Vale S.A.
Form 20-F
March 20, 2015

Use these links to rapidly review the document
TABLE OF CONTENTS
Index to the Financial Statements

Table of Contents

As filed with the Securities and Exchange Commission on March 20, 2015

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, 2014
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)

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Avenida Graça Aranha, No. 26
20030-900 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
6.25% Guaranteed Notes due 2016, issued by Vale Overseas	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, 2014 was:

3,185,653,000 common shares, no par value per share
1,967,722,926 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

	Page
Form 20-F cross reference guide	ii
Forward-looking statements	iv
Risk factors	1
Selected financial data	14
I. Information on the company	
Business overview	16
Lines of business	23
1. Ferrous minerals	25
2. Base metals	34
3. Coal	47
4. Fertilizer nutrients	50
5. Infrastructure	52
6. Other investments	59
Reserves	60
Capital expenditures	72
Regulatory matters	75
II. Operating and financial review and prospects	
Overview	80
Results of operations	86
Liquidity and capital resources	98
Contractual obligations	101
Off-balance sheet arrangements	101
Critical accounting policies and estimates	101
Risk management	105
III. Share ownership and trading	
Major shareholders	107
Related party transactions	110
Distributions	112
Trading markets	113
Share price history	114
Depositary shares	114
Purchases of equity securities by the issuer and affiliated purchasers	115
IV. Management and employees	
Management	115
Management compensation	127
Employees	129
V. Additional information	
Legal proceedings	130
Memorandum and articles of association	134
Shareholder debentures	141
Exchange controls and other limitations affecting security holders	142
Taxation	144
Evaluation of disclosure controls and procedures	151
Management's report on internal control over financial reporting	151
Corporate governance	152

Code of ethics and conduct	154
Principal accountant fees and services	155
Information filed with securities regulators	156
Exhibits	157
Glossary	158
Signatures	164
Index to consolidated financial statements	F-1

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, 72
	4B Business overview	Business overview, Lines of business, Reserves, Regulatory matters	16, 23, 60, 75
	4C Organizational structure	Exhibit 8	
	4D Property, plant and equipment	Lines of business, Capital expenditures, Regulatory matters	23, 72, 75
4A	**Unresolved staff comments**	None	
5	**Operating and financial review and prospects**		
	5A Operating results	Results of operations	86
	5B Liquidity and capital resources	Liquidity and capital resources	98
	5C Research and development, patents and licenses, etc.	Capital expenditures	72
	5D Trend information	Results of operations	86
	5E Off-balance sheet arrangements	Off-balance sheet arrangements	101
		Critical accounting policies and estimates	101
	5F Tabular disclosure of contractual obligations	Contractual obligations	101
	5G Safe harbor	Forward-looking statements	iv
6	**Directors, senior management and employees**		
	6A Directors and senior management	Management	115
	6B Compensation	Management compensation	127
	6C Board practices	Management Board of directors	115
	6D Employees	Employees	129
	6E Share ownership	Major shareholders, Employees Performance-based compensation	107, 130
7	**Major shareholders and related party transactions**		
	7A Major shareholders	Major shareholders	107
	7B Related party transactions	Related party transactions	110
	7C Interests of experts and counsel	Not applicable	
8	**Financial information**		
	8A Consolidated statements and other financial information	Financial statements	F-1
		Distributions	112
		Legal proceedings	130
	8B Significant changes	Not applicable	
9	**The offer and listing**		
	9A Offer and listing details	Share price history	114

9B Plan of distribution	Not applicable	
9C Markets	Trading markets	113

Table of Contents

Item	Form 20-F caption	Location in this report	Page
	9D Selling shareholders	Not applicable	
	9E Dilution	Not applicable	
	9F Expenses of the issue	Not applicable	
10	**Additional information**		
	10A Share capital	Memorandum and articles of association Common shares and preferred shares	134
	10B Memorandum and articles of association	Memorandum and articles of association	134
	10C Material contracts	Lines of business; Results of operations; Related party transactions	23, 86, 110
	10D Exchange controls	Exchange controls and other limitations affecting security holders	142
	10E Taxation	Taxation	144
	10F Dividends and paying agents	Not applicable	
	10G Statement by experts	Reserves	60
	10H Documents on display	Information filed with securities regulators	156
	10I Subsidiary information	Not applicable	
11	**Quantitative and qualitative disclosures about market risk**	Risk management	105
12	**Description of securities other than equity securities**		
	12A Debt securities	Not applicable	
	12B Warrants and rights	Not applicable	
	12C Other securities	Not applicable	
	12D American Depositary Shares	Depositary shares	114
13	**Defaults, dividend arrearages and delinquencies**	Not applicable	
14	**Material modifications to the rights of security holders and use of proceeds**	Not applicable	
15	**Controls and procedures**	Evaluation of disclosure controls and procedures	151
		Management's report on internal control over financial reporting	151
16	16A Audit Committee financial expert	Management Fiscal Council	124
	16B Code of ethics	Code of ethics and conduct	154
	16C Principal accountant fees and services	Principal accountant fees and services	155
	16D Exemptions from the listing standards for audit committees	Management Fiscal Council; Corporate governance	124, 152
	16E Purchase of equity securities by the issuer and affiliated purchasers	Purchases of equity securities by the issuer and affiliated purchasers	115
	16F Change in registrant's certifying accountant	Not applicable	
	16G Corporate governance	Corporate governance	152
	16H Mine safety disclosure	Not applicable	
17	**Financial statements**	Not applicable	
18	**Financial statements**	Financial statements	F-1
19	**Exhibits**	Exhibits	157

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 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;
- 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, and (g) 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 Graça Aranha, No. 26, 20030-900 Rio de Janeiro, RJ, Brazil, and its telephone number is 55-21-3814-4477.*

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 2014, Chinese demand represented 69% of global demand for seaborne iron ore, 52% of global demand for nickel and 44% of global demand for copper. The percentage of our net operating revenues attributable to sales to customers in China was 33.7% in 2014. 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 65.4% of our 2014 net operating revenues, are used to produce carbon steel. Nickel, which accounted for 11.9% of our 2014 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.

Table of Contents

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 and the impairment of assets, and it would adversely affect our financial position and results of operations.

We are especially exposed to movements in iron ore prices. Average iron ore prices decreased 28.1%, from US$135 per dry metric ton unit ("dmt") in 2013 to US$97 per dmt in 2014, according to the average Platts IODEX (62% Fe CFR China). On February 27, 2015 the year to date average Platts IODEX iron ore price was US$65.4 per dmt. In addition to reduced demand for iron ore, an excess in supply has adversely affected our prices since 2014. The expected conclusion of certain iron ore projects in the coming years may result in additional pressure on prices.

The nickel industry has experienced strong supply growth in recent years. Nickel refining in China, primarily using imported nickel ores and related raw materials, increased an estimated 536,000 metric tons from 2006 to 2014, with Chinese nickel pig iron production representing 23% of global nickel output. In January 2014, the Indonesian government approved a law restricting the export of unprocessed nickel. Since Indonesia has in recent years supplied the majority of high grade nickel ores to China, we expect this new export restriction to contribute to a decline in Chinese domestic nickel production in the coming years, leading to an increase in refined nickel imports and in international nickel prices. In the event that this measure is reversed or has an impact different from what we expect, nickel prices may not reflect our expectations.

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

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

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.

Conversely, operating at significant idle 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.

Table of Contents

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.

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. Although we contribute to local communities with taxes, royalties, employment and business opportunities, and social programs, and have a team dedicated to mitigate the social impacts, expectations are complex and involve multiple stakeholders with different and constantly evolving interests. In some instances, our operations and mineral reserves are located on or near lands owned or used by indigenous or aboriginal people or other groups of stakeholders. Some of these indigenous peoples may have rights to review or participate in natural resource management, and we consult and negotiate with them to mitigate the impact of our operations or to obtain access to their lands. 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 consult and negotiate with these groups to come to common agreement on land access and how to mitigate the impact on our operations.

Disagreements or disputes with local groups, including indigenous or aboriginal 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. Although we engage in active dialogue with all stakeholders and vigorously defend ourselves against illegal acts, future attempts by protesters to harm our operations could adversely affect our business.

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.

Table of Contents

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.

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*.

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, 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 development 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.

A deterioration in our cash flows, credit ratings and ability to raise capital may adversely affect our planned investments.

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 in the capital markets at attractive rates. In addition, a downturn in the Brazilian economy may result in a downgrade of the Brazilian sovereign credit rating and, consequently, our credit ratings. A deterioration in our cash flows, credit rating and ability to access the capital markets may adversely affect our ability to fund our capital investments, pay dividends and comply with the financial covenants existing in some of our long-term debt instruments.

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

Customers, suppliers, contractors, 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. Suppliers are also subject to capacity constraints in times of high demand which may affect their ability to fulfill their commitments.

Table of Contents

We currently operate important parts of our pelletizing, bauxite, nickel, coal, copper, fertilizers and steel businesses through joint ventures with other companies. Important parts of our electricity investments and projects are operated through consortia. 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.

In addition, some of our assets may be controlled and managed by joint venture partners that may not fully comply with our standards, controls and procedures, including our health, safety, environment and community standards. Failure by any of our partners to adopt standards, controls and procedures equivalent to ours could lead to higher costs, reduced production or environmental, health and safety incidents or accidents, which could adversely affect our results and reputation.

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. We have health, safety and environmental standards and risk management programs and procedures in place to mitigate such risks. 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, 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 or cost increases. 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.

Table of Contents

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 engage in complex discussions with Brazilian environmental regulators, which are continuing. We cannot yet assess the final impact of these regulations on our operations, but 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*.

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 in the mining industry. 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 cause 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 certain 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. A current drought in the Southeast region of Brazil may result in water shortage in the most populous region in the country, which may adversely affect the Brazilian economy and our activities in Brazil.

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.

Table of Contents

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 and 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 and other factors. For example, fluctuations in the 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.

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.

Table of Contents

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 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 increased 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 tailing 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.

We may face shortages of equipment, services and skilled personnel.

The mining industry has faced worldwide shortages of mining and construction equipment, spare parts, contractors and other skilled personnel during periods of high demand for minerals and metals and intense development of mining projects. We may experience longer lead times for mining equipment and problems with the quality of contracted engineering, construction and maintenance services. We compete with other mining and extractive sector companies for highly skilled management and staff with relevant industry and technical experience, and we may not be able to attract and retain such people. Shortages during peak periods could negatively impact our operations, resulting in higher production or capital expenditure costs, production interruptions, higher inventory costs, project delays and potentially lower production and revenues.

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

Energy costs are a significant component of our cost of production, representing 8.9% of our total cost of goods sold in 2014. To fulfill our energy needs, we depend on the following sources: oil by-products, which represented 41% of total energy needs in 2014, electricity (27%), natural gas (19%), coal (12%) and other energy sources (1%), using figures converted into terajoule ("TJ").

Fuel costs represented 6.5% of our cost of goods sold in 2014. Increases in oil and gas prices adversely affect margins in our logistics services, mining, iron ore pellets, fertilizers and nickel businesses.

Electricity costs represented 2.4% of our total cost of goods sold in 2014. 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 excess demand, 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.

Table of Contents

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 2014, 2013 and 2012 we had foreign exchange losses of US$2.1 billion, US$2.8 billion and US$1.9 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 affect our results since most of our costs of goods sold are denominated in currencies other than the U.S. dollar, principally the *real* (54% in 2014) and the Canadian dollar (13% in 2014), 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.

The integration between the Company and acquired companies might prove more difficult than anticipated.

We may not be able to successfully integrate our acquired businesses. We have grown our business in part through acquisitions, and some of our future growth could depend on acquisitions. Integration of acquisition targets might take longer than expected, and the costs associated with integration of acquisition targets might be higher than anticipated. Completed acquisitions could fail to achieve the increased revenues, cost savings or operational benefits that were anticipated at the time of their conception. Acquisitions could lead to the incurrence of substantial costs as a result of, for example, impairment of goodwill, unforeseen liabilities arising from acquired businesses, inability to retain key staff, inconsistencies in standards, controls, procedures and policies between the Company and the acquisition target which could negatively affect our financial condition and results of operations. In addition, management attention could be diverted from ordinary responsibilities to integration issues.

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.

We are involved in legal proceedings that could have a material adverse effect on our business in the event of an outcome that is unfavorable to us.

We are involved in legal proceedings in which adverse parties have claimed substantial amounts. 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 shares, ADSs and HDSs. For additional information, see *Additional information Legal proceedings*.

Table of Contents

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 27, 2015, 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*.

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

We operate in a global environment, and our activities straddle 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) is not subject to appeal; (d) 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 (e) 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.

Table of Contents

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.

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.

Table of Contents

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 us 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,				
	2010	2011	2012	2013	2014
	(US$ million)				
Net operating revenues	46,424	60,075	46,553	46,767	37,539
Cost of products and services	(19,829)	(24,528)	(25,390)	(24,245)	(25,064)
Selling, general and administrative expenses	(1,663)	(2,271)	(2,172)	(1,302)	(1,099)
Research and development	(876)	(1,671)	(1,465)	(801)	(734)
Other operating expenses, net	(2,214)	(2,775)	(3,588)	(2,843)	(2,145)
Impairment of non-current assets			(4,023)	(2,298)	(1,152)
Gain (loss) on measurement or sales of non-current assets		1,494	(506)	(215)	(167)
Operating income	21,842	30,324	9,409	15,063	7,178
Non-operating income (expenses):					
Financial income (expenses), net	(1,533)	(3,549)	(4,022)	(8,332)	(6,069)
Equity results from associates and joint controlled entities	983	1,138	645	469	505
Results on sale of investments from associates and joint controlled entities				41	(30)
Impairment on investments			(1,941)		(31)
Income before income taxes	21,292	27,913	4,091	7,241	1,553
Income taxes	(3,712)	(5,265)	1,174	(6,833)	(1,200)
Income from continuing operations	17,580	22,648	5,265	408	353
Income (loss) attributable to non-controlling interests	190	(233)	(257)	(178)	(304)
Net income attributable to Company's shareholders, from continuing operations	17,390	22,881	5,522	586	657
Loss from discontinued operations, net of tax	(133)	(86)	(68)	(2)	
Net income attributable to Company's shareholders	17,257	22,795	5,454	584	657
Income (loss) attributable to non-controlling interests	190	(233)	(257)	(178)	(304)
Net income	17,447	22,562	5,197	406	353
Total cash paid to shareholders(1)	3,000	9,000	6,000	4,500	4,200

(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,				
	2010	2011	2012	2013	2014
	(US$, except as noted)				
Earnings per share:					
Per common share	3.25	4.34	1.06	0.11	0.13
Per preferred share	3.25	4.34	1.06	0.11	0.13

Weighted average number of shares outstanding (in thousands)(1)(2):					
Common shares	3,210,023	3,197,063	3,172,179	3,185,653	3,185,653
Preferred shares	2,035,783	1,984,030	1,933,491	1,967,722	1,967,722
Treasury common shares underlying convertible notes	18,416	18,416			
Treasury preferred shares underlying convertible notes	47,285	47,285			
Total	5,311,507	5,246,794	5,105,670	5,153,375	5,153,375
Distributions to shareholders per share(3):					
Expressed in US$	0.57	1.74	1.17	0.87	0.81
Expressed in R$	0.98	2.89	2.26	1.81	1.89

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

(2) Changes in the number of shares outstanding reflect share repurchase programs conducted from May 2011 to November 2011. For more information see *Share ownership and trading Purchases of equity securities by the issuer and affiliated purchasers*.

(3) 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,				
	2010	2011	2012	2013	2014
	(US$ million)				
Current assets	31,559	21,538	22,069	20,611	16,594
Property, plant and equipment, net and intangible assets	86,115	91,863	94,093	88,536	84,942
Investments in affiliated companies and joint ventures and other investments	4,394	8,013	6,384	3,584	4,133
Other assets	4,559	5,502	8,031	11,866	10,820
Total assets	126,627	126,916	130,577	124,597	116,489
Current liabilities	17,987	11,093	12,402	9,164	10,626
Liabilities directly associated with non-current assets held for sale and discontinued operations			169	448	111
Long-term liabilities(1)	17,214	16,470	16,380	22,379	22,043
Long-term debt(2)	21,591	21,538	26,799	27,670	27,388
Total liabilities	56,792	49,101	55,750	59,661	60,168
Shareholders' equity:					
Capital stock	45,266	60,578	60,578	60,578	61,614
Additional paid-in capital	1,413	7	(552)	(552)	(601)
Mandatorily convertible notes common ADSs	236	191			
Mandatorily convertible notes preferred ADSs	528	422			
Retained earnings and revenue reserves	19,866	14,902	13,213	3,299	(5,891)
Total Company shareholders' equity	67,309	76,100	73,239	63,325	55,122
Non-controlling interests	2,526	1,715	1,588	1,611	1,199
Total shareholders' equity	69,835	77,815	74,827	64,936	56,321
Total liabilities and shareholders' equity	126,627	126,916	130,577	124,597	116,489

(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 and the largest in the Americas, 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. To support our growth strategy, we are engaged in mineral exploration efforts 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,					
	2012		2013		2014	
	US$ million	% of total	US$ million	% of total	US$ million	% of total
Ferrous minerals:						
Iron ore	26,691	57.3%	27,844	59.6%	19,301	51.4%
Iron ore pellets	6,560	14.1	6,000	12.8	5,263	14.0
Manganese and ferroalloys	543	1.2	523	1.1	392	1.0
Other ferrous products and services	486	1.0	425	0.9	741	2.0
Subtotal ferrous minerals	34,280	73.6	34,792	74.4	25,697	68.4
Coal	1,092	2.4	1,010	2.2	739	2.0
Base metals: Nickel and other products(1)	5,975	12.8	5,839	12.5	6,241	16.6
Copper(2)	1,156	2.5	1,447	3.1	1,451	3.9
Subtotal base metals	7,131	15.3	7,286	15.6	7,692	20.5
Fertilizer nutrients	3,570	7.7	2,814	6.0	2,415	6.4
Other(3)	480	1.0	865	1.8	996	2.7
Total net operating revenues from continued operations	46,553	100.0%	46,767	100.0%	37,539	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.

- 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 and a maritime terminal and a port. The Southern

System consists of three mining sites and two maritime terminals. 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. We also have a 50% stake in Samarco Mineração S.A. ("Samarco"), which operates an integrated system in the Brazilian states of Minas Gerais and Espírito Santo, and we have 25% stakes in two pellet companies in China.

Table of Contents

- *Manganese ore and ferroalloys*. We conduct our manganese mining operations through 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, South Korea and China. 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. Salobo operations are ramping up. 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. Some of the precious metals from our Canadian operations are upgraded at our Port Colborne facilities, and all such precious metals are refined by unrelated parties in Canada and other countries.

- Coal:
  - We conduct our coal operations primarily in Mozambique through Vale Moçambique, S.A. ("Vale Moçambique"), where we produce metallurgical and thermal coal, and we are ramping up our 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 suspended operations in the Isaac Plains and Integra Coal mines in 2014 in response to market conditions. We also have minority interests in Chinese coal and coke producers.

- Fertilizer nutrients:
  - We produce potash in Brazil, with operations in Rosario do Catete, in the state of Sergipe. Our main phosphate operations are conducted by our subsidiary Vale Fertilizantes S.A. ("Vale Fertilizantes"), which holds most of our fertilizer assets in Brazil, is the largest Brazilian producer of phosphate rock and phosphate fertilizers and the second-largest Brazilian producer of nitrogen fertilizers. We also have operations in Bayóvar, a phosphate rock mine in Peru.

Table of Contents

- 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 constructing 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, expandability and high quality output, capable of creating value through the 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 invest in 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 continue to consolidate our competitiveness in the global iron ore market. In 2014, we had an estimated market share of 20.4% of the total volume traded in the seaborne market, slightly below the previous year. 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.

To support our commercial strategy for our iron ore business, we have developed a distribution center in Malaysia. We also operate a distribution center in Oman and two floating transfer stations ("FTS") in the Philippines, and we continue to increase the fleet of very large ore carriers of 400,000 deadweight tons ("DWT") dedicated to Vale, which are primarily used to transport iron ore from Brazil to Asia on a shuttle basis.

Table of Contents

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

Maximization of 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, South 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 61% of our nickel sales in 2014. Our long-term goal is to strengthen our competitiveness in the nickel business. We continue to optimize our operational flowsheet 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 that can directly supply our existing processing facilities. We are also ramping up our copper operations at Lubambe, in Zambia, through a joint venture. We also recover copper 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 minority interests in two joint ventures 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.

Development of 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.

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.

Table of Contents

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 reduce the consumption of water in our activities and to use it more efficiently, especially through reuse and recirculation of water. In addition, 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.

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 2014.

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 2014 are summarized below:

- *Tubarão VIII pellet plant.* In the first half of 2014, we completed the Tubarão VIII pelletizing plant in our existing site at Tubarão port, in the Brazilian state of Espírito Santo. We currently have an environmental operating license for 7.0 Mtpy of pellets, and the nominal capacity of this project is 7.5 Mtpy.

- *Salobo II.* In the first half of 2014, we completed the Salobo II project, located in the Brazilian state of Pará. The expansion brings an additional nominal capacity of 100,000 tpy of copper in concentrate.

- *Serra Leste.* In the first half of 2014, we concluded the Serra Leste project, a new processing plant located in Carajás, in the Brazilian state of Pará. The project has a nominal capacity of 6 Mtpy of sinter feed.

- *Vargem Grande Itabiritos.* In the second half of 2014, we completed the construction of a new iron ore processing plant in the Brazilian state of Minas Gerais. The additional nominal capacity of this project is 10 Mtpy of pellet feed.

- *Expansion of Brucutu plant.* In the second half of 2014, we completed the expansion of the Brucutu plant, which is part of our Southeastern System. The additional nominal capacity of this project is 9.5 Mtpy of pellet and sinter feed.

- *Teluk Rubiah Distribution Center.* In the second half of 2014, we completed the construction of a maritime terminal located in Teluk Rubiah, Malaysia. The terminal has a private jetty with enough depth to receive vessels with capacity of 400,000 DWT and a storage yard with capacity of 3 Mt. The distribution center has a throughput of 30 Mtpy of iron ore products.

Table of Contents

- *Nacala Corridor.* The Nacala Corridor project consists of railway and port infrastructure connecting the Moatize site to the Nacala-à-Velha maritime terminal, located in Nacala, Mozambique. In the second half of 2014, we completed the greenfield and the brownfield sections of the railway and successfully transported the first coal shipment from Moatize to the Nacala à Velha port. We expect the upgrade of a 500-kilometer portion of the brownfield section of the railway, which is already operational, to be completed in the third quarter of 2015. The nominal capacity of the project is initially 18 Mtpy. The start-up of the port infrastructure is expected for the first half of 2015.

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. To that end, we disposed of assets that we have determined to be non-strategic. We summarize below our most significant dispositions since the beginning of 2014.

- *Sale of stakes in VLI* In August 2014, we concluded the sale of an aggregate of 62.4% of VLI. We sold 20% of the total share capital of VLI to Mitsui & Co., Ltd. ("Mitsui"), for R$1.5 billion; 15.9% to the investment fund of a Brazilian employee benefits fund called Fundo de Garantia por Tempo de Serviço FGTS ("FI-FGTS"), for R$1.2 billion; and 26.5% to an investment fund managed by Brookfield Asset Management ("Brookfield"), for R$2.0 billion. All of the cash proceeds from the sale to FI-FGTS and R$800 million of the proceeds from Mitsui consisted of a cash contribution to VLI in consideration of the issue of new shares to Mitsui and FI-FGTS. The cash contribution to VLI will be used to finance part of VLI's investment plan. We received the remaining R$709 million from Mitsui and the total amount of R$2.0 billion from Brookfield in consideration of the transfer of VLI shares held by Vale. We may be required to pay a further amount to Brookfield six years after closing, to provide a specified minimum return on its investment. We hold 37.6% of VLI's total share capital following completion of these transactions and are party to a shareholders' agreement with FI-FGTS, Mitsui and Brookfield.

- *Sale of gold stream from Salobo copper mine* In March 2015, we sold to Silver Wheaton (Caymans) Ltd. 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 will receive an initial cash payment of US$900 million and ongoing payments of the lesser of US$400 (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.

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. Mitsui investment is subject to conditions precedent, and is expected to close in 2015.

- *Moatize* Mitsui has agreed to invest US$450 million, as a capital increase to Vale Moçambique and also by acquiring part of Vale's equity stake and funding instruments currently in place. Such funds will be used to fund part of the capital expenditures required for the expansion of the Moatize mine. The agreement provides for the Mitsui investment to increase by up to US$30 million or decrease by up to US$120 million, based on certain yield and production targets, through 2021. Mitsui will also fund future capital expenditures for the expansion of Moatize mine, pro-rata to its 15% equity stake, in an estimated additional amount of US$188 million. Upon completion of the transaction, we will indirectly own 81% of the Moatize mine.

Table of Contents

- *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 in this holding company, which will be used to fund the project. Vale and Mitsui are seeking non-recourse project financing to fund the remaining capital expenditures required for the Nacala Corridor project and to replace part of the financing provided by Vale. See *Lines of Business Infrastructure Railroads*.

Restructuring our investments in iron ore shipping

We have been revising our business strategy with respect to maritime shipping for our iron ore. The strategy involves 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 are negotiating long-term affreightment agreements and agreements for the sale of six of our very large ore carriers of 400,000 DWT.

Obtaining environmental licenses for N4WS ore body in Carajás

In November 2014, we obtained the environmental license for expanding our N4WS mine pit located in Carajás, Brazil. This license supports our iron ore production growth process, especially the production plan for 2015 and 2016.

Restructuring our investments in power generation

In December 2013, we entered into several agreements 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$304 million; and (ii) create two distinct joint ventures: Aliança Geração de Energia S.A. ("Aliança Geração"), which will hold 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 will hold our and CEMIG GT's interests in Norte Energia. Our interest in these joint ventures will be 55% and 51%, respectively. The final amounts of these transactions are subject to certain adjustments in accordance with the terms and conditions established in the investment agreements. The transaction to create Aliança Geração was concluded in February 2015. The transaction to create Aliança Norte is still subject to certain conditions precedent, and we expect to conclude it in the first half of 2015.

Suspension of operations at Integra and Isaac Plains coal mines in Australia

In 2014, we suspended operations at our Integra and Isaac Plains mines in Australia, because they were not economically feasible under current market conditions. The decision is consistent with our strategy to focus on discipline in capital allocation and maximizing value for our shareholders.

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

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 through Samarco, a joint venture with an affiliate of BHP Billiton plc in which we have a 50% equity stake. 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 first quarter of 2014, we started a new mine and beneficiation plant in Serra Leste.	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. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.	EFC railroad transports the iron ore to the Ponta da Madeira maritime terminal in the 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 sites: 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 four 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 sites.	Supplied through the national electricity grid. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.	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 sites: Minas Itabirito (four mines, three major beneficiation plants and three secondary beneficiation plants); Vargem Grande (three mines and two major beneficiation plants); and Paraopeba (four mines and four beneficiation plants).	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 sites.	Supplied through the national electricity grid. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.	MRS, an affiliate railway company, transports our iron ore products from the mines to our Guaíba Island and Itaguaí maritime terminals in the state of Rio de Janeiro.
Midwestern System	State of Mato Grosso do Sul	Comprised of the Corumbá mines (two mines and two plants). Open-pit mining operations.	Corumbá ore reserves are comprised of 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 transported by the customers, which pick up the products in the Corumbá ports.
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.	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 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, 2012	2013	2014	2014 Process Recovery
		(million metric tons)			(%)
Southeastern System					
Itabira	Open pit	37.7	34.0	35.5	58.4
Minas Centrais(1)	Open pit	40.7	37.8	33.0	68.9
Mariana	Open pit	37.2	37.6	38.9	82.6
Total Southeastern System		115.6	109.5	107.5	
Southern System					
Minas Itabirito	Open pit	31.8	31.0	33.0	71.5
Vargem Grande	Open pit	22,6	22,0	25,0	82.7
Paraopeba	Open pit	25.8	26.0	28.2	92.8
Total Southern System		80.3	79.0	86.3	
Midwestern System					
Corumbá (MCR/Urucum)	Open pit	6.4	6.5	5.8	73.7
Total Midwestern System		6.4	6.5	5.8	
Northern System					
Serra Norte	Open pit	106.8	104.9	117.4	94.4
Serra Leste	Open pit			2.2	98.1
Total Northern System		106.8	104.9	119.7	
Vale Systems		309.0	299.8	319.2	
Samarco(2)		10.9	10.9	13.1	55.1
Total		320.0	310.7	332.4	

(1) Água Limpa mine and plants are part of the Minas Centrais operations and are owned by Baovale, in which we own 100% of the voting shares and 50% of the total shares. Production figures for Água Limpa have not been adjusted to reflect our ownership interest.

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

Table of Contents

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 64.2 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 2014 pellet production, including the production of our joint ventures, 61.5% was blast furnace pellets and 38.5% 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 2014, we sold 10.2 million metric tons of run of mine to Samarco and 0.7 million metric tons to Zhuhai YPM.

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. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.	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 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 transported by MRS and EFVM.	4.5	Supplied through the national electricity grid. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.		100.0	
Vargem Grande (state of Minas Gerais)	Part of the Southern System. Receives iron ore from the Sapecado, Galinheiro and Vargem Grande mines and the production is transported by MRS.	7.0	Supplied through the national electricity grid. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.		100.0	
São Luís (state of Maranhão)	Part of the Northern System. Receives iron ore from Carajás mines and production is shipped to customers through our Ponta da Madeira maritime terminal.	7.5	Supplied through the national electricity grid. Acquired from regional utility companies or supplied by Aliança Geração or 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	

Table of Contents

Company/Plant	Description / History	Nominal Capacity (Mtpy)	Power Source	Other Information	Vale's Share (%)	Partners
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.	50.0	BHP Billiton Brasil Ltda.
Oman:						
Vale Oman Pelletizing Company LLC ("VOPC")	Vale's industrial complex. Two pellet plants (totaling 9.0 Mtpy of capacity) for direct reduction pellets. 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.		70.0	Oman Oil Company S.A.O.C.

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

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, 2012	2013	2014
		(million metric tons)	
Vale(1)	43.3	39.0	43.0
Hispanobras(2)	1.1		
Samarco(3)	10.7	10.6	12.1
Total	55.1	49.6	55.1

(1) Figure indicates actual production, including full production from our pellet plants in Oman and from the four pellet plants we leased in Brazil in 2008. 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.

(2) On July 1, 2012, we signed a three-year operating lease for Hispanobras' pellet plant and started to consolidate its output with our production.

(3) 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 2014, China accounted for 50% of our iron ore and iron ore pellet shipments, and Asia as a whole accounted for 67%. Europe accounted for 16%, followed by Brazil with 12%. Our 10 largest customers collectively purchased 139.5 million metric tons of iron ore and iron ore pellets from us, representing 44% of our 2014 iron ore and iron ore pellet sales volumes and 44% of our total iron ore and iron ore pellet revenues. In 2014, no individual customer accounted for more than 10.0% of our iron ore and iron ore pellet shipments.

In 2014, 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 main 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 who may be more conveniently located geographically. In addition to offering technical assistance to our customers, we operate sales support offices in 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.

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 the IODEX spot market price index, and uses a variety of mechanisms, including current spot prices and average prices over an agreed period. 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.

30

Table of Contents

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 plc ("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 grade 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.

In terms of reliability, 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 the 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 two FTS in the Philippines. We are party to medium- and long-term freight contracts, and we own vessels, including very large ore carriers called Valemax. They reduce energy consumption and greenhouse emissions by carrying an increased amount of cargo in a single trip, offering lower freight rates. 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. There are several small iron ore producers and new companies with developing projects, such as Anglo Ferrous Brazil, Ferrous Resources and Bahia Mineração. Some steel companies, including Gerdau S.A. ("Gerdau"), Companhia Siderúrgica Nacional ("CSN"), V&M 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.

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).

Table of Contents

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 Site	Company	Location	Description/History	Mineralization	Operations	Power Source	Access/ Transportation
Azul(1)	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.	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.

(1) Vale Mina do Azul S.A. was merged into Vale S.A. in December 2014.

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

Mine	Type	Production for the year ended December 31, 2012	2013	2014	2014 Process Recovery
		(million metric tons)			(%)
Azul	Open pit	1.9	1.9	1.7	52.4
Morro da Mina	Open pit	0.2	0.1	0.1	57.9
Urucum	Underground	0.3	0.4	0.6	81.4

Total	2.4	2.4	2.4

Table of Contents

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 7% of our total consumption in Brazil in 2014. 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. Energy 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 independent producer through power purchase agreements.

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

	Production for the year ended December 31,		
Plant	2012	2013	2014
	(thousand metric tons)		
Barbacena	65	45	50
Ouro Preto	62	48	8
Simões Filho	79	82	113
Total	206	175	171

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.

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. 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 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.

Mining System/Company	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.	Patented mineral rights with no expiration date; mineral leases expiring between 2015 and 2033; and mining license of occupation with indefinite expiration date.	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 considered for phase out in Thompson, due to pending federal sulfur dioxide emission standards that are expected to come into effect in 2015. Vale	Order in Council leases expiring between 2020 and 2030; 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.

	has secured an agreement in principle with Environment Canada on emissions, which may permit continued smelting and refining through 2019, subject to negotiating an environment performance agreement in 2015.

Table of Contents

Lines of business

Mining System/Company	Location	Description/History	Operations	Mining Title	Power Source	Access/Transportation
Vale Newfoundland & Labrador Limited	Canada Voisey's Bay, Newfoundland and Labrador	Integrated open-pit mining, milling, refining of ore into intermediate and finished nickel products and copper concentrates with a nominal capacity of 50,000 metric tons refined nickel per year. Voisey's Bay's operations started in 2005 and were purchased by Vale in 2006.	Comprised of the Ovoid open pit mine, and deposits with the potential for underground operations at a later stage. We mine nickel sulfide ore bodies, which also contain copper and cobalt. 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. Long Harbour refinery started up in July 2014. Initially, Long Harbour is processing a blend of Voisey's Bay high grade nickel concentrates with nickel in matte from PTVI.	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 are transported to the port by haulage trucks and then shipped by drybulk vessels to either overseas markets or to our 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

Mining System/Company	Location	Description/History	Operations	Mining Title	Power Source	Access/Transportation
Asia Pacific						
PT Vale Indonesia Tbk ("PTVI")	Indonesia Sulawesi Sorowako,	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 PVTI'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%). (1)	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 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 2015 and 2051.	Supplied through the national electricity grid and by independent producers.	Products are packed into containers and are trucked approximately 4 km to Prony port.

Table of Contents

Mining System/Company	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 indirectly 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.
Korea Nickel Corporation	South Korea Onsan	Stand-alone nickel refinery (producer of finished nickel), with nominal capacity of 30,000 metric tons per year. Vale indirectly owns 25.0% of the shares, and the remaining shares are held by Korea Zinc Co., Ltd, Posteel Co., Ltd, Young Poong Co., Ltd. and others. The refinery commenced production in 1989.	Produces finished nickel for the stainless steel industry using intermediate products from our Matsuzaka and New Caledonia operations.		Supplied through the national electricity grid. Acquired from regional utility companies.	KNC's production is transported by truck over public roads to customers in Korea and is exported in containers to overseas customers from the ports of Busan and Ulsan.

Table of Contents

Mining System/Company	Location	Description/History	Operations	Mining Title	Power Source	Access/Transportation
South Atlantic						
Vale/Onça Puma	Brazil Ourilândia do Norte, Pará	Mining, smelting and refining 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. Acquired from regional utility companies or supplied by Aliança Geração or directly by Vale.	The ferro-nickel is transported by public paved road and EFC railroad to the Itaqui maritime terminal in the state of Maranhão.It is exported in ocean containers.

(1) Sumic is a joint venture between Sumitomo and Mitsui. Pursuant to the shareholders agreement between Vale Canada and Sumic, amended in February 2015, if VNC does not start commercial production by December 2015, Sumic will sell its entire equity interest in VNC to Vale Canada for a pre-determined purchase price. If VNC achieves commercial production by December 2015, Sumic will have the option to repurchase from Vale Canada equity interests in VNC equivalent to the dilution in Sumic's shareholding that occurred as a result of an agreement in October 2012, which may increase Sumic's shareholding in VNC up to 21%. See note 30 to our consolidated financial statements. The 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 for Sulawesi operating mining areas, in Indonesia, operated by PTVI, because it has mining areas rather than 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.

	2012			2013			2014		
	(thousands of metric tons, except percentages)								
		Grade			Grade			Grade	
	Production	% Copper	% Nickel	Production	% Copper	% Nickel	Production	% Copper	% Nickel
Ontario operating mines									
Copper Cliff North	792	1.09	0.92	913	1.32	1.28	1,053	1.45	1.34
Creighton	797	1.80	1.84	915	2.01	2.19	903	1.81	2.47
Stobie	2,006	0.56	0.66	1,887	0.59	0.65	2,089	0.58	0.66
Garson	643	1.56	1.61	815	1.42	1.75	678	1.39	1.75
Coleman	1,062	2.58	1.51	1,515	3.15	1.52	1,385	3.10	1.52
Ellen	371	0.44	0.93	109	0.49	1.00	181	0.62	1.07
Totten	6	2.37	1.15	64	1.84	1.92	303	1.98	1.50
Gertrude	36	0.27	0.72	196	0.32	0.89			
Total Ontario operations	5,714	1.29%	1.14%	6,414	1.61%	1.3%	6,591	1.57%	1.36%
Manitoba operating mines									
Thompson	1,160		1.86	1,175		2.07	1,184		1.95
Birchtree	643		1.34	613		1.39	545		1.39
Total Manitoba operations	1,804		1.67%	1,788		1.84%	1,729		1.78%
Voisey's Bay operating mines									
Ovoid	2,351	1.94%	3.11%	2,318	1.68%	2.89%	2,243	1.54%	2.58%
Sulawesi operating mining areas									
Sorowako	3,678		2.02%	4,369		2.00%	4,391		1.99%
New Caledonia operating mines									
VNC	1,179		1.27%	1,860		1.36%	2,134		1.44%
Brazil operating mines									

Onça Puma	1,975	1.87%	263	2.28%	1,358	2.19%

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, 2012	2013	2014
		(thousand metric tons)		
Sudbury(1)	Underground	65.5	69.4	64.3
Thompson(1)	Underground	24.2	24.5	26.1
Voisey's Bay(2)	Open pit	61.9	63.0	48.3
Sorowako(3)	Open cast	69.0	78.8	78.7
Onça Puma(4)	Open pit	6.0	1.9	21.4
New Caledonia(5)	Open pit	4.5	16.3	18.7
External(6)		5.9	6.4	17.5
Total(7)		237.0	260.2	274.9

(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.

(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 NHC and 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 2014, 41% of our refined nickel sales were delivered to customers in Asia, 30% to North America, 28% 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 has 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.

In 2014, the principal end-use applications for nickel were:

- stainless steel (68% of global nickel consumption);
- non-ferrous alloys, alloy steels and foundry applications (16% of global nickel consumption);
- nickel plating (7% of global nickel consumption); and

Table of Contents

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

In 2014, 61% of our refined nickel sales were made into non-stainless steel applications, compared to the industry average for primary nickel producers of 32%, 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 to the applications and geographic regions that offer the highest margins for our products.

Our nickel deliveries represented 14% of global consumption for primary nickel in 2014. 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 ("Norilsk"), Jinchuan Nonferrous Metals Corporation ("Jinchuan"), Glencore Xstrata and BHP Billiton. Together with us, these companies accounted for about 46% of global refined primary nickel production in 2014.

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. In recent years, 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 in China from imported lateritic ores, is primarily 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 8% year-over-year to approximately 460,000 metric tons, representing 23% of world primary nickel supply. The delivery of previously shipped ores and the significant stockpiles of Indonesian ores within China mitigated the effect of this decrease in nickel pig iron production in 2014. We anticipate that Chinese nickel pig iron production will decline further in 2015 and 2016, with the depletion of Indonesian 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 Site/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 and started production in 2004.	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. Acquired from Eletronorte, pursuant to power purchase agreements or supplied by Aliança Geração or directly by Vale.	We truck the concentrate to a storage terminal in Parauapebas and then transport it via the EFC railroad to the Ponta da Madeira maritime terminal in São Luís, in the state of Maranhão. We constructed an 85-kilometer road to link Sossego to Parauapebas.
Vale/Salobo	Carajás, state of Pará.	Salobo I processing plant is ramping up to a total capacity of 100,000 tpy of copper in concentrates. Salobo is expected to reach a total capacity of approximately 200,000 tpy by 2016, after 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 from Eletronorte, pursuant to power purchase agreements.	We truck the concentrate to a storage terminal in Parauapebas and then transport it via the EFC railroad to the Ponta da Madeira maritime terminal in São Luís, in the state of Maranhão. We constructed a 90-kilometer road to link Salobo to Parauapebas.

Table of Contents

Mining Site/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 electrowon copper cathode as a by-product of our nickel refining operations.	Please refer to the table in our 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.	Please refer to the table in our Nickel Operations		
Zambia						
Lubambe	Zambian Copperbelt	Lubambe (previously Konkola North) copper mine, which includes an underground mine, plant and related infrastructure. TEAL (our 50/50 joint venture with ARM) has an 80% indirect stake in Lubambe. Zambia Consolidated Copper Mines Investment Holding PLC Ltd. holds the remaining (20%) stake.	Nominal production capacity of 45,000 metric tons per year of copper in concentrates. Production started in October 2012 and is ramping up.	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, 2012	2013	2014
			(thousand metric tons)	
Brazil:				
Salobo	Open pit	13	65	98
Sossego	Open pit	110	119	110
Canada:				
Sudbury	Underground	79	103	98
Voisey's Bay	Open pit	42	36	33
Thompson	Underground	3	2	2
External(1)		29	24	29
Chile:				
Tres Valles(2)	Open pit and underground	14	11	
Zambia:				
Lubambe(3)	Underground	1	9	10
Total		290	370	380

(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%.

2.2.3 Customers and sales

We sell copper concentrates from Sossego and Salobo under medium and long-term contracts to copper smelters in South America, 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 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 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, Antofagasta plc, Codelco, Freeport McMoRan, Glencore Xstrata and Anglo American, operating at the parent-company level or through subsidiaries. Our market share in 2014 was about 3% of the total custom copper concentrate market.

Table of Contents

The copper anode/blister market has very limited trade within the copper industry; 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 2014 included Codelco, Glencore Xstrata 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 2014, PGM concentrates from our Canadian operations supplied about 46.1% 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 concentrates.

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. Pursuant to the gold stream contract, Silver Wheaton received 74,325 oz. of gold in 2014.

In March 2015, we agreed to sell 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.*

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

Mine	Type	2012	2013	2014
			(thousand troy ounces)	
Sudbury:				
Platinum	Underground	134	145	182
Palladium	Underground	251	352	398
Gold	Underground	69	91	83
Salobo:				
Gold	Open pit	20	117	160
Sossego:				
Gold	Open pit	75	78	78

2.4 Cobalt

We recover significant quantities of cobalt as a by-product of our nickel operations. In 2014, we produced 1,362 metric tons of refined cobalt metal at our Port Colborne refinery, 1,124 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 1,257 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 will increase. 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, 2012	2013	2014
			(metric tons)	
Sudbury	Underground	589	853	833
Thompson	Underground	96	292	489
Voisey's Bay	Open pit	1,221	1,256	952
New Caledonia	Open pit	385	1,117	1,384
External sources(1)		52	13	84
Total		2,343	3,532	3,743

(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 coal assets in Australia through wholly-owned companies and unincorporated joint ventures. We also have a minority interest in two Chinese companies, Henan Longyu Energy Resources Co., Ltd. ("Longyu") and Shandong Yankuang International Coking Company Limited ("Yankuang").

Company/Mining Site	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 by the Linha do Sena railway to the port of Beira and in the future also by the Nacala Corridor to the port of Nacala.
Vale Australia						
Integra Coal	Hunter Valley, New South Wales	Open-cut and underground coal mines, acquired from AMCI in 2007, located 10 kilometers northwest of Singleton in the Hunter Valley of New South Wales, Australia. Vale had a 61.2% stake until December 2014, when it increased its stake to 64.8%. The remaining stakes are owned by Nippon Steel ("NSC"), JFE Group ("JFE"), Posco, Toyota Tsusho Australia, Chubu Electric Power Co. Ltd.	Produces metallurgical and thermal coal. The operations are comprised of an underground coal mine that produces coal by longwall methods and an open-cut mine. Coal from the mines is processed at a CHPP with a capacity of 1,200 metric tons per hour. Operations at Integra coal mine were suspended in May 2014, as they were not economically feasible under current market conditions.	Mining tenements expiring in 2023, 2026, 2030 and 2033.	Supplied through the national electricity grid. Acquired from local utility companies.	Production is loaded onto trains and transported 83km to the port of Newcastle, New South Wales, 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")	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.

	products. Vale has a 90.0% stake and the remaining is owned by JFE and Posco.

Table of Contents

Company/Mining Site	Location	Description/History	Mineralization/Operations	Mining Title	Power Source	Access/Transportation
Isaac Plains	Bowen Basin, Queensland	The Isaac Plains open-cut mine, acquired from AMCI in 2007, is located close to Carborough Downs in central Queensland. The mine is managed by Isaac Plains Coal Management on behalf of the joint venture parties. Vale has a 50.0% stake, and the remaining shares are owned by a subsidiary of Sumitomo.	Metallurgical and thermal coal mined predominantly using dragline method. The coal is classified as a medium volatile bituminous coal with low sulfur content. Coal is processed at the Isaac Plains CHPP, which has a capacity of 500 metric tons per hour. Operations at Isaac Plains mine were suspended in November 2014, as they were not economically feasible under current market conditions.	Mining tenements expiring in 2025.	Supplied through the national electricity grid. Acquired from local utility companies.	Railed 172 kilometers to the Dalrymple Bay Coal Terminal.

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, 2012	2013	2014
			(thousand metric tons)	
Metallurgical coal:				
Vale Australia				
Integra Coal(1)(4)	Underground and open-cut	962	1,410	715
Isaac Plains(2)	Open-cut	709	656	746
Carborough Downs(3)	Underground	911	2,447	1,857
Vale Moçambique				
Moatize(5)	Open-cut	2,501	2,373	3,124
Total metallurgical coal		5,083	6,885	6,443
Thermal coal:				
Vale Australia				
Integra Coal(1)	Open-cut	351	87	92
Isaac Plains(2)	Open-cut	381	347	326
Vale Moçambique				
Moatize(5)	Open-cut	1,267	1,444	1,784
Total thermal coal		1,999	1,878	2,202

(1) These figures correspond to our 61.2% equity interest in Integra Coal, an unincorporated joint venture. Our equity interest in Integra Coal increased to 64.8% in December 2014.

(2) These figures correspond to our 50.0% equity interest in Isaac Plains, an unincorporated joint venture.

(3) These figures correspond to our 85.0% equity interest in Carborough Downs, an unincorporated joint venture. Our equity interest in Carborough Downs increased to 90% in December 2014.

(4) Operations at Integra Coal and Isaac Plains have been suspended since May and November 2014, 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 markets, including Asia, Africa, Europe and the Americas. Our Chinese coal joint ventures direct their 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.

Growth in the demand for steel, especially in Asia, underpins demand for metallurgical coal, while growth in demand for electricity supports demand for thermal coal. We expect robust supply and lower 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 the ownership of a transportation corridor, the proximity to the Atlantic and Indian markets (as compared to our main competitors) and our lower production costs (as compared to other producers).

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

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	
MVM Resources International, B.V.	Bayóvar, Peru	51.0	40.0	Mosaic, Mitsui

Vale Fertilizantes is a producer of phosphate rock, phosphate fertilizers ("P") (e.g., monoammonium phosphate ("MAP"), dicalcium phosphate ("DCP"), triple superphosphate ("TSP") and single superphosphate ("SSP") 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 state of Goiás, Tapira, Patos de Minas and Araxá, all in the state of Minas Gerais, and Cajati, in the state of São Paulo, in Brazil. In addition, Vale Fertilizantes has nine processing plants for the production of phosphate and nitrogen nutrients, located at Catalão, Goiás; Araxá, Patos de Minas and Uberaba, Minas Gerais; Guará, Cajati, and three plants in Cubatão, 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,		
		2012	2013	2014
		(thousand metric tons)		
Bayóvar	Open pit	3,209	3,546	3,801
Catalão	Open pit	1,026	1,057	1,055
Tapira	Open pit	2,068	1,869	2,005
Patos de Minas	Open pit	44	53	73
Araxá	Open pit	1,084	1,111	883
Cajati	Open pit	550	640	605
Total		7,982	8,277	8,421

Table of Contents

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

Product	Production for the year ended December 31, 2012	2013	2014
	(thousand metric tons)		
Monoammonium phosphate (MAP)	1,201	1,128	1,065
Triple superphosphate (TSP)	913	905	910
Single superphosphate (SSP)	2,226	2,102	1,854
Dicalcium phosphate (DCP)	511	444	502
Ammonia(1)	475	347	178
Urea(2)	483	219	0
Nitric acid	478	416	469
Ammonium nitrate	490	419	485

(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 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, 2012	2013	2014	2014 Process Recovery
		(thousand metric tons)			(%)
Taquari-Vassouras	Underground	549	492	492	82.9

4.3 Customers and sales

All potash sales from the Taquari-Vassouras mine are to the Brazilian market. In 2014, our sales represented approximately 5% of total potash sold 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 2014 generated from four long-term customers.

Our phosphate products are mainly sold to fertilizer blenders. In 2014, our sales represented approximately 27% of total phosphate sold in Brazil, with imports representing around 58% of total supply. In the high-concentration segment our production represented 86% of total Brazilian production, with products like MAP and TSP. In the low-concentration phosphate nutrients segment our production represented 71% of total Brazilian production, with products like SSP.

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 which having only a few producers. The industry presents a high level of investment and a long time required for a project to mature. In addition, the potash industry is highly concentrated, with the five major producers accounting for 83% of total world production capacity. While potash is a scarcer resource, phosphate is more available, but the major exporters are located in the northern region of Africa (Morocco, Algeria and Tunisia) and in the United States. The top five phosphate rock producing countries (China, Morocco, United States, Russia and Jordan) account for 77% of global production in 2014, of which roughly 11% is exported. However, higher value-added products such as MAP and DAP are usually traded instead of phosphate rock due to cost efficiency.

Table of Contents

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, phosphoric acid and urea. Brazil imports 95% of its potash consumption, which amounted to approximately 9 Mtpy of KCl (potassium chloride) in 2014, 14% higher than 2013, from Belarusian, Canadian, Russian, German, Chilean and Israeli producers, in descending order. In terms of global consumption, China, the United States, Brazil and India represent 61% of the total, with Brazil alone representing 15% of the total. Our fertilizer 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 33% of the total seaborne market. Brazil imports 58% of the total phosphate nutrients it needs through phosphate fertilizer products. The phosphate rock imports supply non-integrated producers of phosphate fertilizer products such as SSP, TSP and MAP.

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 and urea are the main inputs for nitrogen-based fertilizers. Consumption 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. Asia receives the largest volume of imports, accounting for 37% of global trade. Main exporting countries are Russia, Trinidad and Saudi Arabia.

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	46.8	47.6	CSN, Usiminas and Gerdau
CPBS	Port and maritime terminal operations	Brazil	100	100	
PTV	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	Port and maritime terminal operations	New Caledonia	80.5	80.5	Sumic, SPMSC
VMM	Port and maritime terminal operations	Malaysia	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 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.

5.1.1 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 2014, the EFVM railroad transported a daily average of 326.8 metric tons of iron ore, or a total of 79.4 billion ntk of iron ore and other cargo, of which 17.2 billion ntk, or 21.7%, consisted of cargo transported for customers, including iron ore for Brazilian customers. The EFVM railroad also carried 955 thousand passengers in 2014. In 2014, we had a fleet of 323 locomotives and 15,146 wagons at EFVM.

Table of Contents

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 2014, the EFC railroad transported a daily average of 319.0 metric tons of iron ore. In 2014, the EFC railroad carried a total of 105.9 billion ntk of iron ore and other cargo, 3.5 billion ntk of which was cargo for customers, including iron ore for Brazilian customers. EFC also carried 307 thousand passengers in 2014. 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 2014, EFC had a fleet of 277 locomotives and 16,158 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), five inland terminals with a total storage capacity of 240,000 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. VLI's main railroad 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 state of Maranhão, and Porto Nacional, in the 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.

In 2014, VLI transported a total of 31.95 billion ntk of general cargo, including 18.7 billion ntk from FCA and FNS and 13.3 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 2014, the MRS railroad carried a total of 164 million metric tons of cargo, including 70.5 million metric tons of iron ore and other cargo from Vale.

Africa

We are ramping up the Nacala Corridor, which connects the Moatize site 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 existing railways in Mozambique and Malawi and a new coal port 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 held by our subsidiary Corredor Logístico Integrado de Nacala S.A. ("CLN"), which will expire in 2043, subject to renewal, and we are 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 2041, 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, which will be used to fund the project. Vale and Mitsui are seeking project financing, without recourse to Vale or Mitsui, to fund the remaining capital expenditures required for the Nacala Corridor project and to replace part of the funding provided by Vale. The transaction is subject to certain conditions precedent, and closing is expected for 2015.

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 Port. 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 (Praia Mole Terminal 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 200,000 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 2014, 101.5 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.

- Praia Mole terminal is principally a coal terminal and handled 11.3 million metric tons in 2014. VLI has rights to use the capacity of the Praia Mole terminal.

- Terminal de Produtos Diversos handled 7.4 million metric tons of grains and fertilizers in 2014. VLI has rights to use the capacity of the Terminal de Produtos Diversos.

Ponta da Madeira maritime terminal. Our Ponta da Madeira maritime terminal is located near the port of Itaqui, 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 production. Other cargo includes manganese ore produced by us and pig iron and soybeans for unrelated parties. In 2014, 112.3 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.

Itaguaí maritime terminal Cia. Portuária Baía de Sepetiba ("CPBS"). CPBS is a wholly-owned subsidiary that operates the Itaguaí terminal, in the Sepetiba Port, in the Brazilian state of Rio de Janeiro. Itaguaí's maritime 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 2014, the terminal uploaded 23.8 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 2014, the terminal uploaded 40.6 million metric tons of iron ore.

VLI also operates Inácio Barbosa maritime terminal (TMIB), owned by Petrobras, in the state of Sergipe; Santos maritime terminal (TIPLAM), in the 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 1.12 million metric tons of iron and manganese ore through this port in 2014, 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.

Oman

Vale Oman Distribution Center LLC ("VODC") operates a distribution center in Liwa, Sultanate of Oman. The maritime terminal has a 1.4 kilometer deep water jetty, which 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 unloading nominal 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 a 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.

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.

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 2014, the terminal unloaded 3.09 million metric tons of iron ore and uploaded 2.58 million metric tons of iron ore.

Table of Contents

5.1.3 Shipping

We continue to develop and 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 32 vessels in operation, including 19 Valemax vessels, with a capacity of 400,000 DWT each, and 13 capsize vessels with capacities ranging from 150,000 to 250,000 DWT. We have 16 Valemax vessels 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 Valemax vessels 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 and to increase our market share in China and the global seaborne market. In 2014, we shipped approximately 158 million metric tons of iron ore and pellets on a CFR and 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 are negotiating (i) long-term contracts for affreightment to secure long-term access to shipping capacity for the transportation of our iron ore from Brazil to Asia and to protect against volatility in freight, and (ii) the sale of six of our very large ore carriers of 400,000 DWT.

In the Paraná and Paraguay waterway system, we transport iron ore and manganese ores through our subsidiary Transbarge Navegación, which transported 2.35 million tons through the waterway system in 2014, 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 1.05 million tons of ore, of a total loading capacity of 3 million tons, at San Nicolas port into ocean-going vessels in 2014. In 2010, we purchased two tugboats, Morro Alto and Morro Azul, that will begin operations in 2015.

We manage a fleet of 26 tug boats in total, of which we own 25 and one is leased. We directly operate ten tug boats, which are operated in the ports of Vitória and Mangaratiba, in the states of Espírito Santo and Rio de Janeiro, respectively. Six 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. Ten 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.

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 2014, our installed capacity in Brazil was 1.3 GW. We use the electricity produced by these plants for our internal consumption needs. We currently have stakes in nine hydroelectric power plants and four small hydroelectric power plants in operation. The hydroelectric power plants of Igarapava, Porto Estrela, Funil, Candonga, Aimorés, Capim Branco I, Capim Branco II and Machadinho are located in the Southeastern and Southern regions, and Estreito is located in the Northern region. The small hydroelectric power plants of Ituerê, Melo, Glória and Nova Maurício are localized in the Southeastern region. Our joint venture Aliança Geração holds our and CEMIG GT's interests in the following hydroelectric power plants: Porto Estrela, Igarapava, Funil, Capim Branco I e II, Aimorés and Candonga. See *Business Overview Significant changes in our business*.

Table of Contents

In 2014, we have a 9% stake in Norte Energia, the company established to develop and operate the Belo Monte hydroelectric plant in the Brazilian state of Pará. Upon completion of the transaction we entered into with CEMIG GT, we will indirectly hold a 4.59% stake in Norte Energia through Aliança Norte Energia. 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 will not be affected by the transactions described in *Business Overview Significant changes in our business Restructuring our investments in power generation*.

We also produce palm oil in the Brazilian state of Pará, which will be used to produce biodiesel, through an extraction plant with an installed capacity of 100,000 tons of palm oil per year. The biodiesel is 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 2014, 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 2014, average demand for electrical energy was 195 MW to all surface plants and mines in the Sudbury area.

In 2014, diesel generation provided 100% of the electric requirements of our Voisey's Bay operations. We have six diesel generators on-site producing 12 MW.

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 CO_2 emissions by replacing non-renewable power generation, and enable us to increase our current nickel production capacity in Indonesia.

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 coal operations in China, Longyu (in the Henan province) and Yankuang (in the Shandong Province). 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. Yankuang produces metallurgical coke, methanol, tar oil and benzene, the remaining interests are owned by Yankuang Group Co. Ltd. and Itochu Corporation.

Table of Contents

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 4.1 Mt of slabs in 2014. TKCSA production capacity of 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 Hydro in two equal tranches in 2014 and 2016. We completed the transfer of the 2014 tranche in December, and we currently have a 13.63% indirect interest in Paragominas.

We also have an onshore and offshore hydrocarbon exploration portfolio in Brazil and Peru. This portfolio is under review, and some concessions are being relinquished while others are in the process of being assigned, subject to regulatory approvals.

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 calculated 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 2014, we performed an analysis of our reserve estimates for certain projects and operations, which is reflected in new estimates as of December 31, 2014. 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 that occurs after mining has ceased. 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 future prices for the products identified in the following table were equal to the three-year average historical prices through December 31, 2014. For this purpose, we used the three-year historical average prices set forth in the following table.

Commodity	**Three-year average historical price (US$ per metric ton, unless otherwise stated)**	**Pricing source**
Iron ore:		
Vale(1)	120.76	Average Platts IODEX (62% Fe CFR China, US$/dmt)
Samarco(2)	141.94	Average realized price for pellets and pellet feeds (US$/dmt)
Coal:		
Metallurgical Moatize	134.40	Average realized hard metallurgical coal price
Metallurgical Integra underground	125.18	Average realized semi hard metallurgical coal price
Metallurgical Integra open cut	97.28	Average semi soft metallurgical coal realized price
Metallurgical Carborough Downs	135.16	Average hard metallurgical coal realized price
Metallurgical Isaac Plains	113.50	Average semi hard metallurgical coal realized price
PCI Carborough Downs	116.84	Average PCI realized price
PCI Isaac Plains(3)	119.80	Average PCI realized price
Thermal Integra open cut	88.09	Average thermal realized price
Thermal Isaac Plains	84.39	Average thermal realized price
Thermal Moatize	68.80	Average thermal realized price
Base metals:		
Nickel(4)	7.47	LME Ni (US$/lb)
Copper	3.35	LME Cu (US$/lb)
Nickel by-products:		
Platinum	1,475.00	Average realized price (US$/oz)
Palladium	724.00	Average realized price (US$/oz)
Gold	1,449.00	Average realized price (US$/oz)
Cobalt(4)	12.95	99.3% low cobalt metal (US$/lb) (source: Metal Bulletin)
Fertilizer nutrients:		
Phosphate	148.09	Average benchmark price for phosphate concentrate, FOB Morocco (source: Fertilizer Week)
Potash	378.60	Average benchmark price for potash, FOB Vancouver (source: Fertilizer Week)
Manganese ore(5):		
Manganese lump ore	177.53	Average realized price (US$/dmt)
Manganese sinter feed	147.08	Average realized price (US$/dmt)

(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) US$ per dry metric ton of iron ore pellets is used for pricing at Samarco.

(3) Both semi soft coking coal (SSCC) and PCI are considered the same product at the operation in compiling the average three yearly sales price.

(4) 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.

(5) Prices mostly on a Delivery Duty Unpaid (DDU) and Cost, Insurance & Freight (CIF) China basis.

Table of Contents

Iron ore reserves

The following tables set forth our iron ore reserves and other information about our iron ore mines. Total iron ore reserves increased 0.2% from 2013 to 2014, after mine production depletion, reflecting new reserves from MCR, Jangada and Apolo. These reserves increased as a result of updated geological models based on new drilling and revisions in some grade cutoffs and pit limits.

Summary of total iron ore reserves(1)

	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Southeastern System	1,768.2	46.5	3,371.9	46.5	5,140.0	46.5	5,247.7	46.5
Southern System	2,072.1	45.8	3,509.8	43.6	5,581.9	44.4	5,599.6	44.4
Midwestern System	85.7	63.3	254.0	61.8	339.7	62.2	31.4	62.3
Northern System	4,674.8	66.7	2,405.9	66.6	7,080.7	66.7	7,184.0	66.7
Total Systems	8,600.8	57.5	9,541.5	51.0	18,142.3	54.0	18,062.7	53.9
Samarco(2)	1,384.2	40.5	1,525.5	38.8	2,909.7	39.6	2,946.1	39.7
Total	9,985.1	55.1	11,067.1	49.3	21,052.0	52.0	21,008.8	51.9

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture contents: Southeastern System 3.9%; Southern System 4.3%; Midwestern System 8.1%; Northern System 5.8%; and Samarco 6%. Grade is % of Fe.

(2) Our equity interest in Samarco is 50.0% and the reserve figures have not been adjusted to reflect our ownership interest.

Iron ore reserves per mine in the Southeastern System(1)(2)

	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Itabira								
Conceição	456.6	45.6	93.3	47.9	549.9	46.0	584.8	46.1
Minas do Meio	189.5	50.5	60.9	48.9	250.4	50.1	272.6	50.8
Minas Centrais								
Água Limpa(3)	15.3	41.9	5.2	42.8	20.5	42.1	27.0	42.2
Brucutu	192.1	50.1	240.3	48.1	432.4	49.0	470.3	49.3
Apolo(4)	47.9	57.4	622.3	56.3	670.2	56.3	632.1	56.1
Mariana								
Alegria	203.3	45.9	141.8	43.8	345.1	45.1	356.8	45.4
Fábrica Nova	363.9	43.3	775.3	40.9	1,139.2	41.6	1,158.3	41.8
Fazendão	299.6	45.7	306.2	40.6	605.8	43.1	619.2	43.2
Capanema			610.7	47.1	610.7	47.1	610.7	47.1
Conta História			515.9	45.4	515.9	45.4	515.9	45.4
Total Southeastern System	1,768.2	46.5	3,371.9	46.5	5,140.0	46.5	5,247.7	46.5

(1)

Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture contents: Itabira 1.5%; Minas Centrais 5.9%; Mariana 3.9%. Grade is % of Fe. Approximate drill hole spacing used to classify the reserves were: 100m × 100m to proven reserves and 200m × 200m to probable reserves.

(2) Average product recovery (tonnage basis) is: 57% for Itabira, 71% for Minas Centrais and 54% for Mariana.

(3) Vale's equity interest in Água Limpa is 50.0% and the reserve figures have not been adjusted to reflect our ownership interest.

(4) Apolo increased reserves due to updated geological resource model and new final pit limits.

Table of Contents

Iron ore reserves per mine in the Southern System(1)(2)

	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Minas Itabiritos								
Segredo	144.3	51.6	96.8	44.3	241.1	48.7	245.5	48.7
João Pereira	623.4	40.8	336.6	40.8	960.0	40.8	986.7	40.9
Sapecado	325.3	44.7	260.1	42.6	585.4	43.7	606.6	44.0
Galinheiro	255.7	45.5	889.0	43.5	1,144.7	43.9	1,153.8	44.0
Vargem Grande								
Tamanduá	48.4	59.5	349.0	47.5	397.4	49.0	402.8	49.2
Capitão do Mato	217.9	50.6	954.0	45.3	1,171.9	46.3	1,186.5	46.5
Abóboras	313.8	41.6	596.4	40.0	910.1	40.5	917.1	40.7
Paraopeba								
Jangada(3)	90.1	61.3	23.4	58.5	113.4	60.7	35.7	66.6
Capão Xavier	53.4	65.0	4.4	64.0	57.7	64.9	64.9	65.0
Total Southern System	2,072.1	45.8	3,509.8	43.6	5,581.9	44.4	5,599.6	44.4

(1) Tonnage is stated in millions of metric tons of wet run-of-mine. Grade is % of Fe, based on the following moisture contents: Minas Itabirito 5.0%; Vargem Grande 3.1%; Paraopeba 5%. Approximate drill hole spacing used to classify the reserves were: 100m × 100m to proven reserves and 200m × 200m to probable reserves.

(2) Average product recovery (tonnage basis) is: 48% for Minas Itabirito, 49% for Vargem Grande and 91% for Paraopeba.

(3) Jangada mine reserves increased due to new cut off limits and new product definition.

Iron ore reserves per mine in the Midwestern System(1)(2)

	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Corumbá								
Urucum	6.1	63.0	22.8	62.2	28.9	62.4	31.4	62.3
MCR	79.7	63.3	231.2	61.8	310.8	62.2		
Total Midwestern System	85.7	63.3	254.0	61.8	339.7	62.2	31.4	62.3

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture contents: 8.1%. Grade is % of Fe. Approximate drill hole spacing used to classify the reserves were: 70m × 70m to proven reserves and 140m × 140m to probable reserves.

(2) Average product recovery (tonnage basis) for Corumbá is 82%.

Iron ore reserves per mine in the Northern System(1)(2)

	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Serra Norte								
N4W	1,072.0	66.5	273.8	66.1	1,345.8	66.5	1,374.7	66.5

N4E	220.2	66.5	81.5	66.0	301.7	66.4	325.2	66.4
N5	194.9	66.9	693.1	67.3	887.9	67.2	937.1	67.2
Serra Sul								
S11	3,045.8	66.8	1,193.7	66.7	4,239.6	66.7	4,239.6	66.7
Serra Leste								
SL1	141.9	65.7	163.7	65.2	305.6	65.4	307.4	65.4
Total Northern System	4,674.8	66.7	2,405.9	66.6	7,080.7	66.7	7,184.0	66.7

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture contents: Serra Norte 8.3%; Serra Sul 4.6%; Serra Leste 4.3%. Grade is % of Fe. Approximate drill hole spacing used to classify the reserves were: 150m × 100m to proven reserves and 300m × 200m to probable reserves, except SL1 which is 100m × 100m to proven reserves and 200m × 200m to probable reserves.

(2) Average product recovery (tonnage basis) is 100%.

Table of Contents

Iron ore reserves per Samarco(1)(2)(3)(4)

	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Samarco								
Alegria								
Norte/Centro	818.70	42.1	925.3	40.4	1,744.0	41.2	1,762.3	41.3
Alegria Sul	511.8	38.0	573.6	36.2	1,085.4	37.0	1,103.6	37.1
Germano	53.7	40.0	26.5	39.2	80.2	39.8	80.2	39.8
Total Samarco	1,384.2	40.5	1,525.5	38.8	2,909.7	39.6	2,946.1	39.7

(1) Tonnage is stated in millions of metric tons of wet run-of-mine based on moisture content of 6.5%. Grade is % of Fe. Approximate drill hole spacing used to classify the reserves were: Alegria Norte/Centro, 150m × 100m to proven reserves and 300m × 200m to probable reserves; Alegria Sul, 100m × 100m to proven reserves and 200m × 200m to probable reserves.

(2) Vale's equity interest in Samarco mines is 50.0% and the reserve figures have not been adjusted to reflect our ownership interest.

(3) Samarco's probable reserves increased due to the conversion of proved to probable reserves in areas impacted by environmental uncertainties.

(4) Samarco recovery was 82% (metal basis).

Southeastern System iron ore mines

	Type	Operating since	Projected exhaustion date	Vale interest (%)
Itabira				
Conceição	Open pit	1957	2025	100.0
Minas do Meio	Open pit	1976	2022	100.0
Minas Centrais				
Água Limpa	Open pit	2000	2017	50.0
Brucutu	Open pit	1994	2023	100.0
Apolo	Open pit		2046	100.0
Mariana				
Alegria	Open pit	2000	2033	100.0
Fábrica Nova	Open pit	2005	2040	100.0
Fazendão	Open pit	1976	2048	100.0
Capanema	Open pit		2057	100.0
Conta História	Open pit		2052	100.0

Southern System iron ore mines

	Type	Operating since	Projected exhaustion date	Vale interest (%)
Minas Itabiritos				
Segredo	Open pit	2003	2047	100.0
João Pereira	Open pit	2003	2045	100.0
Sapecado	Open pit	1942	2046	100.0
Galinheiro	Open pit	1942	2046	100.0
Vargem Grande				
Tamanduá	Open pit	1993	2039	100.0
Capitão do Mato	Open pit	1997	2059	100.0
Abóboras	Open pit	2004	2050	100.0
Paraopeba				
Jangada	Open pit	2001	2027	100.0
Capão Xavier	Open pit	2004	2018	100.0

	Midwestern System iron ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Corumbá				
Urucum	Open pit	1994	2029	100.0
MCR	Open pit	1978	2060	100.0

Table of Contents

Northern System iron ore mines				
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Serra Norte				
N4W	Open pit	1994	2033	100.0
N4E	Open pit	1984	2028	100.0
N5	Open pit	1998	2035	100.0
Serra Sul				
S11	Open pit		2064	100.0
Serra Leste				
SL1	Open pit	2014	2065	100.0

Samarco iron ore mines				
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Samarco				
Alegria Norte/Centro	Open pit	2000	2053	50.0
Alegria Sul	Open pit	2000	2053	50.0
Germano	Open pit		2037	50.0

Manganese ore reserves

The following tables set forth manganese ore reserves and other information about our mines. Total manganese reserves increased 6% from 2013 to 2014, after mine production depletion, reflecting the revision of the Azul ore reserves.

Manganese ore reserves(1)(2)(3)								
	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Azul(4)	44.6	29.6	2.4	25.8	47.0	29.4	37.9	40.1
Urucum	9.4	46.3	1.8	46.5	11.2	46.4	11.6	46.3
Morro da Mina	8.7	25.5	5.6	25.3	14.3	25.4	14.4	25.1
Total	62.6	31.5	9.8	29.3	72.4	31.2	63.9	37.9

(1) The average moisture of the manganese ore reserves is: Azul 16.2%, Urucum 4.2%, Morro da Mina 3.4%.

(2) The average recovery of the manganese ore reserves is: Azul 58%, Urucum 80%, Morro da Mina 58%.

(3) The Statement of Ore Reserves as of December 31, 2014 has been reported as wet metric tons and dry % Mn grade.

(4) Up to 2013 Azul's reserves were reported as product manganese grade. In 2014, reserves are reported as ROM manganese grade.

Manganese ore mines				
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Azul	Open pit	1985	2028	100.0
Urucum	Underground	1976	2026	100.0
Morro da Mina	Open pit	1902	2053	100.0

65

Table of Contents

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, but excluding any adjustment 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 2014 (tonnage)	Probable 2014 (tonnage)	Total (tonnage)	2014 (calorific value)	Total (tonnage)	2013 (calorific value)	2014 (tonnage)	2013 (tonnage)
Integra Coal:									
Integra Open-cut	Metallurgical & thermal	0	0	0	n/a	19.4	29.7 (thermal)	0	10.1
Integra Underground Middle Liddell Seam	Metallurgical	0	0	0	n/a	6.9		0	4.7
Integra Underground Hebden Seam	Metallurgical	0	0	0	n/a	29.5		0	20.6
Total Integra Coal		0	0	0	n/a	55.8		0	35.4
Carborough Downs Underground(4)	Metallurgical & PCI	21.2	2.5	23.7	31.2 (PCI)	26.8	31.2 (PCI)	15.7	17.4
Isaac Plains North Open Cut	Metallurgical, PCI & thermal	0	0	0	n/a	10.8	30.1 (PCI)	0	8.2
Moatize	Metallurgical & thermal l	276.3	1,148.2	1,424.5	28.3 (thermal)	1,437.0	28.3 (thermal)	510.5	515.0
Total		297.5	1,150.7	1,448.2		1,530.4		526.2	576.0

(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. Reserves are reported on a variable basis in regard to moisture: Integra Open Cut on ROM estimated basis, Integra Underground on ROM estimated basis, Carborough Downs on air dry basis, and Isaac Plains North on ROM estimated basis + 2%.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. Reduced reserves are primarily a function of mining depletion during the year.

Reserves at Integra Open Cut, the Middle Liddell Seam for Integra Underground and Isaac Plains decreased to zero in 2014 partially due to depletion but mainly on account primarily of the coal price forecast. Reserves for the Hebden Seam for Integra Underground were depleted to zero on account of the coal price forecast. Reserves at Carborough Downs and Moatize were reduced due to production depletion.

	Coal mines		
Type	Operating since	Projected exhaustion date	Vale interest (%)

Integra Coal:				
Open-cut(1)	Open pit	1991	n/a	64.8
Middle Liddell Seam(1)	Underground	1999	n/a	64.8
Hebden Seam(1)	Underground		n/a	64.8
Carborough Downs(2)	Underground	2006	2021	90.0
Isaac Plains	Open pit	2006	n/a	50.0
Moatize	Open pit	2011	2042	95.0

(1) Vale's stakes in Integra Open-cut, Middle Liddell Seam and Hebden Seam increased to 64.8% as of December 19, 2014.

(2) Vale's stake in Carborough Downs increased to 90.0% in December 2014.

Table of Contents

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	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury	47.2	1.25	37.9	1.27	85.2	1.26	101.4	1.25
Thompson	6.2	1.97	15.5	1.67	21.8	1.76	23.9	1.75
Voisey's Bay	11.9	2.76	2.8	0.70	14.7	2.37	17.2	2.38
Indonesia								
PTVI	108.0	1.80	17.4	1.75	125.4	1.79	127.5	1.79
New Caledonia								
VNC	55.3	1.34	67.0	1.49	122.3	1.42	124.2	1.42
Brazil								
Onça Puma	58.7	1.68	40.0	1.39	98.7	1.56	95.3	1.61
Total	287.4	1.64	180.6	1.45	468.0	1.57	489.5	1.57

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

In Canada, our Sudbury operations mineral reserves decreased due to mining depletions, and the reclassification of mineral reserves to mineral resource at Stobie and at Copper Cliff Mine. Mineral reserves at Thompson and Voisey's Bay operations decreased mainly due to mining depletion. Mineral reserves changes at PTVI were due to mining depletion, block model update, reclassification of mineral resources into mineral reserves at Soroako East and, West Blocks and Petea E and F Blocks, and reclassification of mineral reserves to mineral resources in at Lantoa North, Lantoa South and Petea. Mineral reserves at VNC decreased due to mining depletion of the Goro Plateau. Mineral reserves at Onça Puma increased due to the inclusion of unplanned dilution offset by mining depletion.

	Nickel ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2039	100.0
Thompson	Underground	1961	2033	100.0
Voisey's Bay	Open pit	2005	2022	100.0
Indonesia				
PTVI	Open pit	1977	2035	59.2
New Caledonia				
VNC	Open pit	2011	2044	80.5
Brazil				
Onça Puma	Open pit	2011	2056	100.0

Table of Contents

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	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury	47.2	1.75	37.9	1.44	85.2	1.61	101.4	1.51
Voisey's Bay	11.9	1.54	2.8	0.39	14.7	1.32	17.2	1.34
Brazil								
Sossego	111.5	0.70	15.2	0.71	126.6	0.70	137.5	0.77
Salobo	663.3	0.71	515.8	0.61	1,179.1	0.67	1,136.4	0.71
Zambia								
Lubambe(2)	2.6	2.22	40.5	2.24	43.1	2.24	n/a	n/a
Total	836.5	0.78	612.2	0.77	1,448.7	0.78	1,392.5	0.78

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

(2) Prior to 2014, the Lubambe operation mineral reserves were not reported.

In Canada, our Sudbury operations mineral reserves decreased due to mining depletion, and the reclassification of mineral reserves to mineral resource at Stobie and at Copper Cliff Mine. Mineral reserves at the Voisey's Bay operations decreased due to mining depletion. In Brazil, the Sossego operations mineral reserves decreased due to mining depletion and a cutoff grade re-evaluation. The mineral reserve estimates at the Salobo operation increased due to the inclusion of unplanned dilution offset by cutoff grade changes and mining depletion.

	Copper ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2039	100.0
Voisey's Bay	Open pit	2005	2022	100.0
Brazil				
Sossego	Open pit	2004	2024	100.0
Salobo	Open pit	2012	2065	100.0
Zambia				
Lubambe	Underground	2013	2038	40.0

Table of Contents

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	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury								
Platinum	47.2	0.9	37.9	1.1	85.2	1.0	101.4	0.9
Palladium	47.2	1.0	37.9	1.3	85.2	1.2	101.4	1.1
Gold	47.2	0.4	37.9	0.4	85.2	0.4	101.4	0.4
Brazil								
Sossego								
Gold	111.5	0.2	15.2	0.2	126.6	0.2	137.5	0.2
Salobo								
Gold	663.3	0.4	515.8	0.3	1,179.1	0.4	1,136.4	0.4
Total Pt + Pd(2)	47.2	1.9	37.9	2.4	85.2	2.2	101.4	2.0
Total Gold	822.0	0.4	568.9	0.3	1,390.9	0.4	1,375.3	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

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 Canadian operations and from the VNC project. Our cobalt reserve estimates are of in-place material after adjustments for depletion and mining losses (or screening in the case of VNC) and recoveries, with no adjustments for metal losses due to processing.

	Cobalt ore reserves(1)							
	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								

Sudbury	47.2	0.04	37.9	0.04	85.2	0.04	101.4	0.04
Voisey's Bay	11.9	0.13	2.8	0.03	14.7	0.11	17.2	0.11
New Caledonia								
VNC	55.3	0.12	67.0	0.11	122.3	0.11	124.2	0.11
Total	114.4	0.09	107.7	0.08	222.2	0.08	242.8	0.08

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

Table of Contents

Our cobalt reserve estimates decreased in 2014 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	2022	100.0
New Caledonia				
VNC	Open pit	2011	2043	80.5

Phosphate reserves

The total phosphate reserves have increased due to new reserves estimation for Catalão mine and also for Patrocínio project. We had a growth of 49.2% of proven reserves, mostly at Patrocínio project, but also Tapira mine had probable reserves converted into proven reserves as result of new drilling and studies. Our phosphate reserves estimates are of in-place material after adjustments for depletion and mining dilution.

	Phosphate reserves(1)							
	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Bayóvar(2)	159.7	16.3	249.6	14.9	409.3	15.4	415.9	15.5
Catalão	67.5	10.5	30.3	10.6	97.9	10.5	52.8	10.4
Tapira	301.0	7.8	378.1	7.4	679.2	7.6	680.9	6.8
Araxá	124.3	11.7	6.3	9.5	130.6	11.6	132.1	11.7
Cajati	63.9	5.6	45.7	4.7	109.6	5.2	114.4	5.2
Patrocinio project(3)	183.8	13.7	302.3	11.1	486.1	12.1	205.7	11.4
Total	900.2	11.1	1012.3	10.3	1912.5	10.7	1601.8	10.1

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

(2) 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.

(3) Patrocínio project refers to Salitre project and is still subject to approval of our Board of Directors.

	Phosphate rock ore mine			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Bayóvar	Open pit	2010	2045	40.0
Catalão	Open pit	1982	2033	100.0
Tapira	Open pit	1979	2054	100.0
Arax	Open pit	1977	2027	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 life of mine is higher than 2045.

Table of Contents

Potash ore reserves

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. Carnalita project, located at Sergipe state, Brazil, is still subject to approval of our Board of Directors.

	Potash ore reserves(1)(2)							
	Proven	2014	Probable	2014	Total	2014	Total	2013
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Taquari-Vassouras(3)	5.9	25.6	4.6	22.4	10.6	24.2	12.9	24.1
Carnalita Project(4)	247.1	12.2	54.5	12.2	301.6	12.2	301.5	12.1
Total	253.0	12.5	59.1	13.0	312.2	12.6	314.4	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.

(4) Carnalite potash reserves.

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

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

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.

The 2015 investment budget approved by our Board of Directors is US$6.358 billion for project execution, reflecting a 31.2% decrease compared to the 2014 investment budget, and US$3.809 billion for sustaining existing operations, reflecting a 15.6% decrease compared to 2014. This is the fourth consecutive year in which we reduce our capital expenditures, maintaining capital discipline and focusing only on world class projects.

Most of the capital expenditures budget for project execution will be invested in Brazil (87.3%) and in Mozambique (9.3%). The remaining part has been allocated to investments in Canada, New Caledonia and Indonesia, among others.

	2013 expenditures (US$ million)	2014 expenditures (US$ million)	2015 budget (US$ million)	2015 budget (% of total)
Project execution	9,648	7,920	6,358	62.5%
Investments to sustain existing operations	4,585	4,059	3,809	37.5%
Total	US$14,233	US$11,979	US$10,167	100.0%

We are developing a focused organic growth portfolio with fewer projects, but higher expected rates of return. Our main initiatives, which are described below, account for 71% of the US$6.358 billion budgeted for project execution in 2015.

- Expansion of our integrated iron ore operations in Carajás (US$3.696 billion) through the S11D and CLN S11D projects.
- Completion of the Itabirites projects for the replacement of capacity, increase in production and quality improvement in the iron ore production from the Southern and Southeastern Systems (US$659 million), including the Conceição Itabiritos II, Vargem Grande Itabiritos and Cauê Itabiritos projects.

Table of Contents

The following table sets forth total expenditures in 2014 for our main investment projects and expenditures budgeted for those projects in 2015, together with estimated total expenditures for each project and the estimated start-up date of each project as of December 31, 2014.

			Executed CAPEX		Expected CAPEX	
Business area	**Main projects(1)**	**Actual or Estimated Start-up**	**2014(2)**	**Total Executed(3)**	**2015(2)**	**Total Expected(4)**
			(US$ million)			
Iron ore	Carajás Serra Sul S11D(5)	2H16	973	3,492	1,321	6,878
	CLN S11D(6)	1H14 to 2H18	1,559	2,653	2,375	9,484
	Serra Leste(7)	1H14	32	440		478
	Vargem Grande Itabiritos(7)	2H14	433	1,683	129	1,910
	Conceição Itabiritos II	1H15	228	863	179	1,189
	Cauê Itabiritos	2H15	346	686	350	1,504
	Teluk Rubiah(7)	2H14	236	1,217	5	1,371
Pellet plants	Tubarão VIII(7)	1H14	141	1,187	30	1,321
Coal mining and logistics	Moatize II	2H15	570	1,384	629	2,068
	Nacala Corridor(7)	2H14 to 1H15	1,584	2,892	648	4,444
Copper mining	Salobo II(7)	1H14	350	1,371	72	1,707
Nickel mining and refining	Long Harbour(8)	2H14	65	4,250		4,331
Steelmaking	CSP(9)	2H15	182	1,055	185	2,570

(1) Projects approved by the board of directors.

(2) All figures presented on a cash basis.

(3) Total executed CAPEX through December 31, 2014, including capital expenditures in prior periods.

(4) 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.

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

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

(7) Projects delivered in 2014.

(8) We completed construction in 2013 and started up in the second half of 2014.

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

The paragraphs below describe the status of each project as of December 31, 2014 and have not been updated to reflect any developments after that date.

Ferrous minerals and logistics projects

Iron ore mining and logistics projects:

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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 56% complete, with total realized expenditures of US$3,492 million. We have received all electrocenters of the truckless system, and we initiated electromechanical assembly services of the mine and the long-distance conveyor belts. 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 (70 km of which we have already built), construction of a rail spur with 101 km, acquisition of wagons and locomotives and 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. We have obtained the environmental installation license and the authorization from ANTT required for civil construction. Civil foundation construction on the port expansion are ongoing, with 43% completion of pile driving in the offshore north berth. Regarding the onshore expansion, nine of the 48 duplication segments of the railroad were delivered in 2014. The project is 32% complete, with total realized expenditures of US$2,653 million. The start-up is expected from the first half of 2014 to second half of 2018.

Table of Contents

- *Conceição Itabiritos II.* Adaptation of the plant, located in the Southeastern System, to process low-grade itabirites. The project has a nominal capacity of 19 Mtpy, without net additional capacity. We have concluded commissioning and powering the secondary and tertiary crushing substations of the hematite and initiated testing on dry grinding the hematite. The project is 94% complete, with total realized expenditures of US$863 million. The start-up is expected for the first half of 2015.

- *Cauê Itabiritos.* Adaptation of the plant, located in the Southeastern System, to process low-grade itabirites. We finalized civil engineering work of the main operational areas, and the assembly of equipment's is in progress. We have also finalized commissioning the grinding substation. The project has a nominal capacity of 24 Mtpy. The project is 78% complete, with total realized expenditures of US$686 million. The start-up is expected for the second half of 2015.

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. We have received the first train from the Nacala corridor in the rail loop. The civil works scope and primary crusher installation are complete. The electromechanical assembly of the CHPP (coal handling and preparation plant) is in progress. The project is 79% complete, with total realized expenditures of US$1,384 million. The start-up is expected for the second half of 2015.

- *Nacala Corridor.* Railway and port infrastructure connecting Moatize site to the Nacala-à-Velha maritime terminal, located in Nacala, Mozambique. The total realized expenditure is US$2,892 million. In the second half of 2014, we completed the greenfield and the brownfield sections of the railway and successfully transported the first coal shipment from Moatize to the Nacala à Velha port. We expect the upgrade of a 500-kilometer portion of the brownfield section of the railway, which is already operational, to be completed in the third quarter of 2015. The nominal capacity after completion is initially 18 Mtpy. The start-up of the port infrastructure is expected for the first half of 2015.

Steel projects

- *Companhia Siderúrgica do Pecém* ("*CSP*"). Construction of a steel integrated 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. We have already obtained preliminary and installation environmental licenses, and assembly of the steel structure and rails are in progress. We have realized US$1,055 million of expenditures, and the start-up is expected for the second half of 2015.

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. In addition to the concessions described below, we have exploration licenses and exploration applications covering 5.1 million hectares in Brazil and 7.6 million hectares in other locations.

Location	Mining title	Approximate area covered (in hectares)	Expiration date
Brazil	Mining concessions (including under applications)	662,932	Indefinite
Canada	Mining concessions (terminology varies among provinces)	278,208	2015(5)-2035
Indonesia(1)	Contract of work	118,435	2025
Australia	Mining leases	19,209	2015-2041
New Caledonia	Mining concessions	20,157	2015-2051
Peru(2)	Mining concessions	199,398	Indefinite
Argentina(3)	Mining concessions	40,108	Indefinite
Mozambique(4)	Mining concessions	23,780	2032

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

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

(3) 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.

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

(5) In Sudbury, expiry is subject to current renewal applications that take years to approve but are in process. In Newfoundland & Labrador, mineral licenses were reorganized and some were surrendered in 2014.

There are several proposed or recently adopted changes in mining legislation and regulations in the jurisdiction where we have operations that could materially affect us. These include the following:

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Brazil. In June 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

- *Indonesia.* As required by the 2009 mining law, PTVI renegotiated the terms of its contract of work with the government, which resulted in the execution of an amendment in October 2014. The renegotiation primarily focused on six government-identified strategic items: (1) size of the area under of contract of work; (2) continuity of business operations; (3) state revenues; (4) domestic processing and refining; (5) divestment; and (6) priority use of domestic manpower, goods and services. The executed amendment secures PTVI's future and our business strategy; it provides investment certainty in respect of our rights and obligations. Under the terms of the amendment, PTVI's contract of work is set to expire in 2025 and PTVI may apply to extend its operations by way of business license for a period of two consecutive ten-year extensions upon approval of the Indonesian government. Under the amendment, we secured a detailed land package, reduced our contract of work area from 190,510 hectares to 118,435 hectares, increased Vale's divestment obligation in PTVI to 15% in the next five years and agreed to pay a royalty rate tied to the nickel market price, ranging from 2% to 3%. Further, the amendment outlines investment commitments consistent with PTVI's growth strategy and which reflects PTVI's commitment to prioritize domestic manpower, goods and services.

- *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 March 2014 and our authorization is expected by April 2015. A recently proposed bill of law, if approved, may delay the approval of our authorization to April 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.

- *Guinea.* We owned a 51% interest in VBG Vale BSGR Limited, which held iron ore concession rights in Simandou South (Zogota) and iron ore exploration permits in Simandou North (Blocks 1 & 2) in Guinea. In connection with the Guinean mining code adopted in 2011 and amended in 2013, the Government of Guinea launched in 2012 a contract review process to harmonize existing mining contracts with the new mining code. After the technical committee set up by the Government of Guinea began the review of the VBG mining rights, VBG suspended work on the ground.

  In April 2014, the Government of Guinea revoked the mining rights held by VBG following the recommendation of the technical committee, which concluded from its investigation that VBG's mining rights had been acquired through corrupt practices committed by BSGR, Vale's joint venture partner in VBG, prior to Vale's investment in the project. Vale acquired its interest in VBG after the completion of extensive due diligence conducted by outside advisors and on the basis of representations that VBG had obtained its mining rights lawfully and without any improper promises or payments. The Government of Guinea's decision does not indicate any involvement by Vale in the alleged corrupt practices and does not prohibit Vale from participating in any reallocation of the mining titles in the future. We are pursuing remedies against BSGR.

  In March 2015, we transferred our equity interest in VGB to BSGR. This transfer does not represent any form of settlement with BSGR, and we have retained rights to pursue BSGR with respect to the loss of our investment in VBG.

- *Mozambique.* The Congress approved a new mining law in August 2014. Although the new mining law revoked the previous mining law, it preserved the mining rights granted under the previous regime. So, we do not expect that our operations will be adversely affected by this change. The holders of mining rights granted under the previous regime have the option to convert their titles into mining rights subject to the new mining law regime. The regulation of the new mining law is still pending.

Table of Contents

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.

- *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$2.5697 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 a royalty fee on, among other items, nickel produced in its concession area. The royalty payment has been based on sales volume (for contained nickel matte, US$78 per metric ton, and for contained cobalt, US$140 per metric ton for total production below 500 tons, or US$156 per metric ton for total production above 500 tons). In 2014, the royalty payment was equal to 1.13% of revenues from the sale of nickel in matte products, while the average yearly royalty payment for the period from 2011 to 2014 was equal to 0.80% of revenues from the sale of nickel in matte products, including the additional royalty payment in 2014 for production beyond 160 million pounds in 2013, as agreed in the previous regime. As a result of the amendment of its Contract of Work in October 2014, PTVI started to pay mining royalties of 2% of its nickel matte revenue when LME nickel prices are below US$21,000 per metric ton and 3% of its nickel matte revenue 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. In the state of New South Wales, for coal, the applicable royalty is a percentage of the value of production total revenue (which is net of certain costs and levies) less allowable deductions of 6.2% for deep underground mines, 7.2% for underground mines and 8.2% for open cut mines. There is also a supplementary royalty payable of 1.95% (for coal recovered between December 1, 2012 and June 30, 2013) and 1% (for coal recovered on or after July 1, 2013) of the value of coal recovered, payable only by holders of mining leases who are liable to pay minerals resource rent tax.

- *Mozambique.* The Congress approved, in September 2014, a new tax regime for the mining and oil sectors that could affect mining projects in Mozambique. The new law granted the stabilization and security of the tax regimes prescribed on the mining contracts signed prior to the new tax law. We are still assessing the effect of this change in our operations in Mozambique.

Table of Contents

- *Zambia.* Zambia's government recently enacted substantial changes to the fiscal regime for the mining industry. These changes became effective on January 1, 2015. The government has replaced corporate income taxes applicable to mining operations with an 8% mineral royalty on the revenue from underground mining operations and a 20% mineral royalty on the revenue from open-pit operations. Operations generating income from tolling and the processing of purchased mineral ores, concentrates and any other semi-processed minerals will be subject to 30% corporate income tax. Previously, royalty rates for both underground and open-pit operations were 6%. The impact of these changes on mine operators will depend on the copper price and their operating costs. An increased mineral royalty will place a greater burden on high-cost operators, especially when copper prices are low, as compared to the previous profit-based corporate income tax. As our joint venture's operations are underground, it will be subject to an 8% mineral royalty.

Environmental regulations

We are also subject to environmental regulations that apply to the specific types of mining and processing activities we conduct. We require approvals, licenses, permits or authorizations from governmental authorities to operate, and 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. We must also 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 rega