, due to higher sales volumes of nickel, cobalt, PGMs and gold.

Our net expenses from base metals, excluding depreciation and impairment charges, decreased 41.2% on a constant currency basis, due to a reduction of pre-operating expenses and higher insurance proceeds received.

Our adjusted EBITDA from base metals was US$2.521 billion in 2014, 53.8% higher than in 2013. In addition to the lower costs and expenses, adjusted by the increase in sales volume, certain non-recurring items, such as insurance proceeds received in 2014 and the proceeds in the amount of US$244 million received in the gold stream transaction in 2013, contributed to our income generation.

Our operating income from base metals was US$1.942 billion in 2014, while we had an operating loss of US$342 million in 2013. The partial reversal of the impairment on our Onça Puma nickel assets positively affected our operating income in 2014.

Table of Contents

Fertilizers

2015 compared to 2014.

Our net operating revenues from sales of fertilizers decreased 7.9%, to US$2.225 billion in 2015 from US$2.415 billion in 2014, due to reduction in prices and volumes of most of our fertilizer products, partially offset by an increase in phosphatic rock and sulfuric prices in the international market and better commercial performance.

Our cost of goods sold from fertilizers, excluding depreciation, decreased 4.8% on a constant currency basis, due to decrease in volume sold and cost saving initiatives, which were partly offset by inflation.

Our net expenses from fertilizers, excluding depreciation and impairment charges, decreased 6.9% on a constant currency basis, due to downsizing initiatives, which was partly offset by inflation. Also pre-operating and stoppage expenses decreased mainly as a result of a reduction in stoppage expenses in the amount of US$15 million.

Our adjusted EBITDA from fertilizers increased from US$278 million in 2014 to a US$567 million in 2015. The increase resulted from exchange rate impacts in the amount of US$246 million, costs saving initiatives and expense reductions, partly offset by inflation, lower volumes, higher research and evaluation expenses and lower sales prices.

Our operating result from fertilizers was an operating income of US$100 million in 2015 compared to an operating loss of US$1.194 billion in 2014. In 2015, we had a reversion of impairment on certain Brazilian phosphates operations of US$391 million due to depreciation of the Brazilian *real* against U.S. dollar and we had an impairment of US$548 million related to the Rio Colorado project. In 2014, we recorded an impairment of our Rio Colorado potash project in Argentina of US$1.053 billion.

2014 compared to 2013.

Our net operating revenues from sales of fertilizers decreased to US$2.415 billion in 2014, from US$2.814 billion in 2013. The 14.2% decrease was a result of lower prices and lower sales volumes due to the sale of our Araucaria nitrogen operation in June 2013.

Our cost of goods sold from fertilizers, excluding depreciation, decreased 9.8%, on a constant currency basis, due to cost saving initiatives and lower ammonia/sulfur prices.

Our net expenses from fertilizers, excluding depreciation and impairment charges, decreased 64.0%, on a constant currency basis, primarily due to a reduction of stoppage expenses associated with our Rio Colorado project in the amount of US$376 million.

Our adjusted EBITDA from fertilizers was an income of US$278 million in 2014, against a loss of US$54 million in 2013. The increase resulted from the reduction of costs and expenses of US$355 million, the reduction of the stoppage expenses with the Rio Colorado project in the amount of US$376 million, which were partially off-set by lower prices (US$276 million).

Our operating loss from fertilizers was US$1.194 billion in 2014 compared to an operating loss of US$2.601 billion in 2013. These losses primarily reflected the impairment of fertilizers assets in 2014, in the amount of US$1.053 billion, and the impairment of the Rio Colorado project in 2013, in the amount of US$2.116 billion. Lower costs and lower stoppage expenses in the Rio Colorado project contributed to mitigate these operating losses.

Table of Contents

Financial results

The following table details our net non-operating income (expenses) for the periods indicated.

	Year ended December 31,		
	2013	2014	2015
		(US$ million)	
Financial income	US$643	US$401	US$270
Financial expenses	(5,002)	(2,936)	(1,112)
Gains (losses) on derivatives, net	(1,033)	(1,334)	(2,478)
Foreign exchange gains (losses), net	(2,765)	(2,115)	(7,166)
Indexation gains (losses), net	(175)	(85)	(315)
Non-operating income (expenses)	US$(8,332)	US$(6,069)	US$(10,801)

2015 compared to 2014. Our non-operating expenses increased 78.0%, to US$10.801 billion in 2015 from US$6.069 billion in 2014. This principally resulted from:

- Net foreign exchange losses of US$7.166 billion in 2015 compared to net foreign exchange losses of US$2.115 billion in 2014, principally due to the depreciation of the Brazilian *real* against the U.S. dollar.

- The net effect of fair value changes in derivatives, which represented a loss of US$2.478 billion in 2015 compared to a loss of US$1.334 billion in 2014. This reflected the following main categories of derivatives transactions:

  Currency and interest rate swaps. We recognized a net loss of US$1.502 billion in 2015 from currency and interest rate swaps, compared to net loss of US$683 million in 2014. These swaps are primarily used to convert debt denominated in other currencies into U.S. dollars in order to protect our cash flow from exchange rate volatility.

  Nickel derivatives. We recognized a loss of US$49 million in 2015 compared to a gain of US$9 million in 2014. These derivatives are part of our nickel price protection program.

  Bunker oil derivatives. We recognized a net loss of US$1.181 billion in 2015 compared to a net loss of US$614 million in 2014. These derivatives are structured to minimize the volatility of the cost of maritime freight, and the variation is due to the sharp decrease in the spot bunker oil price.

  Warrants. We recognized a net loss of US$142 million in 2015 compared to a net loss of US$5 million in 2014. These derivatives were part of the consideration we received under the 2013 gold sale contract with Silver Wheaton.

- A net indexation loss of US$315 million in 2015 compared to a loss of US$84 million in 2014, as a result of higher inflation in Brazil.

- A decrease in financial income from US$401 million in 2014 to US$270 million in 2015, as a result of lower average cash position in 2015, as compared to 2014.

-

A decrease in financial expenses of US$1.824 billion, from US$2.936 billion in 2014 to US$1.112 billion in 2015, attributable primarily to the US$1.279 billion decrease in the amount of our participative debentures, which are marked-to-market, due to the decline in commodities price.

Table of Contents

2014 compared to 2013. Our non-operating expenses decreased 27.2%, to US$6.069 billion in 2014 from US$8.332 billion in 2013. This decrease principally resulted from:

- A decrease in financial expenses of US$2.225 billion, from US$5.002 billion in 2013 to US$2.936 billion in 2014, attributable primarily to the US$2.637 billion net effect of fines and interest recognized under the REFIS in 2013, while the effect of interest on REFIS obligations in 2014 was US$683 million.

- The net effect of fair value changes in derivatives, which represented a loss of US$1.334 billion in 2014 compared to a loss of US$1.033 billion in 2013. This reflected the following main categories of derivatives transactions:

  Currency and interest rate swaps. We recognized a net loss of US$683 million in 2014 from currency and interest rate swaps, compared to net loss of US$861 million in 2013. These swaps are primarily used to convert debt denominated in other currencies into U.S. dollars in order to protect our cash flow from exchange rate volatility.

  Nickel derivatives. We recognized a gain of US$9 million in 2014 compared to a gain of US$11 million in 2013. These derivatives are part of our nickel price protection program.

  Bunker oil derivatives. We recognized a net loss of US$614 million in 2014 compared to a net loss of US$114 million in 2013. These derivatives are structured to minimize the volatility of the cost of maritime freight and the variation is due to the sharp decrease in the spot bunker oil price.

  Warrants. We recognized a net loss of US$6 million in 2014 compared to a net loss of US$60 million in 2013. These derivatives were part of the consideration we received under the 2013 gold sale contract with Silver Wheaton.

- Net foreign exchange losses of US$2.115 billion in 2014 compared to net foreign exchange losses of US$2.765 billion in 2013, principally due to the depreciation of the Brazilian *real* against the U.S. dollar in each year.

- A net indexation loss of US$85 million in 2014 compared to a loss of US$175 million in 2013, mainly due to changes in the amount of certain tax assets.

- A decrease in financial income of US$242 million to US$401 million in 2014, mainly due to fair value gains of US$214 million as a result of the sale of Hydro shares in 2013, which was classified as held for sale.

Equity results in associates and joint ventures

2015 compared to 2014. Our equity results in associates and joint ventures in 2015 decreased to a loss of US$439 million from an income of US$505 million in 2014, mostly due to the negative results from Companhia Siderúrgica do Pecém (US$307 million loss in 2015) and from Samarco (US$167 million loss in 2015) while in 2014 we had a positive result from Samarco (US$392 million income).

2014 compared to 2013. Our equity results in associates and joint ventures increased to a US$505 million income in 2014 from a US$469 million income in 2013, mostly related to a positive result from Samarco, while the results in 2013 were affected by the negative results of Thyssenkrupp Companhia Siderúrgica do Atlântico Ltd.

Table of Contents

Results on sale or disposal of investments in associates and joint ventures

2015 compared to 2014. Our results on sale or disposal of investments in associates and joint ventures increased to an income of US$97 million in 2015 from loss of US$30 million in 2014. In 2015, we had positive results from coal asset sale in the amount of US$79 million and energy generation assets in the amount of US$18 million. In 2014, the US$30 million loss refers to Vale Florestar.

2014 compared to 2013. While in 2014 we registered a loss of US$30 million related to the sale of our interest at Vale Florestar, in 2013 the income of US$41 million is related to a gain on the sale of Log-In and a gain related to disposal of Fosbrasil, resulting in an income of US$27 million.

Impairment of investments in associates and joint ventures

Impairments of investments in associates and joint ventures totaled US$446 million in 2015, of which US$132 million related to our investment in Samarco and US$314 million related to our investment in TEAL. In 2014, we recognized an impairment of US$31 million on our investment in Vale Soluções em Energia S.A. In 2013, we recognized no impairment of investments in associates and joint ventures.

Income taxes

For 2015, we recorded net income tax gain of US$5.100 billion, compared to a net income tax expense of US$1.200 billion in 2014. In 2015, our effective tax rate was 28.8%. Tax legislation that became effective in 2015 provides that income of our foreign subsidiaries will be taxed in Brazil, on an accrual basis, applying the differential between the local rate and the Brazilian tax rates. Accordingly, the effective tax rate was different from the statutory rate mainly due to: (i) unrecognized tax losses and (ii) nondeductible impairment, partially offset by the constitution of tax loss forward related to losses at foreign subsidiaries that we were able to recognize due to change of law. Under the legislation that became effective in 2015, the accumulated losses of our foreign subsidiaries as of December 31, 2014 were available to offset their future profits. On September 30, 2015, we filed the required tax return and completed the review of the income tax loss carryforwards available in each foreign subsidiary as of December 31, 2014, which permitted us to recognize a deferred tax asset of US$2.952 billion related to accumulated losses in certain of our foreign subsidiaries.

For 2014, we recorded net income tax expense of US$1.200 billion, compared to an income tax expense of US$6.833 billion in 2013. In 2014, we had a nondeductible impairment related to our iron ore operations in Guinea and our nickel operations in New Caledonia. Excluding the effect of these impairment charges and the reversal for tax loss carryforwards, the effective tax rate would have been 35.5%.

In 2013, we had a tax expense from continued operations of US$4.048 billion in connection with the REFIS, a federal tax settlement program for payment of amounts relating to Brazilian corporate income tax and social contribution, in order to settle the claims related to the net income of our non-Brazilian subsidiaries and associates from 2003 to 2012. Our participation in the REFIS resulted in a substantial reduction in the amounts in dispute. For more information, see *Additional information Legal proceedings Litigation on Brazilian taxation of foreign subsidiaries* and Notes 6, 20 and 21 to our consolidated financial statements. The effective tax rate on our pretax income, excluding the income tax expense and financial expenses in connection with the REFIS, as well as the impairment of fixed assets, was 23.3%, which is lower than the statutory rate, mainly because of the tax benefit of shareholder distributions categorized as interest on shareholders' equity.

Table of Contents

LIQUIDITY AND CAPITAL RESOURCES

Overview

In the ordinary course of business, our principal funding requirements are for capital expenditures, dividend payments and debt service. We have historically met these requirements by using cash generated from operating activities and through borrowings, supplemented by dispositions of assets.

For 2016, we have budgeted capital expenditures of US$6.167 billion, including US$3.172 billion for project execution and US$2.995 billion for sustaining existing operations and replacement projects. Our Board of Directors approved a contingency plan for 2016, pursuant to which we target reducing the investment budget for 2016 to US$5.561 billion. Our Board of Executive Officers has proposed that we not make dividend payments in 2016, subject to approval by our Board of Directors. A principal amount of US$2.012 billion of our debt matures in 2016, including US$951 million which matured in January 2016.

As a result of the decrease in global commodity prices, we expect our operating cash flow to decrease in 2016. We have taken measures to reduce our capital expenditures, and we are evaluating opportunities for additional cash generation, in order to mitigate the effect of this expected decrease in our operating cash flow. In 2015, for example, we entered into transactions to recover part of our investments in our business in Mozambique, and we are seeking project financing for the Nacala project. Additionally, we received an upfront payment of US$900 million and ongoing payments in consideration of the sale to Silver Wheaton of 25% of the gold stream from our Salobo copper mine, and we sold 12 of our very large ore carriers for US$1.316 billion. We continue to consider the sale of certain assets and investments, and joint ventures for certain of our businesses. Finally, we are committed to continue the reduction in our costs and expenses and to maintain discipline in capital allocation.

We also regularly review acquisition and investment opportunities and, when suitable opportunities arise, we make acquisitions and investments to implement our business strategy. We may fund these investments with borrowings.

Sources of funds

Our principal sources of funds are operating cash flow and borrowings. The amount of operating cash flow is strongly affected by global prices for our products. In 2015, our operating activities generated cash flows from continued operations of US$4.491 billion, compared to US$12.807 billion in 2014, reflecting primarily the lower prices of iron ore and pellets.

In 2015, we borrowed US$4.0 billion under our new and existing financing agreements. Our major new borrowing transactions in 2015 are summarized below.

- In 2015, we entered into pre-export financing facilities that are linked to future receivables from export sales, in the total amount of US$1.2 billion. These facilities will mature in 2018 and 2020.
- In November 2015, we issued R$1.5 billion, or US$384 million, in export credit notes to a Brazilian commercial bank, which will mature in 2022.
- In August 2015, we issued R$1.35 billion, or US$346 million, in infrastructure debentures maturing in 2020 and 2022 to finance part of the CLN S11D project.
- In April 2015, we issued a bank credit note to a Brazilian bank in the amount of R$700 million, or US$179 million, maturing in 2022.
- In 2015, we borrowed approximately US$750 million from BNDES to finance a variety of our iron ore and logistics infrastructure projects.

Table of Contents

- The remaining US$1.14 billion mostly relates to trade finance transactions to finance general corporate purposes.

In 2015, we received approximately US$3.4 billion as a result of divestments and sales of interests in certain joint ventures and investments. The main divestment transactions in 2015 are described below:

- In March 2015, we received an initial cash payment of US$900 million from Silver Wheaton, as part of the sale an additional 25% of the gold produced from the Salobo copper mine for the life of mine. As a consequence of this transaction, we recorded a deferred liability in the amount of US$532 million, which will be recognized in our income statement as the services are rendered and the gold is extracted.

- In April 2015, we received a cash payment of R$306 million, equivalent to US$97 million, from Cemig CT, as part of the transaction pursuant to which we sold 49% of our 9% participation in the Belo Monte hydroelectric plant project.

- As part of the sale of 12 very large ore carriers of 400,000 tons DWT previously owned and operated by Vale, we received cash payments of (i) US$445 million from China Ocean Shipping Company in June 2015; (ii) US$448 million from China Merchants Energy Shipping Co. Ltd. in September 2015; and (iii) US$423 million from a consortium led by ICBC Financial Leasing in December 2015. We used part of the proceeds to repay debt to the Export-Import Bank of China and the Bank of China Limited that was incurred to finance the construction of the very large ore carriers, reducing the total debt by US$284 million.

In September 2015, we received a cash payment of R$4 billion (US$1.089 billion) from an affiliate of Banco Bradesco S.A., as proceeds from the sale of preferred shares representing 36.4% stake of MBR. See *Information on the Company Business overview Significant changes in our business.*

Uses of funds

Capital expenditures

Capital expenditures in 2015 amounted to US$8.401 billion, including US$5.548 billion for project execution and US$2.853 billion dedicated to sustaining existing operations. Our actual capital expenditures detailed in other part of these report may differ from those reported in our cash flow statements, because actual figures include some amounts that are treated as current expenses for accounting purposes, such as expenses for project development and maintenance of existing assets. There may also be differences due to the fact that some actual figures are converted into U.S. dollars at the exchange rate on the date of each cash disbursement, while figures reported in our cash flow statements are converted into U.S. dollars based on average exchange rates. For more information about the specific projects for which we have budgeted funds, see *Information on the Company Capital expenditures*.

Distributions and repurchases

We paid total dividends of US$1.5 billion in 2015 (including distributions classified as interest on shareholders' equity), consisting of US$1 billion in April and US$500 million in October. Our Board of Executive Officers proposed that we not distribute dividends in 2016, subject to approval by our Board of Directors. We did not repurchase any of our shares in 2015.

Tax payments

We paid US$527 million in income tax in 2015, excluding the payments in connection with REFIS, compared to US$504 million in 2014. In connection with our participation in the REFIS, our outstanding commitment totals US$4.431 billion, which will be paid in 154 monthly installments. In 2015, we paid a total of US$384 million in connection with the REFIS.

Table of Contents

Debt

As of December 31, 2015, our outstanding debt was US$28.853 billion (including US$28.229 billion of principal and US$624 million of accrued interest) compared with US$28.807 billion at the end of 2014. As of December 31, 2015, US$495 million of our debt was secured by liens on some of our assets. As of December 31, 2015, the average remaining term of our debt was 8.13 years, compared to 9.10 years in 2014.

As of December 31, 2015, the short term debt and the current portion of long-term debt was US$2.506 billion, including charges.

Our major categories of long-term indebtedness are as follows. The principal amounts given below include the current portion of long-term debt and exclude accrued charges.

- *U.S. dollar-denominated loans and financing (US$7.047 billion at December 31, 2015).* This category includes export financing lines, loans from export credit agencies, and loans from commercial banks and multilateral organizations.

- *U.S. dollar-denominated fixed rate notes (US$14.114 billion at December 31, 2015).* We have issued in public offerings several series of fixed-rate debt securities, directly by Vale and through our finance subsidiary Vale Overseas Limited, guaranteed by Vale, totaling US$12.462 billion. Our subsidiary Vale Canada has outstanding fixed rate debt in the amount of US$400 million.

- *Euro-denominated fixed rate notes (US$1.633 billion at December 31, 2015).* We have issued in public offerings two series of fixed-rate debt securities denominated in Euro totaling €1.500 billion.

- *Other debt (US$5.435 billion at December 31, 2015*). We have outstanding debt, principally owed to BNDES, Brazilian commercial banks and infrastructure debentures, denominated in Brazilian *reais* and other currencies.

We have a variety of credit lines available, including the following, as of December 31, 2015:

- Credit lines for R$7.3 billion, or US$1.9 billion, to finance our investment program. As of December 31, 2015, the total amount available under these facilities was R$1.4 billion, or US$365 million.

- A R$3.9 billion, or US$1.0 billion, financing agreement with BNDES to finance part of the implementation of the CLN 150 Mtpy project, which will expand the logistics infrastructure in Vale's Northern System. As of December 31, 2015, this facility was almost fully drawn.

- A R$6.2 billion, or US$1.6 billion, financing agreement with BNDES to finance part of the implementation of the S11D project and its infrastructure (CLN S11D). As of December 31, 2015, the total amount available under this facility was R$2.9 billion, or US$730 million.

- We have two revolving credit facilities with syndicates of international banks, which will mature in 2018 and 2020. As of December 31, 2015, the total amount available under these facilities was US$5.0 billion, which can be drawn by Vale, Vale Canada and Vale International. In January 2016, we drew US$3.0 billion under these facilities.

Table of Contents

Some of our long-term debt instruments contain financial covenants. In particular, instruments representing approximately 21% of the aggregate principal amount of our total debt require that we maintain, as of the end of each quarter, (a) a consolidated ratio of total debt to adjusted EBITDA for the past twelve months not exceeding 4.5 to one and (b) a consolidated interest coverage ratio of at least 2.0 to one. These covenants appear in our financing agreements with BNDES, with other export and development agencies, and with some other lenders. During the last quarter of 2015, we agreed with lenders under these agreements to amend the leverage ratio to require a ratio of 5.5 to one through the end of 2016, which will give us flexibility to finalize our investment cycle. On December 31, 2015, (i) our consolidated ratio of total debt to adjusted EBITDA for the past twelve months was 4.1 to one and (ii) our consolidated interest coverage ratio was 4.8 to one.

As of December 31, 2015, the corporate guarantees we provided (corresponding to our direct or indirect interest) for the companies Norte Energia S.A. and Companhia Siderúrgica do Pecém S.A. totaled US$274 million and US$1.172 billion, respectively. As a result of the transfer of 49% of our 9% stake in Norte Energia S.A. to Cemig GT, the guarantee for Norte Energia S.A. is now shared with Cemig GT.

CONTRACTUAL OBLIGATIONS

The following table summarizes our contractual obligations as of December 31, 2015. This table excludes other common non-contractual obligations that we may have, including pension obligations, deferred tax liabilities and contingent obligations arising from uncertain tax positions, all of which are discussed in the notes to our consolidated financial statements.

	Payments due by period					
	Total	Less than 1 year	2017	2018	2019	2020	Thereafter
	(US$ million)					
Debt less accrued interest	US$28,229	US$2,011	US$6,714	US$6,459	US$13,045		
Interest payments(1)	17,393	1,477	3,064	2,669	10,183		
Operating lease obligations(2)	286	56	121	109			
Purchase obligations(3)	9,100	4,225	2,566	791	1,518		
Total	US$55,008	US$7,769	US$12,465	US$10,028	US$24,746		

(1) Consists of estimated future payments of interest on our loans, financings and debentures, calculated based on interest rates and foreign exchange rates applicable at December 31, 2015 and assuming that (i) all amortization payments and payments at maturity on our loans, financings and debentures will be made on their scheduled payments dates, and (ii) our perpetual bonds are redeemed on the first permitted redemption date. Amounts do not include derivatives transactions.

(2) Amounts include fixed payments related to the operating lease contracts for the pellet plants.

(3) Obligations to purchase materials. Amounts are based on contracted prices, except for purchases of iron ore from mining companies located in Brazil.

OFF-BALANCE SHEET ARRANGEMENTS

At December 31, 2015, we did not have any off-balance sheet arrangements as defined in the SEC's Form 20-F. For information on our contingent liabilities see Note 30 to our consolidated financial statements.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

We believe that the following are our critical accounting policies. We consider an accounting policy to be critical if it is important to our financial condition and results of operations and if it requires significant judgments and estimates on the part of our management. For a summary of all of our significant accounting policies, see Note 32 to our consolidated financial statements.

Table of Contents

Mineral reserves and useful life of mines

We regularly evaluate and update our estimates of proven and probable mineral reserves. Our proven and probable mineral reserves are determined using generally accepted estimation techniques. Calculating our reserves requires us to make assumptions about future conditions that are uncertain, including future ore and metal prices, currency prices, inflation rates, mining technology, availability of permits, production and capital costs. Changes in some or all of these assumptions could have a significant impact on our recorded proven and probable reserves.

One of the ways we make our ore reserve estimates is to determine the mine closure dates used in recording the fair value of our asset retirement obligations for environmental and site reclamation costs and the periods over which we amortize our mining assets. Any change in our estimates of total expected future mine or asset lives could have an impact on the depreciation, depletion and amortization charges recorded in our consolidated financial statements under cost of goods sold and impairment test. Changes in the estimated lives of our mines could also significantly impact our estimates of environmental and site reclamation costs, which are described in greater detail below.

Asset retirement obligation

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

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

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

Our Environmental Department defines the policies and procedures that should be used to evaluate our asset retirement obligations. The future costs of retirement of our mines and processing assets at all our sites are reviewed annually, in each case considering the actual stage of exhaustion and the projected exhaustion date of each mine and site. The future estimated retirement costs are discounted to present value using a credit-adjusted risk-free interest rate.

As of December 31, 2015, we estimated the fair value of our aggregate total asset retirement obligations to be US$2.474 billion.

Table of Contents

Impairment of non-current assets

We annually assess whether there is any objective evidence of impairment of our financial assets and long-lived, non-financial assets. For financial assets measured through amortized cost, we compare the carrying amount with the expected cash flows of the asset, adjusted to reflect the present value. For long-lived, non-financial assets (such as intangible assets or property plant and equipment), when there are indications of impairment, we conduct the test by comparing the recoverable value of these assets (which are grouped at the lowest levels for which there are separately identifiable cash flows of the corresponding cash-generating unit) to their carrying amount. If we identify the need for adjustment for a particular asset, we apply that adjustment consistently for the corresponding cash-generating unit. The recoverable amount for an asset is the higher of (i) its value in use and (ii) its fair value less the cost of selling it.

We determine our discounted cash flows based on approved budgets, considering mineral reserves and mineral resources calculated by internal experts, costs and investments. These determinations also take into account our past performance, sales prices consistent with projections used in industry reports and information about market prices when available and appropriate. Cash flows used in our impairment testing are based on the life of each cash-generating unit, or on the consumption of reserve units in the case of minerals, and considering discount rates that reflect specific risks relating to the relevant assets in each cash-generating unit, depending on their composition and location.

Goodwill balances arising from business combinations, intangible assets with indefinite useful lives and lands are tested for impairment at least once a year, regardless of any indication of impairment of their carrying value.

Non-current assets (excluding goodwill) which we recognized as impairment 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.

Fair values of derivatives and other financial instruments

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

We have entered into some cash flow hedges that qualify for hedge accounting. We use well-known market participants' valuation methodologies to compute the fair value of instruments. To evaluate the financial instruments, we use estimates and judgments related to present values, taking into account market curves, projected interest rates, exchange rates, counterparty (credit) risk adjustments, forward market prices and their respective volatilities, when applicable. We evaluate the impact of credit risk on financial instruments and derivative transactions, and we enter into transactions with financial institutions that we consider to have a high credit quality. The exposure limits to financial institutions are proposed annually by the Executive Risk Committee and approved by the Board of Executive Officers. The financial institution's credit risk tracking is performed making use of a credit risk valuation methodology that considers, among other information, published ratings provided by international rating agencies and other management judgments. During 2015, we implemented hedge accounting for foreign exchange hedge and bunker costs hedge. In 2015, we recorded net losses on our income statement of US$2.916 billion in relation to derivative instruments, including US$481 million of realized losses relating to derivatives instruments designated as cash flow hedge accounting.

Table of Contents

Deferred income taxes

We recognize deferred tax effects of tax loss carryforwards and temporary differences in our consolidated financial statements. We record a valuation allowance when we believe that it is probable that tax assets will not be fully recoverable in the future.

Deferred tax assets arising from tax losses, negative social contribution basis and temporary differences are registered taking into consideration the analysis of future performance, based on economic and financial projections, prepared based on internal assumptions and macroeconomic, trade and tax scenarios that may be subject to changes in future.

When we prepare our consolidated financial statements, the provision for income tax is calculated individually for each entity in the group based on Brazilian tax rates, on an accrual basis, by applying the differential between the nominal local tax rates (based on rules in force in the location of the entity) and the Brazilian rate. This requires us to estimate our actual current tax exposure and to assess temporary differences that result from deferring treatment of certain items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which we show on our consolidated balance sheet. We must then assess the likelihood that our deferred tax assets will be recovered from future taxable income. To the extent we believe that recovery is not probable, we record a provision against a tax expense in our statement of income. When we reduce the provision, we record a tax benefit in our statement of income.

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

Litigation

We disclose material contingent liabilities unless the possibility of any loss arising is considered remote, and we disclose material contingent assets where the inflow of economic benefits is probable. We discuss our material contingencies in Note 18 to our consolidated financial statements.

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

The provision for litigation at December 31, 2015, totaling US$822 million, consists of provisions of US$454 million for labor, US$79 million for civil, US$269 million for tax and US$20 million for other claims. Claims where in our opinion, and based on the advice of our legal counsel, the likelihood of loss is reasonably possible but not probable, and for which we have not made provisions, amounted to a total of US$9.908 billion at December 31, 2015, including claims of US$1.866 billion for labor, US$1.335 billion for civil, US$5.326 billion for tax and US$1.381 billion for other claims.

Table of Contents

Employee post-retirement benefits

We sponsor defined benefit pension and other post-retirement benefit plans covering some of our employees. The determination of the amount of our obligations for these benefits depends on certain actuarial assumptions. These assumptions are described in Note 21 to our consolidated financial statements and include, among others, the discount rate, the expected long-term rate of return on plan assets and increases in salaries.

Table of Contents

RISK MANAGEMENT

The aim of our risk management strategy is to promote enterprise-wide risk management that supports our growth strategy, strategic plan, corporate governance practices and financial flexibility to support maintenance of investment grade status. We developed an integrated framework for managing risk, which considers the impact on our business of not only market risk factors (market risk), but also risks arising from third party obligations (credit risk), risks associated with inadequate or failed internal processes, people, systems or external events (operational risk) and risks associated with political and regulatory conditions in countries in which we operate (political risk).

In order to achieve this objective and to further improve our corporate governance practices, our Board of Directors has established a company-wide risk management policy and an Executive Risk Management Committee. The risk management policy requires that we regularly evaluate and monitor the corporate risk on a consolidated basis in order to guarantee that our overall risk level remains in accordance with the acceptable corporate risk guidelines.

See Note 24 to our consolidated financial statements for quantitative information about risks relating to financial instruments, including financial instruments entered into pursuant to our risk management policies.

Market risk

We are exposed to various market risk factors that can impact our financial stability and cash flow. An assessment of the potential impact of the consolidated market risk exposure is performed periodically to support our decision making processes and growth strategy, ensure financial flexibility and monitor future cash flow volatility.

When necessary, market risk mitigation strategies are evaluated and implemented. Some of these strategies may incorporate financial instruments, including derivatives. The financial instrument portfolios are monitored on a monthly basis, enabling us to properly evaluate financial results and their impact on cash flow, and ensure correlation between the strategies implemented and the proposed objectives.

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

- *Foreign exchange rates and interest rates:* our cash flows are exposed to the volatility of several currencies against the U.S. dollar. While most of our product prices are indexed to U.S. dollars, most of our costs, disbursements and investments are indexed to currencies other than the U.S. dollar, principally the Brazilian *real* and the Canadian dollar. We may use derivative instruments, primarily forward transactions and swaps, in order to reduce our potential cash flow volatility arising from this currency mismatch. We also have debt instruments denominated in currencies other than U.S. dollars, mainly in Brazilian *reais* and euros. We may use swaps to convert into U.S. dollars a portion of the cash outflows from these debt instruments.

  We are also exposed to interest rate risk on loans and financings. Our floating rate debt consists mainly of loans including export pre-payments, commercial bank loans and multilateral organization loans. In general, the U.S. dollar floating rate debt is subject to changes in LIBOR (London Interbank Offer Rate) in U.S. dollars. To mitigate the impact of interest rate volatility on our cash flows, we take advantage of natural hedges resulting from the correlation between commodity prices and U.S. dollar floating interest rates. If such natural hedges are not present, we may opt to obtain the same effect by using financial instruments.

Table of Contents

- *Product prices and input costs:* we are also exposed to market risks associated with commodities price volatilities. In line with our risk management policy, we may also employ risk mitigation strategies to manage this risk that can include forward transactions, futures contracts and zero-cost collars. In 2015, we entered into transactions to partially hedge our exposure to nickel, copper and bunker oil prices.

Credit risk

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

Commercial credit risk management

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

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

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

Treasury credit risk management

To manage the credit exposure arising from cash investments and derivative instruments, our Board of Executive Officers approves, on an annual basis, credit limits by counterparty. Furthermore, we control the portfolio diversification, the overall credit risk of the treasury portfolio and the risk of each counterparty by monitoring market credit risk.

Operational risk

Operational risk management is the structured approach we take to manage uncertainty related to inadequate or failed internal processes, people and systems and to external events.

We mitigate operational risk with new controls and improvement of existing ones, new mitigation plans and transfer of risk through insurance. As a result, the Company seeks to have a clear view of its major risks, the cost-benefit on mitigation plans and the controls in place to monitor the impact of operational risk closely and to efficiently allocate capital to reduce it.

Table of Contents

III. SHARE OWNERSHIP AND TRADING

MAJOR SHAREHOLDERS

Valepar is Vale's controlling shareholder. Valepar is a special-purpose company organized under the laws of Brazil that was incorporated for the sole purpose of holding an interest in Vale. Valepar does not have any other business activity. Valepar acquired its controlling stake in Vale from the Brazilian government in 1997 as part of the first stage of Vale's privatization.

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

	Common shares owned(1)	% of class	Preferred shares owned(1)	% of class
Valepar(2)	1,716,435,045	53.9%	20,340,000	1.0%
BNDESPAR(3)	206,378,882	6.5%	66,185,272	3.4%
Capital Group International, Inc.(4)	n/a	n/a	205,280,842	10.13%
Capital Research Global Investors(4)	n/a	n/a	214,275,432	10.57%
Directors and executive officers as a group	9,300	Less than 1.0%	1,593,367	Less than 1.0%

(1) As of December 31, 2015.

(2) See the tables below for information about Valepar's shareholders.

(3) BNDESPAR is a wholly-owned subsidiary of BNDES. The figures do not include common shares beneficially (as opposed to directly) owned by BNDESPAR.

(4) Based on notices provided to the Company pursuant to Brazilian law by Capital Group International, Inc. (CGII) and Capital Research Global Investors (CRGI). According to the notices, (a) CGII and CRGI are part of the same economic group, (b) the economic group also includes Capital World Investors (CWI), which together with CRGI is a division of Capital Research and Management Company, and (c) CWI holds 5,620,000 additional preferred shares, corresponding to 0.28% of Vale's preferred shares.

The Brazilian government also owns 12 golden shares of Vale, which give it veto powers over certain actions, such as changes to our name, the location of our headquarters and our corporate purpose as it relates to mining activities.

The table below sets forth information regarding ownership of Valepar common shares as of December 31, 2015.

	Common shares owned	% of class
Valepar shareholders		
Litel Participações S.A.(1)	637,443,857	49.00%
Eletron S.A.	380,708	0.03
Bradespar S.A.(2)	275,965,821	21.21
Mitsui	237,328,059	18.24
BNDESPAR	149,787,385	11.51
Total	1,300,905,830	100.00%

(1) Litel also owns 200,864,272 preferred class A shares of Valepar, which represents 71.41% of the preferred class A shares. LitelA, an affiliate of Litel, also owns 80,416,931 preferred class A shares of Valepar, which represents 28.59% of the preferred class A shares.

(2) Bradespar is controlled by a control group consisting of Cidade de Deus Cia. Comercial Participações, Fundação Bradesco, NCF Participações S.A. and Nova Cidade de Deus Participações S.A.

111

Table of Contents

The table below sets forth information regarding ownership of Litel Participações S.A., one of Valepar's shareholders, as of December 31, 2015.

	Common shares owned	% of class
Litel Participações S.A. shareholders(1)		
BB Carteira Ativa	193,740,121	78.40
Carteira Ativa II	31,688,443	12.82
Carteira Ativa III	19,115,620	7.74
Singular	2,583,919	1.05
Caixa de Previdência dos Funcionários do Banco do Brasil	22	
Others	220	
Total	247,128,345	100.00%

(1) Each of BB Carteira Ativa and Carteira Ativa II is a Brazilian investment fund. BB Carteira Ativa is 100.00% owned by Caixa de Previdência dos Funcionários do Banco do Brasil ("Previ"). Carteira Ativa II is 100% owned by Funcef. Carteira Ativa III is 100% owned by Petros. Singular is 100% owned by Fundo de Investimentos em Cotas de Fundo de Investimento em Ações VRD ("FIC de FI em Ações VRD"). FIC de FI em Ações VRD is 100% owned by Fundação Cesp. Each of Previ, Petros, Funcef and Fundação Cesp is a Brazilian pension fund.

The shareholders of Valepar are parties to a shareholders' agreement, which expires in 2017. The Valepar shareholders' agreement also:

- grants rights of first refusal on any transfer of Valepar shares and preemptive rights on any new issue of Valepar shares;
- prohibits the direct acquisition of Vale shares by Valepar's shareholders unless authorized by the other shareholders party to the agreement;
- prohibits encumbrances on Valepar shares (other than in connection with financing an acquisition of Vale shares);
- requires each party generally to retain control of its special purpose company holding its interest in shares of Valepar, unless the rights of first refusal previously mentioned are observed;
- allocates seats on Valepar's and Vale's boards among representatives of the parties;
- commits the Valepar shareholders to support a Vale dividend policy of distributing 50% of Vale's net profit for each fiscal year, unless the Valepar shareholders commit to support a different dividend policy for a given year;
- provides for the maintenance by Vale of a capital structure that does not exceed specified debt to equity thresholds;
- requires the Valepar shareholders to vote their indirectly held Vale shares and to cause their representatives on Vale's Board of Directors to vote only in accordance with decisions made at Valepar meetings held prior to meetings of Vale's Board of Directors or shareholders; and
-

establishes supermajority voting requirements for certain significant actions relating to Valepar and to Vale.

Pursuant to the Valepar shareholders' agreement, Valepar cannot support any of the following actions with respect to Vale without the consent of at least 75% of the holders of Valepar's common shares:

- any amendment of Vale's bylaws;

Table of Contents

- any increase of Vale's capital stock by share subscription, creation of a new class of shares, change in the characteristics of the existing shares or any reduction of Vale's capital stock;
- any issuance of debentures of Vale, whether or not convertible into shares of Vale, participation certificates upon compensation (*partes beneficiárias*), call options (*bônus de subscrição*) or any other security of Vale;
- any determination of issuance price for any new shares of capital stock or other security of Vale;
- any amalgamation, spin-off or merger to which Vale is a party, as well as any change to Vale's corporate form;
- any dissolution, receivership, bankruptcy or any other voluntary act for financial reorganization or any suspension thereof;
- the election and replacement of Vale's Board of Directors, including the Chairman of the Board, and any executive officer of Vale;
- the disposal or acquisition by Vale of an equity interest in any company, as well as the acquisition of any shares of capital stock of Vale or Valepar;
- the participation by Vale in a group of companies or in a consortium of any kind;
- the execution by Vale of agreements relating to distribution, investment, sales exportation, technology transfer, trademark license, patent exploration, license to use and leases;
- the approval and amendment of Vale's business plan;
- the determination of the compensation of the executive officers and directors of Vale, as well as the duties of the Board of Directors and the Board of Executive Officers;
- any profit sharing among the members of the Board of Directors or Board of Executive Officers of Vale;
- any change in the corporate purpose of Vale;
- the distribution or non-distribution of any dividends (including distributions classified as interest on shareholders' equity) on any shares of capital stock of Vale other than as provided in Vale's bylaws;
- the appointment and replacement of Vale's independent auditor;
- the creation of any "in rem" guarantee, granting of guarantees including rendering of sureties by Vale with respect to obligations of any unrelated party, including any affiliates or subsidiaries;

- the passing of any resolution on any matter which, pursuant to applicable law, entitles a shareholder to withdrawal rights;
- the appointment and replacement by the Board of Directors of any representative of Vale in subsidiaries, companies related to Vale or other companies in which Vale is entitled to appoint directors and officers; and
- any change in the debt to equity threshold, as defined in the shareholders' agreement.

In addition, the shareholders' agreement provides that any issuance of participation certificates by Vale and any disposition by Valepar of Vale shares requires the unanimous consent of all of Valepar's shareholders.

Table of Contents

RELATED PARTY TRANSACTIONS

We have engaged, and expect to continue to engage, in arm's-length transactions with certain entities controlled by, or affiliated with, our controlling shareholders, including the following:

- *Bradesco* Bradespar, a controlling shareholder of Valepar, is controlled by a group of entities that also control Banco Bradesco S.A. ("Bradesco"). Bradesco and its affiliates are full service financial institutions that have performed, and may perform in the future, certain investment banking, advisory or general financing and banking services for us and our affiliates, from time to time, in ordinary course of business. In September 2015, we sold preferred shares representing 36.4% of the total capital of our subsidiary MBR to an affiliate of Bradesco for R$4 billion (US$1.089 billion). See *Information on the Company Business overview Significant changes in our business*.

- *Banco do Brasil* Previ, a pension fund of the employees of Banco do Brasil S.A. ("Banco do Brasil"), owns 100% of the investment fund BB Carteira Ativa, which holds the majority of the common equity of Litel Participações S.A., which holds 49% of the common equity of Valepar. Banco do Brasil appoints three out of the six members of Previ's senior management. An affiliate of Banco do Brasil is the manager of BB Carteira Ativa. Banco do Brasil is also a full service financial institution, and Banco do Brasil and its affiliates have performed, and may perform in the future, certain investment banking, advisory or general financing and banking services for us and our affiliates, from time to time, in ordinary course of business.

- *Mitsui* We have commercial relationships in the ordinary course of our business with Mitsui, a large Japanese conglomerate and a shareholder of Valepar.

- *BNDES*, the Brazilian state-owned development bank, is the parent company of one of our major shareholders, BNDESPAR.

  We and BNDES are parties to a contract relating to authorizations for mining exploration. This contract, which we refer to as the Mineral Risk Contract, provides for the joint development of certain unexplored mineral deposits that form part of our Northern System, except for our iron ore and manganese ore deposits which were specifically excluded from the contract, as well as proportional participation in any profits earned from the development of such resources. In 2007, the Mineral Risk Contract was extended indefinitely, with specific rules for all exploration projects and exploration targets and mineral rights covered under the contract.

  BNDES has provided us with credit lines of R$7.3 billion, or US$1.9 billion, to finance our investment program, facilities totaling R$985 million, or US$252 million, to finance the acquisition of equipment in Brazil, a R$3.9 billion, or US$1.0 billion, financing for our CLN 150 Mtpy project and a R$6.2 billion, or US$1.6 billion, financing for our S11D project and its infrastructure (CLN S11D).

  BNDES holds a total of R$1.163 billion, or US$298 million, in debentures of our subsidiary Salobo Metais S.A., with a right to subscribe for Salobo's preferred shares in exchange for part of the outstanding debentures, which right expires two years after Salobo reaches an accumulated revenue equivalent to 200,000 tons of copper.

  BNDESPAR is in the control group of several Brazilian companies with which we have commercial relationships in the ordinary course of our business.

  For more information on our transactions with BNDES, see *Operating and financial review and prospects Liquidity and capital resources*.

Table of Contents

Mitsui has direct investments in some of our subsidiaries, joint ventures and associated companies. Mitsui has a minority stake in our subsidiary MVM Resources International B.V., which controls the Bayóvar (Peru) phosphate operations, and is part of a joint venture that holds an equity stake in our subsidiary VNC. Mitsui is also our joint venture partner at VLI, and BNDES holds debentures issued by Vale exchangeable into common shares of VLI. In December 2014, we entered into an investment agreement with Mitsui in connection with our coal business in Mozambique (see *Information on the Company Business overview Significant changes in our business*).

We have a policy on Related Party Transactions, which sets forth rules and principles to ensure transparency and arm's-length conditions in our transactions with related parties and other situations of potential conflicts of interest. Pursuant to that policy and our bylaws, our Governance and Sustainability Committee is responsible for issuing reports about potential conflicts of interest between us and our shareholders or management and for reviewing the procedure and terms of related party transactions that are submitted to our Board of Directors for approval. Under the policy, if we identify a conflict of interest with a shareholder, then that shareholder or its representative may not participate in any discussions related to the transaction at any shareholders' meeting and will only have access to publicly available information about the matter. The policy also prohibits the extension of any loans to related parties other than our subsidiaries and affiliated companies.

For information regarding investments in associate companies and joint ventures and for information regarding transactions with major related parties, see Notes 11 and 30 to our consolidated financial statements.

Table of Contents

DISTRIBUTIONS

Under our dividend policy, our Board of Executive Officers announces, by no later than January 31 of each year, a proposal to be approved by our Board of Directors of a minimum amount, expressed in U.S. dollars, that will be distributed in that year to our shareholders. Distributions may be classified either as dividends or interest on shareholders' equity, and references to "dividends" should be understood to include all distributions regardless of their classification, unless stated otherwise. We determine the minimum dividend payment in U.S. dollars, considering our expected free cash flow generation in the year of distribution. The proposal establishes two installments, to be paid in April and October of each year. Each installment is submitted to the Board of Directors for approval at meetings in April and October. Once approved, dividends are converted into and paid in *reais* at the Brazilian *real*/U.S. dollar exchange rates announced by the Central Bank of Brazil on the last business day before the Board meetings in April and October of each year. The Board of Executive Officers can also propose to the Board of Directors, depending on the evolution of our cash flow performance, an additional payment to shareholders of an amount over and above the minimum dividend initially established.

For 2016, our Board of Executive Officers has proposed that we not make dividend payments in 2016, subject to approval by our Board of Directors. We pay the same amount per share on both common and preferred shares in accordance with our bylaws.

Also, we will submit a proposal to modify our current dividend policy for approval of our shareholders at our next shareholders' meeting.

Under Brazilian law and our bylaws, we are required to distribute to our shareholders an annual amount equal to not less than 25% of the distributable amount, referred to as the mandatory dividend, unless the Board of Directors advises our shareholders at our shareholders' meeting that payment of the mandatory dividend for the preceding year is inadvisable in light of our financial condition. For a discussion of dividend distribution provisions under Brazilian corporate law and our bylaws, see *Additional information*.

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

By law, we are required to hold an annual shareholders' meeting by April 30 of each year at which an annual dividend may be declared. Additionally, our Board of Directors may declare interim dividends. Under Brazilian corporate law, dividends are generally required to be paid to the holder of record on a dividend declaration date within 60 days following the date the dividend was declared, unless a shareholders' resolution sets forth another date of payment, which, in either case, must occur prior to the end of the fiscal year in which the dividend was declared. A shareholder has a three-year period from the dividend payment date to claim dividends (or payments of interest on shareholders' equity) in respect of its shares, after which we will have no liability for such payments. From 1997 to 2003, all distributions took the form of interest on shareholders' equity. In many years, part of the distribution has been made in the form of interest on shareholders' equity and part as dividends. See *Additional information Memorandum and articles of association Common shares and preferred shares*.

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

Table of Contents

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

		Reais per share
Year	**Payment date**	**Dividends**