Vale S.A.
Form 20-F
April 17, 2012

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As filed with the Securities and Exchange Commission on April 17, 2012

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, 2011
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)

Tito Botelho Martins, Chief Financial Officer
phone: +55 21 3814 8888
fax: +55 21 3814 8820
tito.martins@vale.com

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
6.75% Guaranteed Notes due 2012, Series VALE, issued by Vale Capital II	New York Stock Exchange
6.75% Guaranteed Notes due 2012, Series VALE.P, issued by Vale Capital II	New York Stock Exchange
9.0% Guaranteed Notes due 2013, issued by Vale Overseas	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
$5^{5}/_{8}$% 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

*

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, 2011 was:

3,256,724,482 common shares, no par value per share
2,108,579,618 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 Web site, 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 ý International Financial Reporting Standards as issued by the International Accounting Standards Board o 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

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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;
- 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) the countries in which we operate, mainly Brazil and Canada, (b) the global economy, (c) capital markets, (d) the mining and metals businesses and their dependence upon global industrial production, which is cyclical by nature, and (e) 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, organized on January 11, 1943 and existing under the laws of the Federative Republic of Brazil for an unlimited period of time. Its head offices are 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

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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.

RISK FACTORS

Risks relating to our business

The mining industry is highly exposed to the cyclicality of global economic activity and requires significant investments of capital.

The mining industry is primarily 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 production capacity, build infrastructure and preserve the environment. The sensitivity to industrial production, together with the need for significant long-term capital investments, are important sources of risk for the financial performance and growth prospects of Vale and the mining industry generally.

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 2011, Chinese demand represented 63% of global demand for seaborne iron ore, 43% of global demand for nickel and 39% of global demand for copper. The percentage of our gross operating revenues attributable to sales to consumers in China was 32.4% in 2011. Although China largely withstood the global recession of 2008/2009, a 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, could also negatively impact our results.

Our business can be adversely affected by declines in demand for the products our customers produce, including steel (for our iron ore and coal business), stainless steel (for our nickel business) 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 71.5% of our 2011 operating revenues, are used to produce carbon steel. Nickel, which accounted for 9.5% of our 2011 gross 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 sectoral 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 industry and the use of scrap could reduce the global seaborne trade of iron ore.

The demand for fertilizers is affected by global prices of agricultural commodities. A sustained decline in the price of one or more agricultural commodities could negatively impact our fertilizer nutrients business.

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The prices we charge, including prices for iron ore, nickel and copper, 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.

Increased availability of alternative nickel sources or substitution of nickel from end-use applications could adversely affect our nickel business.

Scrap nickel competes directly with primary nickel as a source of nickel for use in the production of stainless steel, and the choice between them is largely driven by their relative prices and availability. In 2011, the stainless steel scrap ratio remained relatively unchanged from 2010, at 43%. Nickel pig iron, a product developed by Chinese steel and alloy makers that utilizes lateritic nickel ores, competes with other nickel sources in the production of stainless steel. In 2011, estimated Chinese nickel pig iron and ferro-nickel production increased 67%, representing 16% of global nickel output. Demand for primary nickel may be negatively affected by the direct substitution of primary nickel with other materials in current applications. In response to high nickel prices or other factors, producers and consumers of stainless steel may partially shift from stainless steel with high nickel content (series 300) to stainless steels with either lower nickel content (series 200) or no nickel content (series 400), which would adversely affect demand for nickel.

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 render us unable to satisfy 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.

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, particularly Argentina, Australia, Brazil, Canada, Chile, China, Colombia, France, Guinea, Indonesia, Japan, Liberia, Malawi, Mozambique, New Caledonia, Norway, Oman, Peru, the United Kingdom and Zambia.

Our operations depend on authorizations and concessions from governmental regulatory agencies in the countries in which we operate. For details about the authorizations and concessions upon which our operations depend, see *Information on the Company Regulatory matters*. 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.

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Actual or potential political 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 in which we operate may arise from time to time. Although we contribute to local communities with taxes, job and business opportunities and social programs, community expectations are complex and involve multiple stakeholders with different interests. Some of our operations and reserves are located on or near lands owned or used by indigenous or aboriginal tribes or other groups. These indigenous peoples may have rights to review or participate in natural resource management, and we negotiate with them to mitigate impacts of our operations or to obtain access to their lands.

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 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, including the imposition of new taxes or royalties on mining activities.

Mining is subject to government regulation in the form of taxes and royalties, which can have an important 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, 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 shorten the duration of those commitments.

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

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 operation of our mines, 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 there is no assurance that new conditions will not be imposed in connection therewith. Fees for mining concessions might increase substantially due to the passage of time from the original issuance of each individual exploration license. If so, our business objectives might be impeded by the costs of holding or renewing our mining concessions. 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 mining concessions are justified by the results of operations to date, and 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 obtaining a mining concession. This retrocession 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 *Regulatory matters.*

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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, logistics capabilities and to expand the scope of the minerals we produce. Our projects are 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 according to schedule may be hampered by a lack of infrastructure, including a reliable power supply.
- Suppliers and contractors may fail to meet their obligations to us.
- We may face unexpected weather conditions or other force majeure events.
- We may fail to obtain, or experience delays or higher than expected costs in obtaining, the required permits and licenses to build a project.
- 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.

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. Ineffective project management could mean that we are not able to perform the continuous operation of our activities. 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:

- We may face unexpected weather conditions or other force majeure events.
- Adverse mining conditions may delay and hamper our ability to produce the expected quantity of minerals and to meet specifications required by customers.
- There may be accidents or incidents during business operations involving our mines, plants, railroads, ports and ships.

We may experience delays or interruptions in the transportation of our products, including with railroads, ports and ships.

Some of our development projects are located in regions where tropical diseases, AIDS and other contagious diseases are a major public health issue and pose health and safety risks to our employees. If we are unable to ensure the health and safety of our employees, our operations may be adversely affected.

Labor disputes may disrupt our operations from time to time.

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Rules governing ocean transport of iron ore fines could affect our operations.

A portion of our production is in the form of non-concentrate iron ore. This type of ore has been occasionally compared to fines, which are small particles of ore. Current studies are analyzing whether these ores, when transported with a high moisture content, may begin to act like a fluid, although we have no record of such an event occurring. This might cause cargo to become less stable, presenting potential dangers to navigation. The operational risks depend on many factors, including the characteristics of the ore, the circumstances under which they are transported and the type of vessel used. To manage these risks, the shipping industry and maritime insurers generally follow rules adopted under the International Maritime Solid Bulk Cargoes (IMSBC) Code, but those rules do not currently specifically address the transportation of non-concentrate iron ore such as we produce in the Carajás mineral province in our Northern System. Potential changes to the rules are currently under consideration under the auspices of the International Maritime Organization (IMO). We believe that the safety of our shipping practices is evidenced by our long track record of safe operations, but regulatory changes could require us to modify our practices for handling or shipping our Carajás production, and these measures could increase our costs, require new investment, and even limit the volume of our exports of Carajás iron ore.

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

Customers, suppliers, contractors 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.

We currently operate important parts of our pelletizing, bauxite, nickel, coal, copper and steel businesses through joint ventures with other companies. Important parts of our electricity investments and our oil and gas 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. For more information about our joint ventures, see *Information on the Company Lines of business*.

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

Our operations involve the use, handling, discharge and disposal of hazardous materials into the environment and the use of natural resources, and the mining industry is generally subject to significant risks and hazards, including the potential for fire or explosion, gas leaks, escape of polluting substances or other hazardous materials, rockfall incidents in underground mining operations and incidents involving mobile equipment or machinery. This could occur by accident or by a breach of operating standards, and could result in a significant incident, including 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. Vale has health, safety and environmental standards in place to mitigate the risk of such incidents or accidents. Notwithstanding our standards, policies and controls, our operations remain subject to incidents or accidents, which could adversely affect our business or reputation.

Environmental, health and safety regulation, including regulation pertaining to climate change, may adversely affect our business.

Nearly all aspects of our activities, products, services and projects around the world are subject to environmental, health and safety regulation, which may expose us to increased liability or increased costs. Such regulations require us to obtain environmental licenses, permits and authorizations for our operations, and to conduct environmental impact assessments in order to get approval for our projects and permission for initiating construction. Additionally, all significant changes to existing operations must also undergo the same

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procedures. Difficulties in obtaining permits may lead to construction delays or cost increases, and in some cases may lead us to postpone or even abandon a project. Environmental regulation also imposes 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, community activist groups and other stakeholders may increase demands for socially responsible and environmentally sustainable practices, which could entail significant costs and reduce our profitability. Private litigation relating to these or other matters may adversely affect our financial condition or cause harm to our reputation.

Environmental 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.

Concern over climate change and efforts to comply with international undertakings could lead governments to impose limits on carbon emissions or carbon taxes and emissions trading schemes applicable to our operations, which could adversely affect our operating costs or our capital expenditure requirements. For example, the Brazilian government has adopted a decree under the carbon emissions law (*Política Nacional de Mudanças Climáticas*) that contemplates specific limits on carbon emissions to be established in 2012 and phased in through 2020, and the Australian government has introduced a carbon pricing mechanism that commences in July 2012.

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

Natural disasters, such as wind storms, 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. Moreover, although the physical impact of climate change on our business remains highly uncertain, 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 January 11, 2012, we determined that force majeure had occurred under a number of our iron ore sales contracts due to high rainfall in the Brazilian states of Minas Gerais, Rio de Janeiro and Espírito Santo, which created serious challenges to the operations of our Southeastern and Southern Systems. The force majeure was lifted on January 23, 2012.

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, mineral 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. As a result, accidents or other negative developments involving our mining, production or transportation facilities could have a material adverse effect on our operations.

Our reserve estimates may materially differ from mineral quantities that we may be able to actually 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 ore reserves are estimated quantities of ore and minerals that we have determined can be economically mined and processed under present and assumed future conditions to extract their mineral content. 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

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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. Estimates may vary, and results of our mining and production subsequent to the date of an estimate may lead to revisions of estimates. 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 or other factors may render proven and probable reserves uneconomic to exploit and may ultimately result in a restatement of reserves. Such 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 speculative 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.

Drilling and production risks could adversely affect the mining process.

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

establish mineral reserves through drilling;

determine appropriate mining and metallurgical processes for optimizing the recovery of metal contained in ore;

obtain environmental and other licenses;

construct mining, processing facilities and infrastructure required for greenfield properties; and

obtain the ore or extract the minerals from the ore.

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

We face rising extraction costs over time as reserves deplete.

Reserves are gradually depleted in the ordinary course of a given mining operation. As mining progresses, distances to the primary crusher and to waste deposits become longer, pits become steeper 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. 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. Negotiation may become more difficult in times of higher prices and consequently higher profits in the mining and metals industries, as labor unions may seek wage increases and other forms of additional compensation.

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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 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 13.4% of our total cost of goods sold in 2011. To fulfill our energy needs, we depend on the following sources: oil by-products, which represented 37% of total energy needs in 2011, electricity (21%), coal (19%), natural gas (15%) and other energy sources (8%), using figures converted into tons of oil equivalent ("TOE").

Fuel costs represented 9.3% of our cost of goods sold in 2011. Increases in oil and gas prices adversely affect margins in our logistics services, mining, iron ore pellets and nickel businesses.

Electricity costs represented 4.1% of our total cost of goods sold in 2011. 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 due to excess demand or weather conditions, such as floods or droughts.

Electricity shortages have occurred throughout the world, and there can be no assurance that growth in power generation capacity in the countries in which we operate will be sufficient to meet future consumption increases. Future shortages, and government efforts to respond to or prevent shortages, may adversely impact the cost or supply of electricity for our operations. Through our subsidiary PT Vale Indonesia Tbk ("PTVI") (formerly known as PT International Nickel Indonesia Tbk), we process lateritic nickel ores using a pyrometallurgical process, which is energy-intensive. Although PTVI currently generates a majority of the electricity for its operations from its own hydroelectric power plants, low rainfall or other hydrological factors could adversely affect electricity production at PTVI's plants in the future, which could significantly increase the risk of higher costs or lower production volume.

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 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 our currency derivatives used to stabilize our cash flow in U.S. dollars. In 2011, we had currency losses of US$1.382 billion, while in 2010 and 2009 we had currency gains of US$102 million and US$665 million, 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* (59% in 2011) and the Canadian dollar (15% in 2011), while our revenues are

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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 and may 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 those acquisition targets that are a key part of the Company's strategies 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. In addition, if the focus on post-acquisition integration impacts the performance of our existing businesses, our results and operations may be adversely affected. 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, 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.

We are involved in several 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 several 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. In addition, under Brazilian law, a taxpayer intending to challenge a tax assessment in the judicial system must ordinarily provide the court with a bond or security in the amount of the assessment in order to suspend collection efforts. In some of our tax litigation cases, we may be required to post bond or some form of security with the court, and, depending on the nature, amount and scope of such a bond or pledge, this may have a significant financial impact on our business. For additional information, see *Additional information Legal proceedings*.

Risks relating to our corporate structure

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

As of March 31, 2012, Valepar S.A. ("Valepar") owned 52.7% of our outstanding common stock and 32.4% of our total outstanding capital. As a result of its share ownership, Valepar can 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*.

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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 law, accounting or governance standards. We may be subject to breaches of our Code of Ethical Conduct, business conduct protocols and instances of fraudulent behavior 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 the 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, foreign court orders 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*), which confirmation will only be granted if such 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 Company or after sufficient evidence of the Company's absence has been given, 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.

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 U.S. dollars 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 Resolution No. 2,689 of the National Monetary Council ("CMN"), 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.

We cannot assure ADR holders or HDR holders that the custodian's registration or any registration obtained will not be affected by future legislative changes, or that additional restrictions applicable to ADR holders or HDR holders, the disposition of the underlying shares or the repatriation of the proceeds from disposition will not be imposed in the future.

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

ADR holders and HDR holders may not be able to exercise preemptive rights or other types of rights with respect to the underlying shares. 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 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. We are also not obligated to extend the offer of preemptive rights to HDR holders through the depositary. For a more complete description of preemptive rights with respect to the underlying shares, see *Additional information Memorandum and articles of association Preemptive rights*.

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 the event that we fail to provide the depositary with voting materials on a timely basis, or the depositary does not provide sufficient time for ADR holders and HDR holders to submit voting instructions, ADR holders and HDR holders will not be able to vote. With respect to ADSs for which instructions are not received, the depositary may, subject to certain limitations, grant a proxy to a person designated by us.

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

We are a global company with securities traded in several different markets and investors located in many different countries. The legal regime for the protection of investors varies around the world, sometimes in important respects, 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.

PRESENTATION OF FINANCIAL INFORMATION

We have prepared our financial statements in this annual report in accordance with generally accepted accounting principles in the United States ("U.S. GAAP"). We also publish financial statements in accordance with International Financial Reporting Standards ("IFRS"), which differ in certain respects from U.S. GAAP, and use IFRS in reports to Brazilian shareholders, in CVM filings, and in determining the legal minimum dividend under Brazilian law.

Our financial statements and the other financial information in this annual report have been translated from Brazilian *reais* into U.S. dollars on the basis explained in Note 3 to our financial statements, unless we indicate otherwise.

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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.

Statement of income data

	For the year ended December 31,				
	2007	2008	2009	2010	2011
	(US$ million)				
Net operating revenues	32,242	37,426	23,311	45,293	58,990
Cost of products and services	(16,463)	(17,641)	(13,621)	(18,814)	(23,573)
Selling, general and administrative expenses	(1,245)	(1,748)	(1,130)	(1,701)	(2,334)
Research and development	(733)	(1,085)	(981)	(878)	(1,674)
Impairment of goodwill		(950)			
Gain on sale of assets					1,513
Other expenses	(607)	(1,254)	(1,522)	(2,205)	(2,810)
Operating income	13,194	14,748	6,057	21,695	30,112
Non-operating income (expenses):					
Financial income (expenses), net	(1,291)	(1,975)	351	(1,725)	(1,672)
Exchange and monetary gains, net	2,553	364	675	344	(1,641)
Gain on sale of investments	777	80	40		
Subtotal	2,039	(1,531)	1,066	(1,381)	(3,313)
Income before income taxes and equity results	15,233	13,217	7,123	20,314	26,799
Income taxes charge	(3,201)	(535)	(2,100)	(3,705)	(5,282)
Equity in results of affiliates and joint ventures and change in provision for gains on equity investments	595	794	433	987	1,135
Net income from continuing operations	12,627	13,476	5,456	17,596	22,652
Discontinued operations, net of tax				(143)	
Net income	12,627	13,476	5,456	17,453	22,652
Net income (loss) attributable to non-controlling interests	802	258	107	189	(233)
Net income attributable to Company's shareholders	11,825	13,218	5,349	17,264	22,885
Total cash paid to shareholders(1)	1,875	2,850	2,724	3,000	9,000

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

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Earnings per share

	For the year ended December 31,(1)				
	2007	2008	2009	2010	2011
	(US$, except as noted)				
Earnings per share:					
Per common share	2.41	2.58	0.97	3.23	4.33
Per preferred share	2.41	2.58	0.97	3.23	4.33
Weighted average number of shares outstanding (in thousands)(2)(3):					
Common shares	2,943,216	3,028,817	3,181,706	3,210,023	3,197,063
Preferred shares	1,889,171	1,946,454	2,030,700	2,035,783	1,984,030
Treasury common shares underlying convertible notes	34,510	56,582	74,998	18,416	18,416
Treasury preferred shares underlying convertible notes	18,478	30,295	77,580	47,285	47,285
Total	4,885,375	5,062,148	5,364,984	5,311,507	5,246,794
Distributions to shareholders per share(4):					
In US$	0.39	0.56	0.53	0.57	1.74
In R$	0.74	1.09	1.01	0.98	2.89

(1) Share and per-share amounts for all periods give retroactive effect to all stock splits. We carried out a two-for-one stock split in September 2007.

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

(3) Changes in the number of shares outstanding reflect a global equity offering in July 2008 and share repurchase programs conducted from October 2008 to May 2009, from September 2010 to October 2010 and from May 2011 to November 2011. For more information see *Share ownership and trading Purchases of equity securities by the issuer and affiliated purchasers*.

(4) 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.*

Balance sheet data

	At December 31,				
	2007	2008	2009	2010	2011
	(US$ million)				
Current assets	11,380	23,238	21,294	31,791	21,736
Property, plant and equipment, net and intangible assets	54,625	49,329	68,810	84,370	90,030
Investments in affiliated companies and joint ventures and other investments	2,922	2,408	4,585	4,497	8,093
Other assets	7,790	5,017	7,590	8,481	8,869
Total assets	76,717	79,992	102,279	129,139	128,728
Current liabilities	10,083	7,237	9,181	17,912	11,043
Long-term liabilities(1)	13,195	10,173	12,703	17,195	16,033
Long-term debt(2)	17,608	17,535	19,898	21,591	21,538
Total liabilities	40,886	34,945	41,782	56,698	48,614
Redeemable non-controlling interests	375	599	731	712	505
Shareholders' equity:					
Capital stock	12,306	23,848	23,839	23,726	36,903
Additional paid-in capital	498	393	411	2,188	(61)
Mandatorily convertible notes common ADSs	1,288	1,288	1,578	290	290
Mandatorily convertible notes preferred ADSs	581	581	1,225	644	644
Reserves and retained earnings	18,603	16,446	29,882	42,051	39,939
Total Company shareholders' equity	33,276	42,556	56,935	68,899	77,715

Non-controlling interests	2,180	1,892	2,831	2,830	1,894
Total shareholders' equity	35,456	44,448	59,766	71,729	79,609
Total liabilities and shareholders' equity	76,717	79,992	102,279	129,139	128,728

(1) Excludes long-term debt.

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

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I. INFORMATION ON THE COMPANY

BUSINESS OVERVIEW

Summary

We are the second-largest metals and mining company 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 second-largest producer of nickel. We are one of the world's largest producers of manganese ore and ferroalloys. We also produce copper, thermal and metallurgical coal, phosphates, potash, cobalt and platinum group metals ("PGMs"). To support our growth strategy, we are actively engaged in mineral exploration efforts in 27 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 maritime freight portfolio to transport iron ore. Directly and through affiliates and joint ventures, we also have investments in energy and steel businesses.

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

	Year ended December 31,					
	2009		2010		2011	
	(US$ million)	(% of total)	(US$ million)	(% of total)	(US$ million)	(% of total)
Bulk materials:						
Iron ore	US$12,831	53.6%	US$26,384	56.8%	US$35,008	58.0%
Iron ore pellets	1,352	5.6	6,402	13.7	8,150	13.5
Manganese	145	0.6	258	0.6	171	0.3
Ferroalloys	372	1.6	664	1.4	561	0.9
Coal	505	2.1	770	1.6	1,058	1.7
Subtotal bulk materials	US$15,205	63.5%	US$34,478	74.2%	US$44,948	74.4%
Base metals:						
Nickel	US$ 3,260	13.6%	US$ 3,835	8.2%	US$ 5,720	9.5%
Copper	1,130	4.7	1,608	3.4	2,692	4.4
PGMs	132	0.6	101	0.2	492	0.8
Other precious metals	65	0.3	72	0.2	246	0.4
Cobalt	42	0.2	30	0.1	94	0.2
Aluminum	2,050	8.6	2,554	5.5	383	0.6
Subtotal base metals	US$ 6,679	28.0%	US$ 8,200	17.6%	US$ 9,627	15.9%
Fertilizer nutrients	413	1.7	1,846	4.0	3,547	5.9
Logistics	1,104	4.6	1,465	3.2	1,726	2.9
Other products and services(1)	538	2.2	492	1.1	541	0.9
Total gross operating revenues	US$23,939	100.0%	US$46,481	100.0%	US$60,389	100.0%

(1) Includes kaolin, pig iron and energy.

Bulk materials:

- *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, a maritime terminal and a port. The Southern System consists of three mining sites and two maritime terminals. We operate 10 pellet plants in Brazil and two in Oman, both of which have been ramping up since November 2011. We also have a 50% stake in a joint venture that owns three integrated pellet plants in Brazil and 25% stakes in two pellet companies in China.

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- *Manganese and ferroalloys*. We conduct our manganese mining operations through subsidiaries in Brazil, and we produce several types of manganese ferroalloys through subsidiaries in Brazil, France and Norway.

- *Coal*. We produce coal through Vale Moçambique, S.A. ("Vale Moçambique"), which operates assets in Mozambique, and Vale Australia Holdings Pty Ltd ("Vale Australia"), which operates coal assets in Australia through wholly owned subsidiaries and unincorporated joint ventures. Through our subsidiary Vale Coal Colombia Ltd. Sucursal Colombia ("Vale Colombia") we produce thermal coal in the Cesar department of Colombia. In Mozambique, we are ramping up the Moatize coal operation, which includes both metallurgical and thermal coal. We also have minority interests in Chinese coal and coke producers.

Base metals:

- *Nickel*. Our principal nickel mines and processing operations are conducted by our wholly owned subsidiary Vale Canada Limited ("Vale Canada"), which has mining operations in Canada and Indonesia. We are ramping up nickel operations at Onça Puma in Brazil and nickel operations in New Caledonia. We own and operate, or have interests in, nickel refining facilities in the United Kingdom, Japan, Taiwan, South Korea and China.

- *Copper*. In Brazil, we produce copper concentrates at Sossego in Carajás, in the state of Pará. 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 Chile, we produce copper cathodes at the Tres Valles operation, located in the Coquimbo region.

- *Aluminum*. We hold a 22.0% interest in Norsk Hydro ASA ("Hydro"), a major aluminum producer. In the past, we engaged in bauxite mining, alumina refining and aluminum smelting through subsidiaries in Brazil, our interests in which we transferred to Hydro in February 2011. We still own minority interests in two bauxite mining businesses, Mineração Rio do Norte S.A. ("MRN") and Mineração Paragominas S.A. ("Paragominas"). We will transfer our remaining interest in Paragominas to Hydro in two equal tranches in 2014 and 2016. Both MRN and Paragominas are located in Brazil.

- *Cobalt*. 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, currently in the ramp up phase.

- *PGMs*. We produce platinum-group metals 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.

- *Other precious metals*. We produce gold and silver as by-products of our nickel and copper 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.

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 the majority of our fertilizer assets in Brazil and is the largest Brazilian producer of phosphate rock, phosphate and nitrogen fertilizers. In addition, we are ramping up operations at Bayóvar, a phosphate rock mine in Peru.

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Logistics: We are a leading operator of logistics services in Brazil and other regions of the world, with railroads, maritime terminals and ports. Two of our four iron ore systems incorporate an integrated railroad network linked to automated port and terminal facilities, which provide rail transportation for our mining products, general cargo and passengers, bulk terminal storage, and ship loading services for our mining operations and for customers. We also own a majority stake in Sociedade de Desenvolvimento do Corredor de Nacala S.A. ("SDCN"), with railroad concessions in Malawi and Mozambique, and have plans to construct a world-class logistics infrastructure to support our operations in Central and Eastern Africa. In addition, since 2010 we have an agreement for partial assignment, subject to government approvals, of a 756-kilometer railroad concession to provide support to our Rio Colorado potash project in Argentina. We conduct seaborne dry bulk shipping and provide tug boat services. We own and charter vessels to transport iron ore that we sell on a cost and freight ("CFR") basis to customers. Our tug boat services provide an efficient and safe towing service at our terminals in Brazil. We also own a 31.3% interest in Log-In Logística Intermodal S.A. ("Log-In"), which provides intermodal logistics services in Brazil, Argentina and Uruguay, and a 45.8% interest in MRS Logística S.A. ("MRS"), which transports our iron ore products from the Southern System mines to our Guaíba Island and Itaguaí maritime terminals, in the state of Rio de Janeiro.

Business strategy

Our mission is to transform natural resources into prosperity and sustainable development. Our vision is to become the number one global natural resources company, creating long-term value through excellence and passion for people and the planet. We aim to increase our demand driver, mineral and geographical diversification and logistics capabilities. Iron ore and nickel will continue to be our main businesses while we boost the production capacity of our copper, coking coal and fertilizer nutrients businesses. To enhance our competitiveness, we will continue to invest in our railroads, maritime terminals, maritime freight portfolio and power generation capacity. We continue to seek opportunities to make strategic acquisitions and partnerships, while focusing on disciplined capital management in order to maximize return on invested capital and total return to shareholders. We also dispose of assets from time to time that we have determined to be non-strategic or in order to optimize the structure of our business portfolio, but no such divestitures occurred in 2011. Below are the highlights of our major business strategies.

Maintaining our leadership position in the global iron ore market

We continue to consolidate our leadership in the global iron ore market. In 2011 and 2010, we had an estimated market share of 24.3% and 24.7%, respectively, of the total volume traded in the seaborne market. We are committed to maintaining our leadership position in the global iron ore market, by focusing our product line to capture industry trends, increasing our production capacity in line with demand growth, 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 strong and long-standing relationships with major customers will help us achieve this goal. We have also encouraged steelmakers to develop steel projects in Brazil through joint ventures in which we may hold minority stakes, in order to create additional demand for our iron ore.

Achieving leadership in the nickel business

We are the world's second-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, advanced technology and a robust growth profile. We have refineries in North America, Europe and Asia, which produce an array of products for use in most nickel applications. We are a leading producer of high-quality nickel products for non-stainless steel applications, such as plating, alloy steels, high nickel alloys and batteries, which represented 66% of our nickel sales in 2011. Our long-term goal is to strengthen our leadership in the nickel business.

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Expanding our copper businesses

We operate the Sossego copper mine in Carajás, in the Brazilian state of Pará, and the Tres Valles copper mine in Chile. We also recover copper in conjunction with our nickel operations, principally at Sudbury and Voisey's Bay, in Canada. We believe that our copper projects, most of which are situated in Carajás, could be among the most competitive in the world in terms of investment cost per metric ton of ore. We are in the final phase of construction of the Salobo project to produce copper concentrate. We expect these copper mines to benefit from our infrastructure facilities serving the Northern System. We are developing the Konkola North copper mine in Zambia, Africa through a joint venture with African Rainbow Minerals Limited ("ARM"), which has an 80% stake in the project, with the remaining 20% stake held by Zambia Consolidated Copper Mines Ltd. We are also engaged in mineral exploration in several countries in order to increase our reserve base.

Investing in coal

We are pursuing various opportunities to become a large global player in the coal business. We have coal operating assets and a portfolio of exploration projects in Mozambique, Australia and Colombia, and minority interests in two joint ventures in China. We intend to continue pursuing organic growth in the coal business through the expansion of the Moatize project in Mozambique, the development of more advanced coal exploration projects in Australia and Colombia, and mineral exploration initiatives in several countries.

Investing in fertilizer nutrients

We are actively investing to become one of the world's largest producers of potash and phosphate rock in order to benefit from rising global consumption of agricultural products, which is expected to grow significantly in coming years, especially in emerging market countries. We expect per capita income growth and the growing use of biofuels to drive demand for fertilizers. In this context, Brazil is expected to play a key role in the global agricultural market, given its position as a global agricultural powerhouse and its growth potential, mainly due to its access to water and arable land.

We operate a potash mine in Brazil (Taquari-Vassouras) and the Bayóvar phosphate rock operation in Peru, and, in 2010, we expanded our fertilizer nutrients operations through the acquisition of Brazilian phosphate and nitrogen operations, now consolidated under our wholly owned subsidiary Vale Fertilizantes. Our portfolio also includes potash projects in Argentina, Brazil and Canada, as well as several phosphate rock and potash mineral exploration projects around the world as part of our growth strategy. For more information, see *Significant changes in our business* below.

Diversification and expansion of our resource base

We are actively engaged in a mineral exploration program, with efforts in 27 countries around the globe. We are mainly seeking new deposits of coal, copper, iron ore, manganese ore, nickel, phosphates and potash. Mineral exploration is an important part of our organic growth strategy.

Enhancing our logistics capacity to support our bulk materials business

We believe that the quality of our railway assets and extensive experience as a railroad and port operator, together with the lack of efficient transportation for general cargo in Brazil, position us as a leader in the logistics business in Brazil. We have been expanding the capacity of our railroads, primarily to meet the needs of our iron ore business.

To support our commercial strategy for our iron ore business, we continue to invest in a dedicated maritime freight shuttle service from Brazil to Asia and in the development of distribution centers in Asia and the Middle East, in order to minimize freight costs and maximize flexibility, so as to enhance the competitiveness of our iron ore business in these regions.

In order to position ourselves for future expansion of our coal production in Mozambique and leverage our presence in Africa, we acquired an additional 16% of SDCN, bringing our total stake in SDCN

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to 67% at year-end, and we plan to expand its capacity, by rehabilitating the existing railroad. New railroads will be constructed to develop the logistics corridor from our mine to a new port to be built at Nacala-à-Velha.

Optimizing our energy matrix

Energy management and efficient supply have become a priority for us. As a large consumer of electricity, we believe that investing in power generation projects to support our operations will help protect us against volatility in the price of energy, regulatory uncertainties and the risk of energy shortages. Accordingly, we have developed hydroelectric power generation plants in Brazil, Canada and Indonesia, and we currently generate 48% of our worldwide electricity needs from our own plants, after accounting for the transfer of our aluminum production portfolio.

We are seeking to develop a cleaner energy matrix by investing to develop clean energy sources such as biofuels and windpower, and focusing on reducing our carbon footprint.

Significant changes in our business

We summarize below major acquisitions, divestitures and other significant developments since the beginning of 2011.

Index-based pricing for iron ore

Starting in the first half of 2010, we reached agreements with all our iron ore customers to move contracts from annual benchmark pricing to index-based pricing to better reflect market fundamentals. The previous annual benchmark pricing system for iron ore, based on annual bilateral negotiations, was initially replaced by a system under which iron ore prices were established quarterly, based on a three-month average of price indices for the period ending one month before the beginning of the new quarter. Since the last quarter of 2011, we have also reached agreements with some customers to price our products on a quarterly basis using the current quarter's three-month average of price indices and, with other customers, using the monthly average of the price indices or spot prices. The move towards increased price flexibility brings more efficiency and transparency to iron ore pricing and allows for the recognition of quality differences, which helps encourage long-term investment. In addition, many customers value the ability to know beforehand the price to be paid in each quarter.

Consolidation of phosphate operations in Brazil

On December 12, 2011, our wholly owned subsidiary Mineração Naque S.A. concluded a tender offer to acquire up to 100% of the publicly held shares of our subsidiary Vale Fertilizantes. As a result of the public offer, we acquired 211,014 common shares and 82,919,456 preferred shares of Vale Fertilizantes, representing 83.8% of the publicly held common shares and 94.0% of the publicly held preferred shares of Vale Fertilizantes, which correspond to 0.1% of the total common shares and 29.8% of the total preferred shares of Vale Fertilizantes. Both the common and preferred shares were acquired for R$25.00 per share, amounting to a total of R$2.1 billion (US$1.1 billion). Shortly thereafter, Vale Fertilizantes' registration as a publicly listed company in Brazil was cancelled. In January 2012, the shareholders of Vale Fertilizantes approved the redemption of the remaining free floating common and preferred shares. As a result, Vale holds 100% of the common shares and 100% of the preferred shares of Vale Fertilizantes.

Acquisition of Biopalma in Brazil

In February 2011, we invested US$173.5 million to acquire control of Biopalma, in the Brazilian state of Pará. Biopalma will produce palm oil, a raw material used to make biodiesel, and most of the production will be used for a B20 mix (a blend of 20% biodiesel and 80% regular diesel) to power our fleet of locomotives, heavy-duty machinery and equipment. Our investment in producing biodiesel is part of our strategic emphasis on global sustainability and greenhouse gas emissions reduction.

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Acquisition of stake in Belo Monte energy project

In June 2011, we acquired 9% of Norte Energia S.A. ("NESA"). NESA was established to develop and operate the Belo Monte hydroelectric plant in the Brazilian state of Pará. Vale reimbursed the seller for capital invested in NESA and will assume future capital investment commitments related to the acquired stake, which are estimated at US$1.6 billion. The acquisition is consistent with our strategy of reducing operational costs and minimizing energy price and supply risks.

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 and projects*. The most significant projects that have come on stream since the beginning of 2011 are summarized below:

Onça Puma In March of 2011, we started the ramp-up of Onça Puma, a ferro-nickel operation (mine and processing plant) in the Brazilian state of Pará, built mostly on lateritic nickel deposits of saprolitic ore. Its nominal production capacity is 53,000 metric tons per year of nickel contained in ferro-nickel, its final product.

Oman We started up production of direct reduction pellets in the industrial site of Sohar, Oman, with estimated aggregate capacity of 9.0 Mtpy. Each plant has capacity to produce 4.5 Mtpy. The first plant is producing at full capacity rates and the second plant has been ramping up since November 2011. The bulk terminal and a distribution center with the capacity to handle 40 Mt annually are fully operational.

Estreito In 2011, four of the eight turbines of the Estreito hydroelectric power plant became operational. Estreito is our first hydroelectric power plant in the Northern region and is located in the Tocantins River, on the border of the Brazilian states of Maranhão and Tocantins. The plant will have an installed capacity of 1,087 megawatts. We have a 30% stake in the consortium that operates the plant.

Moatize The first phase of the Moatize coal project began operations in August 2011. Total capacity is 11 Mtpy, 8.5 Mt of coking coal, chiefly premium hard coking coal, and 2.5 Mt of thermal coal. In November 2011, the Board of Directors approved Moatize II, which will increase coal production capacity in Mozambique to 22 Mtpy, as well as the implementation of the Nacala Corridor project, a world-class logistics railway and port infrastructure to support the expansion of production capacity at Moatize.

Karebbe The Karebbe hydroelectric power plant in Sulawesi, Indonesia came on stream in September 2011 and is projected to add 90 megawatts of average generating capacity. The plant supplies power to our Indonesian operations, which reduces our production costs and enables the potential expansion of nickel matte production.

Aluminum portfolio management

In February 2011, we transferred a substantial part of our aluminum businesses to Hydro, an integrated aluminum company with operations in Norway and other countries that is listed on the Oslo Stock Exchange and the London Stock Exchange (ticker symbol: NHY). We transferred our interests in Alumínio Brasileiro S.A. ("Albras"), Alumina do Norte do Brasil S.A. ("Alunorte") and Companhia de Alumina do Pará ("CAP"), with net debt of US$655 million, along with off-take rights and outstanding commercial contracts, for US$503 million in cash and shares in Hydro representing a 22% interest in its equity. As part of the transaction, we transferred the Paragominas bauxite mine and all of our other Brazilian bauxite mineral rights (apart from rights owned through our stake in MRN) to the newly incorporated company Paragominas, 60% of which we transferred to Hydro in exchange for US$578 million in cash. We will transfer our interest in Paragominas in two equal tranches in 2014 and 2016, each in exchange for US$200 million in cash, subject to certain contingent adjustments. In addition, under the agreement, we have appointed one director to Hydro's board.

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LINES OF BUSINESS

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

1. Bulk materials

1.1 Iron ore
- 1.1.1 Operations
- 1.1.2 Production

1.2 Iron ore pellets
- 1.2.1 Operations
- 1.2.2 Production

1.3 Iron ore and iron ore pellets
- 1.3.1 Customers, sales and marketing
- 1.3.2 Competition

1.4 Manganese ore

1.5 Ferroalloys

1.6 Manganese ore and ferroalloys: sales and competition

1.7 Coal
- 1.7.1 Operations
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2. Base metals

2.1 Nickel
- 2.1.1 Operations
- 2.1.2 Production
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2.2 Copper
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- 2.2.3 Customers and sales
- 2.2.4 Competition

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4.1 Logistics
- 4.1.1 Railroads
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- 4.1.3 Shipping

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5. Other investments

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1. Bulk materials

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

1.1 Iron ore

1.1.1 Operations

We conduct our iron ore business in Brazil primarily at the parent-company level and through our wholly owned subsidiary Mineração Corumbaense Reunidas S.A. ("MCR"). Our mines, all of which are open-pit, and their related operations are mainly concentrated in three systems: the Southeastern System, the Southern System and the Northern System, each with its own transportation capabilities. We also conduct mining operations in the Midwestern System and through our joint venture Samarco Mineração S.A. ("Samarco").

Company	System	Our share of capital		Partners
		Voting	Total	
		(%)		
Vale	Northern, Southeastern, Southern and Midwestern			
MCR	Midwestern	100.0	100.0	
Samarco		50.0	50.0	BHP Billiton plc

Southeastern System

The Southeastern System mines are located in the Iron Quadrangle region of the state of Minas Gerais, where they are divided into three mining sites: Itabira (comprised of two mines, with two major beneficiation plants), Minas Centrais (comprised of three mines, with three major beneficiation plants and one secondary plant) and Mariana (comprised of three mines, with four major beneficiation plants).

The ore reserves in these mining sites have high ratios of itabirite ore relative to hematite ore. Itabirite ore has iron grade of 35-60% and requires concentration to achieve shipping grade.

We conduct open-pit mining operations in the Southeastern System. At the three mining sites, 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. In 2011, we produced 64% of the electric energy consumed in the Southeastern System at our hydroelectric power plants.

We own and operate integrated railroad and terminal networks in the three mining sites, which are accessible by road or by spur tracks of our EFVM railroad. The EFVM railroad connects these mines to the Tubarão port in Vitória, in the state of Espírito Santo. For a more detailed description of the networks, see *Logistics*.

Southern System

The Southern System mines are located in the Iron Quadrangle region of the state of Minas Gerais in Brazil. The mines of our subsidiary Minerações Brasileiras Reunidas S.A. ("MBR") are operated at the parent-company level pursuant to an asset lease agreement. The Southern System has three major mining sites: Minas Itabirito (comprised of four mines, with two major beneficiation plants and three secondary beneficiation plants); Vargem Grande (comprised of three mines and one major beneficiation plant); and Paraopeba (comprised of four mines and four beneficiation plants).

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We beneficiate run-of-mine obtained from open pit mining operations into sinter feed, lump ore and pellet feed. In 2011, we produced 94% of the electric energy consumed in the Southern System at our hydroelectric power plants.

The ore reserves in the mining sites have high ratios of itabirite ore relative to hematite ore. Itabirite ore has iron grade of 35-60% and requires concentration to achieve shipping grade. 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.

We enter into freight contracts with MRS, an affiliate railway company in which we own a 45.8% stake, to transport our iron ore products at market prices from the mines to our Guaíba Island and Itaguaí maritime terminals in the state of Rio de Janeiro.

Northern System

The Northern System mines, located in the Carajás mineral province of the Brazilian state of Pará, contain some of the largest iron ore deposits in the world. The reserves are divided into Serra Norte, Serra Sul and Serra Leste (northern, southern and eastern ranges) situated 35 kilometers apart. Since 1985, we have been conducting mining activities in the northern range, which is divided into three main mining bodies (N4W, N4E and N5). The Northern System has open-pit mines and an ore-processing plant. The mines are located on public lands for which we hold mining concessions.

The ore reserves in the Northern System are comprised of hematite. Because of the high grade (66.7% on average) of the Northern System deposits, we do not need to operate a concentration plant at Carajás. The beneficiation process consists simply of sizing operations, including screening, hydrocycloning, crushing and filtration. Output from the beneficiation process consists of sinter feed and pellet feed. We obtain all of the electrical power for the Northern System at market prices from regional utilities.

We operate an integrated railroad and maritime terminal network in the Northern System. After completion of the beneficiation process, our EFC railroad transports the iron ore to the Ponta da Madeira maritime terminal in the state of Maranhão. To support our Carajás operations, we have housing and other facilities in a nearby township. These operations are accessible by road, air and rail.

Midwestern System

The Midwestern System is comprised of the mines of Urucum and Corumbá, located in the state of Mato Grosso do Sul.

We conduct open-pit mining operations in the Midwestern System. The Urucum ore reserves contain a high ratio of hematite ore. In September 2009, we concluded the acquisition of the Corumbá mine, where we produce lump ores. At the Urucum and Corumbá mines, we generally process the run-of-mine by means of standard crushing and classification steps, producing lumps and fines.

Iron ore products from the Urucum and Corumbá mines are delivered to customers by barges traveling along the Paraguay and Paraná rivers.

Samarco

We own 50.0% of Samarco, which operates an integrated system comprised of a mine site, pipeline, three pellet plants and a port. Samarco's Alegria mine site, located in Mariana, Minas Gerais, is in the same region as our Mariana site in the Southeastern System.

The ore reserves of Samarco are typically of itabirite type. Two 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.

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Iron ore from Alegria and Fazendão, in our Southeastern System, supplies the Samarco pellet plants using a 396-kilometer pipeline, the longest pipeline in the world for the conveyance of iron ore. Samarco has its own port facilities to transport its production.

1.1.2 Production

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

Mine/Plant	Type	Production for the year ended December 31, 2009	2010	2011	Recovery rate
		(million metric tons)			(%)
Southeastern System					
Itabira					
Cauê(1)	Open pit	13.8	19.3	18.6	63.7
Conceição(1)	Open pit	17.3	19.4	21.4	74.2
Minas Centrais					
Água Limpa(2)	Open pit	1.4	5.0	5.0	52.2
Gongo Soco	Open pit	2.7	6.8	5.3	100
Brucutu	Open pit	23.6	29.7	30.9	73.1
Andrade(3)	Open pit	0.7			
Mariana					
Alegria	Open pit	12.1	13.6	14.7	80.9
Fábrica Nova(4)	Open pit	13.7	12.5	13.2	72.4
Fazendão(5)	Open pit	3.1	10.6	11.1	100
Total Southeastern System		88.5	116.9	120.2	
Southern System					
Minas Itabirito					
Segredo/João Pereira(6)	Open pit	8.4	12.4	11.8	72.2
Sapecado/Galinheiro(7)	Open pit	9.8	17.7	18.6	64.7
Vargem Grande					
Tamanduá(8)	Open pit	7.3	8.6	8.8	79.7
Capitão do Mato(8)	Open pit	8.0	8.2	7.3	79.7
Abóboras	Open pit	5.4	5.2	5.3	100
Paraopeba					
Jangada	Open pit		3.5	5.1	100
Córrego do Feijão	Open pit	5.6	6.8	6.8	77.9
Capão Xavier(9)	Open pit	10.9	9.3	8.4	78
Mar Azul	Open pit		3.0	4.1	100
Total Southern System		55.2	74.7	76.3	
Midwestern System					
Corumbá	Open pit	0.4	2.8	4.1	50.0
Urucum	Open pit	0.5	1.4	1.5	76.0
Total Midwestern System		1.0	4.2	5.6	
Northern System					
Serra Norte(10)					
N4W	Open pit	30.9	33.4	38.9	92.4
N4E	Open pit	16.9	22.2	20.1	92.4
N5	Open pit	36.8	45.6	50.8	92.4
Total Northern System		84.6	101.2	109.8	
Vale		229.3	297.0	311.8	
Samarco(11)		8.6	10.8	10.8	57.6
Total		238.0	307.8	322.6	

(1) The run-of-mine from the Minas do Meio and Conceição mines is sent to the Cauê and Conceição concentration plants.

(2) Água Limpa mine (previously named Água Limpa/Cururu mine) and plants 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.

(3) The lease for the Andrade mine was terminated in 2009.

(4) Fábrica Nova ore is sent to the Alegria and Fábrica Nova plants.

(5) Fazendão ore is sent to Samarco's beneficiation plant.

(6) Segredo and João Pereira ore is processed at the Fábrica plant.

(7) Galinheiro and Sapecado ore is processed at the Pico plant.

(8) Tamanduá and Capitão do Mato ores are processed at the Vargem Grande plant.

(9) Capão Xavier ore is processed at the Mutuca plant.

(10) All Serra Norte ores are processed at the Carajás plant.

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

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1.2 Iron ore pellets

1.2.1 Operations

Directly and through joint ventures, we produce iron ore pellets in Brazil, Oman and China, as set forth in the following table. Our total estimated nominal capacity is 43.7 Mtpy, not including the nominal capacity of our joint ventures of 22.2 Mtpy from Samarco, 4.5 Mtpy from Hispanobras, 1.2 Mtpy from Zhuhai YPM and 1.2 Mtpy from Anyang Yu Vale Yongtong Pellet Co., Ltd. ("Anyang"). After ramping up our pellet plants in Oman, we will add 9.0 Mtpy of nominal capacity.

		Our share of capital		
Company	**Site of operation**	**Voting (%)**	**Total**	**Partners**
	Brazil:			
Vale	Tubarão, Fábrica, Vargem Grande and São Luís			
Hispanobras	Tubarão	51.0	50.9	Arcelor Mittal
Samarco	Mariana and Anchieta	50.0	50.0	BHP Billiton plc
	Oman:			
Vale Oman Pelletizing Company LLC (VOPC)(1)	Sohar industrial complex	100.0	100.0	
	China:			
Zhuhai YPM	Zhuhai, Guangdong	25.0	25.0	Zhuhai Yueyufeng Iron and Steel Co. Ltd., Pioneer Iron and Steel Group Coo, Ltd.(2)
Anyang	Anyang, Henan	25.0	25.0	Anyang Iron & Steel Co. Ltd.

(1) VOPC is currently 100% owned by Vale entities, but 30% of the shareholding of VOPC will be transferred to Oman Oil Company S.A.O.C. ("OOC") during 2012 pursuant to a Shareholders' Agreement dated 29 May 2010 between Vale International and OOC.

(2) Based on the most recent publicly filed business license of Zhuhai YPM.

In the Tubarão port area, in the Brazilian state of Espírito Santo, we operate our wholly owned pellet plants, Tubarão I and II, four plants we lease under operating leases and our jointly-owned plant, Hispanobras. We send iron ore from our Southeastern System mines to these plants and use our logistics infrastructure to distribute their final products.

Our São Luís pellet plant, located in the Brazilian state of Maranhão, is part of the Northern System. We send Carajás iron ore to this plant and ship its production to customers through our Ponta da Madeira maritime terminal.

The Fábrica and Vargem Grande pellet plants, located in the Brazilian state of Minas Gerais, are part of the Southern System. We send some of the iron ore from the Fábrica mine to the Fábrica plant, and iron ore from the Pico mine to the Vargem Grande plant. We transport pellets from the Vargem Grande plant using MRS, and pellets from the Fábrica plant using both MRS and EFVM.

We started up a pelletizing operation in the Sohar industrial complex in Oman, in the Middle East. The two pellet plants will each have production capacity of 4.5 Mtpy, totaling 9 Mtpy of capacity for direct reduction pellets. The first plant is producing at full capacity rates and the second plant has been ramping up since November 2011. The pellet plants are located in an area where we will have a distribution center with capacity to handle 40 Mtpy.

Samarco operates three pellet plants in two operating sites with nominal capacity of 22.3 Mtpy. The pellet plants are located in the Ponta Ubu unit, in Anchieta, Espírito Santo. In April 2011, our Board of Directors approved the construction of a fourth pellet plant with capacity of 8.3 Mtpy, increasing Samarco's iron ore pellet capacity to 30.5 Mtpy.

The Zhuhai YPM pellet plant, in China, is part of the Yueyufeng Steelmaking Complex. It has port facilities, which we use to receive feed from our mines in Brazil. Zhuhai YPM's main customer is Zhuhai Yueyufeng Iron & Steel ("YYF"), which is also located in the Yueyufeng Steelmaking Complex. We also own a 25.0% interest in Anyang, which is a pelletizing operation in China with the capacity to produce 1.2 Mtpy that started production in March 2011.

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We sell pellet feed to our pelletizing joint ventures at market prices. Historically, we have supplied all of the iron ore requirements of our wholly owned production pellet plants and joint ventures, except for Samarco, Zhuhai YPM and Anyang, to which we supply only part of their requirements. Of our total 2011 pellet production, 71.2% was blast furnace pellets and 28.8% was direct reduction pellets, which are used in steel mills that employ the direct reduction process rather than blast furnace technology.

We sell iron ore to our pelletizing joint ventures. In 2011, we sold 4.5 million metric tons to Hispanobras, 12.0 million metric tons to Samarco and 1.2 million metric tons to Zhuhai YPM.

1.2.2 Production

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

	Production for the year ended December 31,		
Company	**2009**	**2010**	**2011**
		(million metric tons)	
Vale(1)	15.3	36.3	39.0
Hispanobras(2)	0.6	1.9	2.1
Samarco(2)	8.0	10.8	10.7
Zhuhai YPM(2)	0.3	0.3	0.3
Anyang(2)			0.2
Total	24.2	49.3	52.3

(1) Figure includes actual production, including production from the four pellet plants we leased 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. We signed a 30-year operating lease contract for Nibrasco's two pellet plants in May 2008.

(2) Production figures for Hispanobras, Samarco, Zhuhai YPM and Anyang have been adjusted to reflect our ownership interest.

1.3 Iron ore and iron ore pellets

1.3.1 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 Demand and prices.*

In 2011, China accounted for 44.1% of our iron ore and iron ore pellet shipments, and Asia as a whole accounted for 62.4%. Europe accounted for 18.9%, followed by Brazil with 13.4%. Our 10 largest customers collectively purchased 131.7 million metric tons of iron ore and iron ore pellets from us, representing 44.0% of our 2011 iron ore and iron ore pellet shipments and 46.0% of our total iron ore and iron ore pellet revenues. In 2011, no individual customer accounted for more than 10.0% of our iron ore and iron ore pellet shipments.

In 2011, the Asian market (mainly Japan, South Korea and Taiwan) and the European market were the primary markets for our blast furnace pellets, while North America, the Middle East 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

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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 our wholly owned subsidiary Vale International, located in St. Prex, Switzerland. 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.

1.3.2 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") and Rio Tinto Ltd ("Rio Tinto"). Although the transportation costs of delivering iron ore from Australia to Asian customers are generally lower than ours as a result of Australia's geographical proximity, 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 very strong, our quality differential is in many cases more valuable to customers than a freight differential. Second, steel companies often develop sales relationships based on a reliable supply of a specific mix of iron ore and iron ore pellets. We have a customer-oriented marketing policy and place specialized personnel in direct contact with our customers to help determine the blend that best suits each particular customer.

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 and to increase our market share. To support this strategy, we ordered new ships, purchased used vessels and entered into medium- and long-term freight contracts.

Our principal competitors in Europe 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 not only for the same reasons we are competitive 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, MMX, Ferrous Resources and Bahia Mineração. Some steel companies, including Gerdau S.A. ("Gerdau"), Companhia Siderúrgica Nacional ("CSN"), V&M do Brasil S.A. ("Mannesmann"), 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.

The demand for iron ore is seasonally stronger in the months of December, March and April. Demand also tends to be moderately weaker in the first half of each year relative to the second half.

With respect to pellets, our major competitors are LKAB, Cliffs Natural Resources Inc., Arcelor Mittal Mines Canada (formerly Quebec Cartier Mining Co.), IOC and Gulf Industrial Investment Co.

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1.4 Manganese ore

We conduct our manganese mining operations in Brazil through our wholly owned subsidiaries Vale Manganês S.A. ("Vale Manganês"), Vale Mina do Azul S.A. ("Vale Mina do Azul") and MCR.

Company	Location	Our share of capital	
		Voting	Total
		(%)	
	Brazil:		
Vale Manganês	Minas Gerais	100.0	100.0
MCR	Mato Grosso do Sul	100.0	100.0
Vale Mina do Azul(1)	Pará	100.0	100.0

(1) In August 2011, we organized Vale Mina do Azul, an entity 100% owned by Vale, to operate our manganese mine in the Brazilian state of Pará. Before that, Mina do Azul mine was operated by Vale Manganês.

Our mines produce three types of manganese ore products:

- metallurgical ore, used primarily for the production of ferroalloys;
- natural manganese dioxide, suitable for the manufacture of electrolytic batteries; and
- chemical ore, used in several industries for the production of fertilizer, pesticides and animal feed, and used as a pigment in the ceramics industry.

We operate on-site beneficiation plants at our Azul mine and at the Urucum mines, which are accessible by road. The Azul and Urucum mines have high-grade ores (at least 40% manganese grade), while our Morro da Mina mine has low-grade ores (24% manganese grade). All of these mines obtain electrical power at market prices from regional electric utilities. The following table sets forth information about our manganese production.

Mine	Type	Production for the year ended December 31,			Recovery rate
		2009	2010	2011	
		(million metric tons)			(%)
Azul	Open pit	1.4	1.6	2.1	66.6
Morro da Mina	Open pit	0.1	0.1	0.1	88.0
Urucum	Underground	0.2	0.2	0.3	80.4
Total		1.7	1.8	2.5	

1.5 Ferroalloys

The following table sets forth the subsidiaries through which we conduct our ferroalloys business.

Company	Location	Our share of capital	
		Voting	Total
		(%)	
Vale Manganês	Minas Gerais and Bahia, Brazil	100.0	100.0
Vale Manganèse France SAS	Dunkerque, France	100.0	100.0
Vale Manganese Norway AS	Mo I Rana, Norway	100.0	100.0

We produce several types of manganese ferroalloys, such as high carbon and medium carbon ferro-manganese and ferro-silicon manganese. Our facilities have total nominal capacity of 651,000 metric tons per year. The production of ferroalloys consumes significant amounts of electricity, representing 11.7% of our total consumption in 2011. The electricity supply for our ferroalloy plant in the Brazilian states of Minas

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Gerais and Bahia and Mo I Rana, Norway are provided through long-term contracts. For information on the risks associated with potential energy shortages, see *Risk factors*.

The following table sets forth information about our ferroalloys production.

Company	Production for the year ended December 31, 2009	2010	2011
		(thousand metric tons)	
Vale Manganês(1)	99	207	204
Vale Manganèse France SAS(2)	45	138	131
Vale Manganese Norway AS	79	106	101
Total	223	451	436

(1) Vale Manganês has three plants in Brazil: Barbacena and Ouro Preto in the state of Minas Gerais and Simões Filho in the state of Bahia.

(2) Vale Manganèse France SAS shut down its only furnace in August 2008 due to technical problems, resuming production in September 2009.

1.6 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 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 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 both with 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 Demand and prices.*

1.7 Coal

1.7.1 Operations

We produce metallurgical and thermal coal through our subsidiaries Vale Moçambique, which operates Moatize, and Vale Australia, which operates coal assets in Australia through wholly owned companies and unincorporated joint ventures, and thermal coal through our subsidiary Vale Colombia.

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We also have a minority interest in two Chinese companies, Henan Longyu Energy Resources Co., Ltd. ("Longyu") and Shandong Yankuang International Coking Company Ltd. ("Yankuang"), as set forth in the following table.

Company	Business	Location	Our share of capital (%)	Partners
Vale Australia		*Australia:*		
Integra Coal	Metallurgical and thermal coal	Hunter Valley, New South Wales	61.2	Nippon Steel ("NSC"), JFE Group ("JFE"), Posco, Toyota Tsusho Austrália, Chubu Electric Power Co. Ltd
Carborough Downs	Metallurgical coal	Bowen Basin, Queensland	85.0	JFE, Posco, Tata Steel
Isaac Plains	Metallurgical and thermal coal	Bowen Basin, Queensland	50.0	IP Coal Pty Ltd (a 100% owned subsidiary of Aquila Resources Limited)(1)
Broadlea	Metallurgical and thermal coal	Bowen Basin, Queensland	100.0	
Vale Colombia				
El Hatillo	Thermal coal	Colombia	100.0	
Longyu	Coal and other related products	Henan Province, China	25.0	Yongmei Group Co., Ltd. (former Yongcheng Coal & Electricity (Group) Co. Ltd.), Shanghai Baosteel International Economic & Trading Co., Ltd. and other minority shareholders
Yankuang	Metallurgical coke and methanol	Shandong Province, China	25.0	Yankuang Group Co. Limited, Itochu Corporation
Vale Moçambique				
Moatize	Metallurgical and thermal coal	Tete, Mozambique	95.0	Empresa Moçambicana de Exploração Mineira, S.A. ("EMEM")

(1) Aquila Resources Limited has announced the sale, through IP Coal Pty Ltd, to Sumitomo Corporation of its joint venture interest in Isaac Plains, which is subject to our preferential rights to purchase within 60 days of receiving a notice of offer from IP Coal Pty Ltd.

Integra Coal Operations (underground and open-cut). The Integra Coal Operations are located 10 kilometers northwest of Singleton in the Hunter Valley of New South Wales, Australia. 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 coal handling and processing plant ("CHPP") with a capacity of 1,200 metric tons per hour, loaded onto trains at a purpose-built rail loadout facility for transport to the port of Newcastle, New South Wales, Australia.

Carborough Downs. Carborough Downs is located in the Central Bowen Basin in central Queensland, Australia, 15 kilometers east of the township of Moranbah and 180 kilometers southwest of the coastal city of Mackay. Carborough Downs mining leases overlie the Rangal Coal Measures of the Bowen Basin with the economic seams of Leichardt and Vermont. Both seams have coking properties and can be beneficiated to produce coking coal and pulverized coal injection ("PCI") products. 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, and which operates seven days per week. The product is loaded onto trains at a rail loadout facility and transported 172 kilometers to the Dalrymple Bay Coal Terminal, Queensland, Australia.

Isaac Plains. The Isaac Plains open-cut mine 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. The coal is classified as a medium volatile bituminous coal with low sulfur content. Coal is processed at the Isaac Plains CHPP and railed 180 kilometers to the Dalrymple Bay Coal Terminal.

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El Hatillo. The El Hatillo coal mine in Colombia is located in the central portion of the Cesar Department, 210 kilometers southeast of Santa Marta. The concession area is adjacent to the town of La Loma and encompasses an area of 9,693 hectares. El Hatillo is mined with truck-and-shovel methodology and uses crushing and screening to produce a thermal coal product that is loaded onto trains at a dedicated rail loading facility for transport to the port of SPRC. Most of the thermal coal product is exported to Europe and United States.

Moatize. Moatize is an open-cut mine located in the province of Tete, Mozambique. It started operations in August 2011 and is expected to reach full capacity in 2015 with a nominal production capacity of 11 Mtpy, comprising 8.5 Mtpy of metallurgical coal and 2.5 Mtpy of thermal coal. The coal production is being transported by the Linha do Sena railway to the Port of Beira. Currently, Moatize's main branded product is the Chipanga prime hard coking coal while a regular hard coking coal product is still being studied.

1.7.2 Production

The following table sets forth information on our coal production.

Operation	Mine type	Production for the year ended December 31, 2009	2010	2011
		(thousand metric tons)		
Thermal coal:				
Vale Colombia				
El Hatillo(1)	Open-cut	1,143	2,991	3,565
Vale Australia				
Integra Coal(2)	Open-cut	702	305	325
Isaac Plains(3)	Open-cut	551	371	274
Broadlea(4)	Open-cut	497	165	0
Vale Moçambique				
Moatize(5)	Open-cut			342
Total thermal coal		2,892	3,832	4,506
Metallurgical coal:				
Vale Australia				
Integra Coal(3)	Underground and open-cut	1,184	1,151	467
Isaac Plains(3)	Open-cut	487	590	635
Carborough Downs(6)	Underground	604	1,216	1,390
Broadlea	Open-cut	252	101	0
Vale Moçambique				
Moatize(5)	Open-cut			275
Total metallurgical coal		2,527	3,057	2,766

(1) We acquired El Hatillo in the first quarter of 2009. Figures for 2009 include production from April to December only.

(2) These figures correspond to our 61.2% equity interest in Integra Coal, an unincorporated joint venture.

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

(4) Broadlea Coal is in care and maintenance since December 2009. The washing of the ROM stockpiles was finalized in June 2010.

(5) Moatize started production in August 2011.

(6) These figures correspond to our 85.0% equity interest in Carborough Downs, an unincorporated joint venture.

Longyu produces coal and other related products. Yankuang, a metallurgical coke plant, has production capacity of 2.0 Mtpy of coke and 200,000 metric tons per year of methanol.

1.7.3 Customers and sales

The coal sales from our Australian operations are primarily focused on East Asia. In 2011, our Chinese coal joint ventures directed their sales mainly to the Chinese domestic market. The coal sales from our Colombian operations are primarily destined for Europe and Central and South America. The coal sales from our Mozambican operations will be directed to the main seaborne coal markets, including East Asia, the Americas, Europe and India.

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1.7.4 Competition

The global coal industry, which is primarily comprised of the markets for hard coal (metallurgical coal and thermal coal) and brown coal/lignite, is highly competitive. Growth in the demand for steel, especially in Asia, underpins strong demand for metallurgical coal. Major port and rail constraints in some of the countries in which major suppliers are located could lead to limited availability of incremental metallurgical coal production.

The global seaborne thermal coal market has significantly expanded in recent years. Growth in thermal coal demand is closely related to growth in electricity consumption, which will continue to be driven by global economic growth, particularly from emerging economies. Large existing fleets of coal-fired power plants with long life cycles take decades to replace or upgrade, keeping a high share of thermal coal in the electricity matrix of countries with high consumption. The cost of fuel is typically the largest variable cost involved in electricity generation and coal is currently the most competitively priced fossil fuel for this purpose.

Competition in the coal industry is based primarily on the economics of production costs, coal quality and transportation costs. We believe that our operations and project pipeline are competitive, and our key competitive strengths include the strategic geographic location of our current and future supply bases and our production cash costs relative to several other coal producers.

Major participants in the coal seaborne market are subsidiaries and affiliates of Xstrata plc ("Xstrata"), BHP Billiton, PT Bumi Resources Tbk., Anglo Coal, Drummond Company, Inc., Rio Tinto, Teck Cominco, Peabody and the Shenhua Group, among others.

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 and the other in the Asia Pacific. In March

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2011, we began production of nickel at the Onça Puma project in the Brazilian state of Pará. Our nickel operations are set forth in the following table.

System	Company	Location	Operations	Our share of capital (%)	Partners
North Atlantic	Vale Canada	Canada Sudbury, Ontario	Fully integrated mines, mill, smelter and refinery (producer of intermediates and finished nickel and by-products)	100.0	
	Vale Canada	Canada Thompson, Manitoba	Fully integrated mines, mill, smelter and refinery (producer of finished nickel and by-products)	100.0	
	Vale Newfoundland & Labrador Limited	Canada Voisey's Bay, Newfoundland and Labrador	Mine and mill (producer of nickel and copper concentrates)	100.0	
	Vale Europe Limited	U.K. Clydach, Wales	Stand-alone nickel refinery (producer of finished nickel)	100.0	
Asia Pacific	PT Vale Indonesia Tbk (previously PT International Nickel Indonesia Tbk)	Indonesia Sorowako, Sulawesi	Mining and processing operations (producer of nickel matte, an intermediate product)	59.2	Sumitomo Metal Mining Co., Ltd, others
	Vale Nouvelle-Calédonie S.A.S	New Caledonia Southern Province	Mining and processing operations (producer of nickel oxide and cobalt carbonate)	74.0	Sumic Nickel Netherlands B.V., Société de Participation Minière du Sud Caledonien SAS
	Vale Japan Limited	Japan Matsuzaka	Stand-alone nickel refinery (producer of intermediate and finished nickel)	87.2	Sumitomo Metal Mining Co., Ltd
	Taiwan Nickel Refining Corporation	Taiwan Kaoshiung	Stand-alone nickel refinery (producer of finished nickel)	93.7	Approx. 25 investors
	Vale Nickel (Dalian) Co. Ltd	China Dalian, Liaoning	Stand-alone nickel refinery (producer of finished nickel)	98.3	Ningbo Sunhu Chem. Products Co., Ltd.
	Korea Nickel Corporation	South Korea Onsan	Stand-alone nickel refinery (producer of finished nickel)	25.0	Korea Zinc Co., Ltd, Posteel Co., Ltd, Young Poong Co., Ltd., others
South Atlantic	Vale	Brazil Ourilândia do Norte, Pará	Mining and processing operations (producer of ferro-nickel)	100.0	

North Atlantic

Sudbury operations

Our long-established mines in Sudbury, Ontario, are primarily underground operations with nickel sulfide ore bodies. These ore bodies also contain co-deposits of copper, cobalt, PGMs, gold and silver. We have integrated mining, milling, smelting and refining operations to process ore into finished nickel at Sudbury. We also smelt and refine nickel concentrates from our Voisey's Bay operations. We ship a nickel intermediate product, nickel oxide, from our Sudbury smelter to our nickel refineries in Wales, Taiwan, China and South Korea for processing into finished nickel. In 2011, we produced 16% of the electric energy consumed in Sudbury at our hydroelectric power plants there. The remaining electricity was purchased from Ontario's provincial electricity grid.

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In February 2011, we shut down one furnace at our Sudbury smelter due to an operational problem. The furnace was restarted in late June 2011. The furnace stoppage resulted in a negative impact of approximately 16,700 metric tons of production of nickel and 17,300 metric tons of copper.

Thompson operations

Our long-established mines in Thompson, Manitoba, are primarily underground operations with nickel sulfide ore bodies. The ore bodies also contain co-deposits of copper and cobalt. We currently have integrated mining, milling, smelting and refining operations to process ore into finished nickel at Thompson. We also smelt and refine an intermediate product, nickel concentrate, from our Voisey's Bay operations. Low-cost energy is available from purchased hydroelectric power at our Thompson operations.

We are transitioning our Thompson operations to a mining and milling business, and phasing out smelting and refining by 2015. This enables us to better align processing capacity with mineral reserves while meeting our environmental commitments. The current mineral reserves in Thompson are not sufficient to sustain the operation of the smelter and refinery at full capacity over the long term and do not support the investment of the significant capital that would be required under new pending federal sulfur dioxide emission standards that are expected to come into effect in 2015.

Voisey's Bay operations

Our Voisey's Bay operation in Newfoundland and Labrador is comprised of the Ovoid mine, an open-pit mine, and deposits with the potential for underground operations at a later stage. We mine nickel sulfide ore bodies, which also contain deposits of copper and cobalt. Until 2013, we will mill Voisey's Bay ore on site and ship it as an intermediate product (nickel concentrates) primarily to our Sudbury and Thompson operations for final processing (smelting and refining), while copper concentrate produced is sold in the market. Beyond 2013, the nickel concentrates will be shipped to our hydrometallurgical plant being constructed at the Long Harbour site to produce finished nickel, while the copper concentrate will continue to be produced at Voisey's Bay and sold in the market. The electricity requirements of our Voisey's Bay operations are supplied through diesel generators.

Clydach operations

Clydach is a stand-alone nickel refinery in Wales, U.K., that processes a nickel intermediate product, nickel oxide, supplied from our Sudbury operations to produce finished nickel in the form of powders and pellets.

Asia Pacific

Sulawesi operations

Our subsidiary PTVI operates an open cast mining area and related processing facility in Sorowako on the Island of Sulawesi, Indonesia. PTVI mines nickel saprolitic laterite ore and produces nickel matte, which is shipped primarily to our nickel refinery 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 Metal Mining Co., Ltd. ("Sumitomo"). PTVI is a public company whose shares are traded on the Indonesia Stock Exchange. We hold 59.2% of its share capital, Sumitomo holds 20.3%, and 20.5% is publicly held.

Energy costs are a significant component of our nickel production costs for the processing of lateritic saprolitic ores at our PTVI operations in Indonesia. A major part of the electric furnace power requirements of PTVI is supplied at low cost by its three hydroelectric power plants on the Larona River: Larona, Balambano and Karebbe. 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. In 2011, the hydroelectric

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power plants provided 93% of the electric energy consumed at our Indonesian operations, with the thermal generators providing the remainder.

Asian refinery operations

Our 87.2%-owned subsidiary Vale Japan Limited ("Vale Japan") operates a refinery in Matsuzaka, Japan, which produces intermediate and finished nickel products, primarily using nickel matte sourced from PTVI. Vale Japan is a privately-owned company controlled by Vale, with the minority interest held by Sumitomo (12.8%).

We also operate or have investments in nickel refining operations in Taiwan through our 93.7% stake in Taiwan Nickel Refining Corporation ("TNRC"), in China through our 98.3% interest in Vale Nickel (Dalian) Co. Ltd. ("VNDC") and in South Korea through our 25.0% stake in Korea Nickel Corporation ("KNC"). TNRC, VNDC and KNC produce finished nickel for the local stainless steel industry in Taiwan, China and South Korea, respectively, primarily using intermediate products containing about 75% nickel (in the form of nickel oxide) from our Matsuzaka Japan and Sudbury operations.

New Caledonian operations

We are ramping up our Vale Nouvelle-Calédonie S.A.S ("VNC") nickel operation in New Caledonia in the South Pacific. VNC utilizes a High Pressure Acid Leach ("HPAL") process to treat limonitic laterite and saprolitic laterite ores. We expect to ramp up VNC over a four-year period to reach nominal production capacity of 60,000 metric tons per year of nickel contained in nickel oxide and 4,600 metric tons of cobalt, once nickel oxide production starts. In order to accelerate cash generation, the resulting nickel and cobalt solution from HPAL is currently sold to customers as an intermediate product, nickel hydroxide cake ("NHC"). We hold 74% of the share capital of VNC, Sumic Nickel Netherlands B.V. ("Sumic") (a joint venture between Sumitomo and Mitsui) holds 21% and Société de Participation Minière du Sud Calédonien SAS holds 5%. Sumic has a put option to sell us 25%, 50%, or 100% of its shares, at a price based on the lower of the book value or the market value of the shares, and we are currently in discussions with Sumic concerning its continued participation in VNC.

South Atlantic

We are continuing to ramp up the Onça Puma project in Ourilândia do Norte, in the Brazilian state of Pará. The Onça Puma mine is built on lateritic nickel deposits of saprolitic laterite ore, and is expected to reach a nominal capacity of 53,000 metric tons per year of nickel contained in ferro-nickel, its final product.

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2.1.2 Production

The following table sets forth our annual mine production by operating mine (or on an aggregate basis for PTVI because it has mining areas rather than mines) and the average percentage grades of nickel and copper. The mine production at PTVI represents the product from PTVI's dryer kilns delivered to PTVI's smelting operations and does not include nickel losses due to 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. The following table sets forth information about ore production at our nickel mining sites.

	2009			2010			2011		
	(thousands of metric tons, except percentages)								
		Grade			Grade			Grade	
		%	%		%	%		%	%
	Production	Copper	Nickel	Production	Copper	Nickel	Production	Copper	Nickel
Ontario operating mines									
Copper Cliff North	524	0.96	1.06	326	1.13	1.13	892	1.15	1.03
Copper Cliff South(1)	78	1.45	1.40						
Creighton	395	1.57	1.82	426	2.65	3.10	991	1.72	2.22
Stobie	1,198	0.64	0.72	775	0.59	0.69	1,568	0.61	0.74
Garson	328	1.93	1.45	246	2.16	1.60	640	1.78	2.08
Coleman	624	3.28	1.64	786	2.74	1.73	1,363	3.02	1.77
Ellen				86	0.56	0.75	131	0.45	0.90
Totten				16	2.54	1.74	28	1.01	0.97
Total Ontario operations	3,145	1.49%	1.19%	2,660	1.78%	1.53%	5,612	1.61%	1.45%
Manitoba operating mines									
Thompson	1,270		1.98	1,325		1.83	1,182		1.76
Birchtree	769		1.48	832		1.41	721		1.36
Total Manitoba operations	2,040		1.79%	2,158		1.67%	1,903		1.61%
Voisey's Bay operating mines									
Ovoid	990	2.57	3.20	1,510	2.44	3.20	2,366	2.39	3.38
Total Voisey's Bay operations	990	2.57%	3.20%	1,510	2.44%	3.20%	2,366	2.39	3.38%
Sulawesi operating mining areas									
Sorowako	3,598		2.02	4,176		2.00	3,848		1.95
Total Sulawesi operations	3,598		2.02%	4,176		2.00%	3,848		1.95%
New Caledonia operating mines									
VNC				326		1.31	1,043		1.29
Total New Caledonia Operations				326		1.31%	1,043		1.29%
Brazil operating mines									
Onça Puma				1,259		1.93	1,466		1.86
Total Brazil operations				1,259		1.93%	1,466		1.86%

(1) This mine has been closed indefinitely since January 2009.

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The following table sets forth information about our nickel production, including: (i) nickel refined through our facilities, (ii) nickel further refined into specialty products and (iii) intermediates designated for sale. The numbers below are reported on an ore-source basis.

Mine	Type	Production for the year ended December 31, 2009	2010	2011
		(thousand metric tons)		
Sudbury(1)	Underground	43.6	22.4	59.7
Thompson(1)	Underground	28.8	29.8	25.0
Voisey's Bay(2)	Open pit	39.7	42.3	68.9
Sorowako(3)	Open cast	68.8	78.4	67.8
Onça Puma(4)	Open pit			7.0
New Caledonia(5)	Open pit			5.1
External(6)		5.8	5.9	8.0
Total(7)		186.7	178.7	241.5

(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, as well as some finished nickel produced by unrelated parties under toll-smelting and toll-refining arrangements.

(3) We have a 59.2% interest in PTVI, which owns the Sorowako mines, and these figures include the minority interests.

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

(5) Primary production only and adjusted for the payable nickel amount. Nickel contained in NHC.

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

(7) Excludes finished nickel produced under toll-smelting and refining arrangements covering purchased intermediates with unrelated parties. Unrelated-party tolling of purchased intermediates was 5.2 thousand metric tons in 2009, none in 2010 and none in 2011.

2.1.3 Customers and sales

Our nickel customers are broadly distributed on a global basis. In 2011, 53% of our total nickel sales were delivered to customers in Asia, 27% to North America, 17% to Europe and 3% 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 with various levels of nickel content, (ii) nickel pig iron has 1.5-6% nickel, (iii) ferro-nickel has 10-40% nickel, (iv) standard LME grade nickel has a minimum of 99.8% nickel, and (v) high purity nickel has a minimum of 99.9% nickel and does not contain specific elemental impurities;
- shape (such as pellets, discs, squares, strips and foams); and
- size.

In 2011, the principal end-use applications for nickel were:

- austenitic stainless steel (64% of global nickel consumption);
- non-ferrous alloys, alloy steels and foundry applications (19% of global nickel consumption);

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nickel plating (9% of global nickel consumption); and

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

In 2011, 66% of our refined nickel sales were made which into non-stainless steel applications, compared to the industry average for primary nickel producers of 36%, 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, Kaohsiung (Taiwan), Bangkok (Thailand) and Bridgetown (Barbados). For information about demand and prices, see below *Operating and financial review and prospects Demand and 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 16% of global consumption for primary nickel in 2011. In addition to us, the largest suppliers in the nickel industry (each with its own integrated facilities, including nickel mining, processing, refining and marketing operations) are Mining and Metallurgical Company Norilsk Nickel, Jinchuan Nonferrous Metals Corporation, BHP Billiton and Xstrata. Together with us, these companies accounted for about 51% of global finished primary nickel production in 2011.

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 43-48% of total nickel used for stainless steels, and primary nickel has accounted for about 52-57%. In 2006, a new primary nickel product entered the market, known as nickel pig iron. This low-grade nickel product made in China from imported lateritic ores (primarily from the Philippines and Indonesia) is primarily suitable for use in stainless steel production. With higher nickel prices and strong demand from the stainless steel industry, Chinese domestic production of nickel pig iron and low-grade ferro-nickel continues to expand. In 2011, Chinese nickel pig iron and ferro-nickel production is estimated to have been greater than 250,000 metric tons, representing 16% of world primary nickel supply.

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.

There is no material seasonality in the demand for nickel, although demand for nickel has been slightly weaker in the third quarter.

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2.2 Copper

2.2.1 Operations

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

Company	Location	Our share of capital		Partners
		Voting	Total	
		(%)		
Vale	Brazil			
Vale Canada	Canada	100.0	100.0	
Tres Valles	Chile	100.0	90.0	Compañia Minera Werenfried

Brazilian operations

Our Sossego copper mine in Carajás, in the state of Pará, has two main copper ore bodies, Sossego and Sequeirinho. The copper ore is mined by 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. 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 the Carajás air and rail facilities and a power line that allows us to purchase electrical power at market prices. We have a long-term energy supply contract with Eletronorte.

Canadian operations

In Canada, we recover copper in conjunction with our nickel operations, principally at Sudbury and Voisey's Bay. At Sudbury, 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. At Voisey's Bay, we produce copper concentrates.

Chilean operations

In Chile, we produce copper cathodes at the Tres Valles operation, located in Salamanca, in the Coquimbo region. The plant has an estimated annual production capacity of 18,500 metric tons of copper cathode (metal plate), and is our first industrial-scale cathode plant using a hydrometallurgical process. The Tres Valles operations include two copper oxide mines: Don Gabriel, an open-pit mine, and Papomono, an underground mine, as well as an SX-EW plant that produces copper cathodes.

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2.2.2 Production

The following table sets forth information on our copper production.

Mine	Type	Production for the year ended December 31, 2009	2010	2011
		(thousand metric tons)		
Brazil:				
Sossego	Open pit	117	117	109
Canada:				
Sudbury	Underground	42	34	101
Voisey's Bay	Open pit	24	33	51
Thompson	Underground	1	1	1
External(1)		14	22	31
Chile:				
Tres Valles	Open pit and underground			9
Total		198	207	302

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

2.2.3 Customers and sales

Copper concentrates from Sossego are sold under medium- and long-term contracts to copper smelters in South America, Europe and Asia. We have long-term off-take agreements to sell the entire production of copper concentrates from the first phase of the Salobo project to smelters. We have long-term copper supply agreements with Xstrata Copper Canada for the sale of copper anodes and most of the copper concentrates produced in Sudbury. Copper concentrates from Voisey's Bay are sold under medium-term contracts to customers in Europe. Electrowon copper from Sudbury is sold in North America under short-term sales agreements.

2.2.4 Competition

The global copper cathode 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"), Aurubis AG, Freeport-McMoRan Copper & Gold Inc. ("Freeport-McMoRan"), Jiangxi Copper Corporation Ltd. and Xstrata, operating at the parent-company level or through subsidiaries. Our participation in the global copper cathode market is marginal.

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 high levels of integration by the major copper producers.

In the copper concentrate market, the main producers are mining companies located in South America and Indonesia, 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 Freeport-McMoRan, Xstrata, BHP Billiton, Antofagasta plc and Anglo American plc, operating at the parent-company level or through subsidiaries. Our market share in 2011 was about 3.0% of the total custom copper concentrate market.

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 are Codelco, Anglo American and Xstrata, operating at the parent-company level or through subsidiaries.

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There is no material seasonality in the demand for copper, although demand for copper is generally weaker throughout the second half of the year.

2.3 Aluminum

We hold a 22.0% interest in Hydro, a major aluminum producer, which we account for on the equity method. In the past, we engaged in bauxite mining, alumina refining and aluminum smelting through subsidiaries in Brazil, our interests in which we transferred to Hydro in February 2011. We still own minority interests in MRN and Paragominas, which are bauxite mining businesses located in Brazil, and which we also account for on the equity method. We will transfer our remaining interest in Paragominas to Hydro in two equal tranches in 2014 and 2016.

2.4 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 also recover gold as a by-product of our operations at our Sossego copper mine in Carajás, in the Brazilian state of Pará. We operate a processing facility in Port Colborne, Ontario, which produces PGMs, gold and silver intermediate products. 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 2011, PGM concentrates from our Sudbury operations supplied about 54% 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.

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

Mine(1)	Type	2009	2010	2011
		(thousand troy ounces)		
Sudbury:				
Platinum	Underground	103	35	174
Palladium	Underground	152	60	248
Gold	Underground	49	42	182
Sossego:				
Gold	Open pit	98	102	90

(1) Production figures exclude precious metals purchased from unrelated parties and toll-refined materials.

2.5 Cobalt

We recover significant quantities of cobalt as a by-product of our Canadian nickel operations. In 2011, we produced 1,469 metric tons of refined cobalt metal at our Port Colborne refinery and 594 metric tons of cobalt in a cobalt-based intermediate product at our Thompson nickel operations in Canada. Our remaining cobalt production consisted of 611 metric tons of cobalt contained in other intermediate products (such as nickel concentrates). We are increasing our production of cobalt as a by-product of our nickel production at the VNC operations in New Caledonia, which is currently ramping up. We sell cobalt on a global basis. Our cobalt metal, which is electro-refined at our Port Colborne refinery, has very high purity levels (99.8%). Cobalt metal is used in the production of various alloys, particularly for aerospace applications, as well as the manufacture of cobalt-based chemicals.

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The following table sets forth information on our cobalt production.

Mine	Type	Production for the year ended December 31, 2009	2010	2011
			(metric tons)	
Sudbury	Underground	359	302	593
Thompson	Underground	181	189	158
Voisey's Bay	Open pit	971	524	1,585
New Caledonia	Open pit			245
External(1)		64	51	93
Total		1,575	1,066	2,675

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

3. Fertilizer nutrients

3.1 Phosphates

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

Company	Location	Our share of capital Voting	Total	Partners
		(%)		
Vale Fertilizantes	Uberaba, Brazil	100.0%	100.0%	
MVM Resources International, B.V.	Bayóvar, Peru	51.0%	40.0%	Mosaic, Mitsui & Co
Vale Cubatão.	Cubatão, Brazil	100.0%	100.0%	

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., ammonium nitrate and urea). It is the largest producer of phosphate and nitrogen crop nutrients in Brazil. Vale Fertilizantes operates the following phosphate rock mines: Catalão, in the state of Goiás, and 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 and Uberaba, Minas Gerais; Guará, Cajati, and three plants in Cubatão, São Paulo; and Araucária, Paraná.

Besides the phosphate and nitrogen operations of Vale Fertilizantes, since 2010 we have also operated the Bayóvar phosphate rock mine in Peru, which is expected to reach nominal capacity of 3.9 Mtpy by 2014. Bayóvar is a world-class resource with a low mining cost of phosphate rock production.

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

Mine	Type	Production for the year ended December 31, 2010	2011
		(thousand metric tons)	(thousand metric tons)
Bayóvar	Open pit	791	2,544
Catalão	Open pit	626	947
Tapira	Open pit	2,068	2,011
Patos de Minas	Open pit	43	44
Araxá	Open pit	1,182	1,231
Cajati	Open pit	545	582
Total		5,255	7,359

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

Product	Production for the year ended December 31, 2010	2011
	(thousand metric tons)	(thousand metric tons)
Monoammonium phosphate (MAP)	898	823
Triple superphosphate (TSP)	788	811
Single superphosphate (SSP)	2,239	2,638
Dicalcium phosphate (DCP)	491	580
Ammonia	508	619
Urea	511	628
Nitric acid	454	468
Ammonium nitrate	447	458

3.2 Potash

We conduct potash operations in Brazil at the parent-company level. We lease Taquari-Vassouras, the only potash mine in Brazil (in Rosario do Catete, in the state of Sergipe), from Petrobras Petróleo Brasileiro S.A., the Brazilian state-owned oil company. The lease, signed in 1991, became effective in 1992 for an initial period of 25 years, and the parties have recently agreed upon an extension of the lease agreement for 30 more years. The following table sets forth information on our potash production.

Mine	Type	Production for the year ended December 31, 2009	2010	2011	Recovery rate
		(thousand metric tons)			(%)
Taquari-Vassouras	Underground	717	662	625	85.7

3.3 Customers and sales

All potash sales from the Taquari-Vassouras mine are to the Brazilian market. In 2011, our production represented approximately 9% of total potash consumption in Brazil. We have a strong presence and long-standing relationships with the major players in Brazil, with more than 60% of our sales generated from four traditional customers.

Our phosphate products are mainly sold to fertilizer blenders. In 2011, our production represented approximately 37% of total phosphate consumption in Brazil, with imports representing 35% of total supply. In the high-concentration segment, our production supplied more than 33% of total Brazilian consumption, with products like MAP and TSP. In the low-concentration phosphate nutrients segment, our production represented approximately 49% of total Brazilian consumption, with products like SSP and DCP.

3.4 Competition

Fertilizers have strong demand growth potential, which is anchored in market fundamentals similar to those underlying the global demand for minerals, metals and energy. Rapid per capita income growth in emerging economies causes diet changes towards an increasing consumption of proteins that ultimately contribute to boost fertilizer use. More recently, global output of biofuels has started to boom as they emerged as an alternative source of energy to reduce world reliance on sources of climate-changing greenhouse gases. Given that key inputs for the production of biofuels sugar cane, corn, palm and soy beans are intensive in the use of fertilizers, they are becoming another major driver of the global demand for crop nutrients.

The industry is divided into three major nutrients: potash, phosphate and nitrogen. There are very limited resources of potash around the world, with Canada, Russia and Belarus being the most important sources. Due to the lack of mineral resources, the high level of investment and the long time required for a project to mature, it is unlikely that other regions will emerge as major potash producers over the next few years. In addition, the potash industry is highly concentrated, with the 10 major producers accounting for

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more than 94% of total world production capacity. While potash is a very scarce resource, phosphate is more available, but all major exporters are located in the northern region of Africa (Morocco, Algeria and Tunisia) and in the United States. The top five phosphate rock producers (China, Morocco, the United States, Russia and Tunisia) account for 76% of global production, of which roughly 9% is exported. However, higher value-added products such as MAP and DAP are usually traded instead of phosphate rock due to cost efficiency.

Brazil is one of the largest agribusiness markets in the world due to its high production, exports and consumption of grains and biofuels. It is the fourth-largest consumer of fertilizers in the world and one of the largest importers of potash, phosphates, phosphoric acid and urea. Brazil imports 91% of its potash consumption, which amounted to 7.5 Mtpy of KCl (potassium chloride) in 2011, 44% higher than 2010, from Russian, Belarussian, Canadian and German producers, in descending order. In terms of global consumption, China, the United States, Brazil and India represent 59% of the total, with Brazil alone representing 13% of the total. Our project portfolios are highly competitive in terms of cost and logistics within these regions.

Most phosphate rock concentrate is consumed locally by downstream integrated producers, with the seaborne market corresponding to 16% of total phosphate rock production. Major phosphate rock exporters are concentrated in North Africa, mainly through state-owned companies, with Moroccan OCP Group holding 37% of the total seaborne market. Brazil imports 19% of the total phosphate nutrients it needs through both phosphate fertilizer products and phosphate rock. The phosphate rock imports supply non-integrated producers of phosphate fertilizers 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 12% of the ammonia produced worldwide is traded. North America is the main importer, accounting for 35% of global trade. Main exporting regions are Central America, Russia, Eastern Europe and the Middle East.

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4. Infrastructure

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

Company	Business	Location	Our share of capital (%) Voting	Total	Partners
Vale	Railroad (EFVM and EFC), port and maritime terminal operations	Brazil	100.0	100.0	
FCA	Railroad operations	Brazil	100.0	99.9	
FNS(1)	Railroad operations	Brazil	100.0	100.0	
MRS	Railroad operations	Brazil	45.7	45.8	CSN, Usiminas and Gerdau
CPBS	Port and maritime terminal operations	Brazil	100.0	100.0	
Log-In	Port and maritime terminal operations and intermodal logistics services	Brazil	31.3	31.3	Mitsui, public investors
PTVI	Port and maritime terminal operations	Indonesia	59.2	59.2	Sumitomo, public investors
SPRC	Port and maritime terminal operations	Colombia	100.0	100.0	
FENOCO	Railroad operations	Colombia	8.4	8.4	Drummond, Glencore and Comercializadora Internacional Colombian Natural Resources I S.A.S.
Vale Logística Argentina	Port operations	Argentina	100.0	100.0	
CEAR(2)	Railroad and maritime terminal operations	Mozambique	51.0	51.0	Portos e Caminhos de Ferro de Moçambique, P.E.
CDN(3)	Railroad and maritime terminal operations	Mozambique	51.0	51.0	Portos e Caminhos de Ferro de Moçambique, P.E.
Vale Logistics Limited	Railroad operations	Malawi	100.0	100.0	
Transbarge Navigación	Paraná and Paraguay Waterway System (Convoys)	Paraguay	100.0	100.0	

(1) BNDESPAR holds debentures of FNS that, beginning in 2018, can be exchanged at its option for a number of FNS common shares representing a minority position in the company, as determined by a formula provided for in the instruments governing the debentures.

(2) Vale controls its interest in CEAR through a 67% interest in SDCN.

(3) Vale controls its interest in CDN through a 67% interest in SDCN.

4.1.1 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. The EFVM railroad has a daily capacity of 342,000 metric tons of iron ore. In 2011, the EFVM railroad carried a total of 69.3 billion ntk of iron ore and other cargo, of which 9.4 billion ntk, or 7.4%, consisted of cargo transported for customers, including iron ore for Brazilian customers. The EFVM railroad also carried 1.0 million passengers in 2011. In 2011, we had a fleet of 322 locomotives and 14,221 wagons at EFVM.

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Carajás railroad ("*EFC*"). We operate the EFC railroad under a 30-year renewable concession, which expires in 2027. EFC is located in the Northern System, beginning at our Carajás iron ore mines in the Brazilian state of Pará and extending 892 kilometers to our Ponta da Madeira maritime terminal complex facilities located near the Itaqui Port in the Brazilian state of Maranhão. Its main cargo is iron ore, principally carried for us. It has a daily capacity of 313,970 metric tons of iron ore. In 2011, the EFC railroad carried a total of 98.1 billion ntk of iron ore and other cargo, 2.8 billion ntk of which was cargo for customers, including iron ore for Brazilian customers. EFC also carried 352,928 passengers in 2011. EFC supports the largest capacity train in Latin America, which measures 3.4 kilometers, weighs 42,300 gross metric tons when loaded and has 330 cars. In 2011, EFC had a fleet of 234 locomotives and 14,261 wagons.

Ferrovia Centro-Atlântica ("*FCA*"). Our subsidiary FCA operates the central-east regional railway network of the Brazilian national railway system under a 30-year renewable concession, which expires in 2026. The central east network has 8,023 kilometers of track extending into the states of Sergipe, Bahia, Espírito Santo, Minas Gerais, Rio de Janeiro and Goiás and Brasília, the Federal District of Brazil. It connects with our EFVM railroad near the cities of Belo Horizonte, in the state of Minas Gerais and Vitória, in the state of Espírito Santo. FCA operates on the same track gauge as our EFVM railroad and provides access to the Santos Port in the state of São Paulo. In 2011, the FCA railroad transported a total of 10.7 billion ntk of cargo for customers. In 2011, FCA had a fleet of 481 locomotives and 12,413 wagons.

Ferrovia Norte-Sul railroad ("*FNS*"). We have a 30-year renewable subconcession for the commercial operation of a 720-kilometer stretch of the FNS railroad in Brazil. Since 1989, we have operated a segment of the FNS, which connects to the EFC railroad, enabling access to the port of Itaqui, in São Luís, where our Ponta da Madeira maritime terminal is located. A 452-kilometer extension was concluded in December 2008. In 2011, the FNS railroad transported a total of 1.9 billion ntk of cargo for customers. This new railroad 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. In 2011, FNS had a fleet of 6 locomotives and 375 wagons.

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

- iron ore and iron ore pellets, 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 building materials, 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*).

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 2011, the MRS railroad carried a total of 151.87 million metric tons of cargo, including 113.51 million metric tons of iron ore and other cargo from Vale.

Colombia

Ferrocarriles del Norte de Colombia S.A. ("FENOCO"). We own an 8.4% equity stake in FENOCO, a company that owns a concession to restore and operate the Chiriguana Santa Marta tranche (220

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kilometers) of the Atlantic Railroad, which connects the Cesar coal-producing region with various ports in the Atlantic Ocean.

Argentina

On August 24, 2010, through our subsidiary Potasio Río Colorado S.A., we executed an agreement with Ferrosur Roca S.A. for partial assignment, subject to governmental approvals, of a 756-kilometer railroad administrative concession. This concession is important to the support of the Rio Colorado potash project and our strategy to become a leading global player in the fertilizer business.

Africa

Consistent with our decision to invest in the Nacala Corridor and following on our September 2010 acquisition of a 51.0% stake in SDCN, in June 2011, we acquired an additional 16% stake in SDCN for US$8 million, reaching a 67% total participation in the company at year end. In December 2011, we executed a concession agreement with the Republic of Malawi with respect to a 137-kilometer railroad to be built from Chikwawa to Nkaya Junction in Malawi. The SDCN acquisition and the concession in Malawi will allow the expansion of Moatize and facilitate the creation of a world-class logistics infrastructure to support our operations in Central and Eastern Africa. We will invest in the capacity expansion of the Nacala logistics corridor through the rehabilitation of the existing railroads in Mozambique and Malawi, respectively owned by Corredor de Desenvolvimento do Norte S.A. ("CDN") and Central East African Railway Company Limited ("CEAR"), each a 51%-owned subsidiary of SDCN, and through the construction of railway links from Moatize to a new deep water maritime terminal to be built in Nacala-à-Velha.

We are currently studying the possible construction of an integrated railway-port system for transporting iron ore output from Simandou, in Guinea.

4.1.2 Ports and maritime terminals

Brazil

We operate a port and six 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 *Bulk materials Iron ore pellets Operations*. We also use our port and terminals to handle customers' cargo. In 2011, 10% of the cargo handled by our port and terminals represented cargo handled for customers.

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 four maritime terminals: (i) an iron ore maritime terminal, (ii) Praia Mole Terminal, (iii) Terminal de Produtos Diversos, and (iv) Terminal de Granéis Líquidos.

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 400,000 DWT at a time, limited at 20 meters draft plus tide. In Pier I there are two ship loaders, which can load up to a combined total of 26,700 metric tons per hour. In Pier II there are two ship loaders that work alternately and can each load up to 16,000 metric tons per hour. In 2011, 102.9 million metric tons of iron ore and iron ore pellets were shipped through the terminal for us. The iron ore maritime terminal has a stockyard capacity of 3.2 million metric tons.

Praia Mole terminal is principally a coal terminal and handled 10.9 million metric tons in 2011. See *Additional information Legal proceedings*.

Terminal de Produtos Diversos handled 6.4 million metric tons of grains and fertilizers in 2011.

Terminal de Granéis Líquidos handled 1.0 million metric tons of bulk liquid in 2011.

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Ponta da Madeira maritime terminal. The Ponta da Madeira maritime terminal is located near the Itaqui Port in the Brazilian state of Maranhão. The terminal facilities can accommodate four vessels. Pier I can accommodate vessels displacing up to 420,000 DWT. Pier II can accommodate vessels of up to 155,000 DWT. Pier I has a maximum loading rate of 16,000 tons per hour. Pier II has a maximum loading rate of 8,000 tons per hour. Pier III, which has two berths and three shiploaders, can accommodate vessels of up to 220,000 DWT at the south berths and 180,000 DWT at the north berths and has a maximum loading rate of 8,000 metric tons per hour in each shiploader. Cargo shipped through our Ponta da Madeira maritime terminal consists principally of our own iron ore production. Other cargo includes manganese ore, copper concentrate and pig iron produced by us and pig iron and soybeans for unrelated parties. In 2011, 100.5 million metric tons of iron ore were handled through the terminal. The Ponta da Madeira maritime terminal has a stockyard capacity of 6.2 million metric 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 that allows the loading of ships up to 18 meters of draft and up to 230,000 DWT. In 2011, the terminal uploaded 21.5 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 that allows the loading of ships of up to 300,000 DWT. In 2011, the terminal uploaded 37.6 million metric tons of iron ore.

Inácio Barbosa maritime terminal ("TMIB"). We operate the Inácio Barbosa maritime terminal, located in the Brazilian state of Sergipe. The terminal is owned by Petrobras. Vale and Petrobras entered into an agreement in December 2002, which allows Vale to operate this terminal for a period of 10 years. In 2011, 1.0 million metric tons of fuel and agricultural and steel products were shipped through TMIB.

Santos maritime terminal ("TUF"). We operate a maritime terminal, through our subsidiary Vale Fertilizantes, in Santos, in the Brazilian state of São Paulo. The terminal has a pier that is equipped to receive ships of up to 67,000 DWT. In 2011, the terminal handled 2.6 million metric tons of ammonia and bulk solids, 21.4% higher than 2010. In July 2011, we signed an agreement to form a joint venture with Vale Fertilizantes to exploit the concession of TUF previously enjoyed by Vale Fertilizantes. Under the agreement, we will pay R$150 million (US$95 million) for the acquisition of 51% of the joint venture and will invest an additional R$432 million (US$274 million) to finance the investment program of TUF.

Colombia

Sociedad Portuaria Rio Cordoba ("SPRC"). SPRC is a seaport facility wholly owned by Vale and used to export coal from the El Hatillo operation, as well as other nearby mines. The port is located in Cienaga, on the Caribbean coast of Colombia, in the Magdalena Department, about 67 kilometers from Barranquilla and 31 kilometers from Santa Marta.

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 stockyard of 20,000 square meters until October 2016 and an agreement with third parties for an extra stockyard of 27,000 square meters. We expect to handle 1.9 million metric tons of iron and manganese ore through this port in 2012, which will come from Corumbá, Brazil, through the Paraguay and Paraná rivers, for shipment to Asian and European markets. The loading rate of this port is 15,000 tons per day and the unloading rate is 11,000 tons per day.

Indonesia

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

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The Balantang Special Port is located in Balantang Village, South Sulawesi, and has two types of piers, with total capacity of 6,000 DWT: a barge slip for barges with capacity of up to 4,000 DWT for dry bulk cargo and a general cargo wharf for vessels of up to 2,000 DWT.

The Harapan Tanjung Mangkasa Special Port is located in Harapan Tanjung Mangkasa Village, South Sulawesi, with mooring buoys that can accommodate vessels displacing 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.

4.1.3 Shipping

In addition to the iron ore seaborne shipping conducted to support our iron ore and pellets business (See *Bulk Materials Iron Ore Operations*), and the shipping and loading in the Paraná and Paraguay waterway system conducted to support our bulk material operations, we also operate tug boat services.

We continue to develop and operate a low-cost fleet of vessels, comprised of our own ships and ships hired pursuant to medium and long-term contracts, to support our bulk materials business. Over the last few years, we purchased 22 used capesize vessels. We have also placed orders with shipyards for the construction of 19 very large ore carriers ("VLOC") each with a capacity of 400,000 DWT and 4 additional capesize vessels, each with a capacity of 180,000 DWT. The first 4 very large ore carriers and the 4 capesize vessels were delivered in 2011. At the end of 2011, 30 of our own vessels were in operation, along with 22 used capesizes, 4 VLOC and 4 new capesizes of 180,000 DWT. In addition to our VLOCs, another 16 have been ordered for construction by third party ship owners to be chartered by Vale and dedicated to transport Vale's iron ore to its customers. 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 2011, we shipped 89.9 million metric tons of iron ore and pellets on a CFR basis, of which 82.4 million metric tons were shipped to China.

In the Paraná and Paraguay waterway system, we transport iron ore and manganese ores through our wholly owned subsidiary Transbarge Navigación, which transported 1.7 million tons through the waterway system in 2011, and our wholly owned subsidiary Vale Logística Argentina, which loaded 1.5 million tons of ore at Saint Nicolas Port into ocean-going vessels in 2011. In 2010, we also purchased two new convoys (two pushers and 32 barges) that will begin operations in 2012.

We operate a fleet of 28 tug boats in maritime terminals in Brazil, specifically in Vitória (in the state of Espírito Santo), Trombetas and Vila do Conde (in the state of Pará), São Luís (in the state of Maranhão), Mangaratiba (in the state of Rio de Janeiro) and Aracaju (in the state of Sergipe).

We own 31.3% of Log-In, which conducts intermodal logistics services. Log-In offers port handling and container transportation services by sea as well as container storage. It operates owned and chartered ships for coastal shipping, a container terminal (Terminal Vila Velha TVV) and multimodal terminals. In 2011, Log-In's coastal shipping service transported 153,350 twenty-foot equivalent units ("teus") and TVV handled 276,245 teus.

4.2 Energy

4.2.1 Electric power

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

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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 and electric energy shortages (as experienced in Brazil in the second half of 2001). We currently have nine hydroelectric power plants and four smaller 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. Vale's first hydroelectric power plant in the Northern region, Estreito, started generating power in March 2011. In addition, in June 2011, we acquired a 9% stake in NESA, the entity established to develop and operate the Belo Monte hydroelectric plant in the Brazilian state of Pará. In 2011, our installed capacity in Brazil was 981 MW. We use the electricity produced by these plants for our internal consumption needs. As a large consumer of electricity, we expect that investing in power projects will help us reduce costs and will protect us against energy supply and price volatility. However, we may experience delays in the construction of certain generation projects due to environmental and regulatory issues, which may lead to higher costs.

Canada

In 2011, our wholly owned and operated hydroelectric power plants in Sudbury generated 16% 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 2011, the power system operator distributed electrical energy at the rate of 179 MW to all surface plants and mines in the Sudbury area.

In 2011, diesel generation provided 100% of the electric requirements of our Voisey's Bay operations. We have six diesel generators on-site, of which normally only four are in operation, producing 12 MW.

Indonesia

Energy costs are a significant component of our nickel production costs for the processing of lateritic saprolitic ores at PTVI operations in Indonesia. A major portion of PTVI's electric furnace power requirements are supplied at a low cost by its three hydroelectric power plants on the Larona River: (i) the Larona plant, which generates an average of 136 MW, (ii) the Balambano plant, which generates an average of 97 MW and (iii) the Karebbe plant, which recently came on stream with 90 MW of average generating capacity. The Karebbe plant helps reduce production costs by substituting oil used for power generation with hydroelectric power, reduce CO2 emissions by replacing non-renewable power generation, as well as enable us to increase our current nickel production capacity in Indonesia. PTVI has thermal generating facilities with 77 MW, which includes 53 MW from 23 Caterpillar diesel generators with capacity of 1 MW each and five Mirrlees Blackstone diesel generators with a capacity of 6 MW each, as well as a 24 MW high sulfur fuel oil burning steam turbine generator located in Sorowako.

4.2.2 Oil and natural gas

Since 2007, we have developed a hydrocarbon exploration portfolio in Brazilian onshore and offshore basins. We believe that natural gas will play an important role in the global energy matrix in the future, given its advantages of lower carbon emissions and greater flexibility with regard to power generation.

5. Other investments

We own a 50.0% stake in California Steel Industries, Inc. ("CSI"), a producer of flat-rolled steel and pipe products located in the United States. The remainder is owned by JFE Steel. CSI successfully concluded the commissioning of a second reheating furnace with state-of-the-art environmental technology at a cost of US$71.0 million, which increased CSI's annual production capacity to approximately 2.8 million metric tons of flat rolled steel and pipe.

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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 during the third quarter of 2010, and produced 3.2 Mt in 2011. The plant will ultimately have a production capacity of 5.0 Mtpy and will consume 8.5 million metric tons of iron ore and iron ore pellets per year, supplied exclusively by Vale. We are also involved in three other steel projects in Brazil, Companhia Siderúrgica do Pecém ("CSP"), which was already approved by our Board of Directors, as well as Aços Laminados do Pará ("Alpa") and Companhia Siderúrgica Ubu ("CSU"), which are both in earlier stages of development.

We have a 61.5% stake in CADAM S.A. ("CADAM"), located on the border of the Brazilian states of Pará and Amapá, in the Amazon area in northern Brazil. CADAM produces kaolin for paper coating and also conducts research into other uses for kaolin products in order to develop a more diversified portfolio. CADAM's reserves are principally concentrated in the open-pit Morro do Felipe mine, in Vitória do Jari, in the state of Amapá. The beneficiation plant and private port facilities are situated on the west bank of the Jari River, in Munguba, in the Brazilian state of Pará. CADAM produces the following products: Amazon SB, Amazon Premium and Amazon Plus. They are sold mainly in the European, Asian and Latin American markets. CADAM obtains electricity from its own thermal power plant. In 2011, CADAM produced 370,969 metric tons of kaolin.

Until recently, we conducted a pig iron operation in northern Brazil, which utilized two conventional mini-blast furnaces to produce 350,000 metric tons of pig iron per year, using iron ore from our Carajás mines in northern Brazil. In February 2012, we began shutting down all of our pig iron operations.

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 2011, we performed an analysis of our reserve estimates for certain projects and operations, which is reflected in new estimates as of December 31, 2011. Reserve estimates for each operation assume that we either have or will obtain all of the necessary rights and permits to mine, extract and process ore reserves at each mine. 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*.

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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, 2011. 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:		
Lump ore Midwestern System	78.42	Average realized price
Pellet feed Samarco	111.83	Average realized price
Pellet feed Southeastern System	106.23	Average realized price
Pellet feed Southern System	95.58	Average realized price
Sinter feed Northern System	102.56	Average realized price
Sinter feed Southeastern System	100.37	Average realized price
Sinter feed Southern System	95.63	Average realized price
Coal:		
Hard metallurgical Moatize	209.70	Reference price for standard hard coking coal
Metallurgical Australia	177.26	Average realized price
Thermal Australia	93.43	Average realized price
Thermal El Hatillo	81.90	Average realized price
PCI Australia	147.98	Average realized price
Base metals:		
Nickel	19,775.44	Average LME spot price for nickel
Copper	7,165.02	Average LME spot price for copper
Nickel by-products:		
Platinum	1,484.00/ t oz	Average realized price
Palladium	530.93/ t oz	Average realized price
Gold	1,310.23/ t oz	Average realized price
Cobalt	16.37/ lb	99.3% low cobalt metal (source: Metal Bulletin)
Fertilizer nutrients:		
Phosphate	145.00	Average benchmark price for phosphate concentrate, FOB Morocco (source: Fertilizer Week)
Potash	466.00	Average benchmark price for potash, FOB Vancouver (source: Fertilizer Week)
Other:		
Manganese	260.00	CIF China, 44% manganese grade (source: CRU)
Kaolin	238.00	Average realized price

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 6.4% from 2010 to 2011, reflecting an updated geological model which

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incorporated new drilling data from Conceição, Galinheiro, Sapecado and Serra Leste deposits, which more than offset mining depletion.

Summary of total iron ore reserves(1)

	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Southeastern System	2,200.6	49.6	1,307.7	49.2	3,508.3	49.4	3,499.0	50.6
Southern System	2,085.2	49.0	2,124.9	46.6	4,210.1	47.8	3,271.3	50.3
Midwestern System	7.7	62.6	27.2	62.1	34.9	62.2	35.4	62.2
Northern System	4,928.7	66.7	2,453.9	66.6	7,382.7	66.7	7,260.0	66.7
Vale Total	9,222.2	58.6	5,913.7	55.6	15,135.9	57.4	14,065.7	58.9
Samarco(2)	1,104.2	42.3	925.2	39.8	2,029.4	41.2	2,068.9	41.2
Total	10,326.4	56.9	6,838.9	53.4	17,165.3	55.5	16,134.6	56.6

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture content: Southeastern System 4%; Southern System 5%; Midwestern System 3%; Northern System 6%; and Samarco 7%. Grade is % of Fe.

(2) Reserves of Samarco's Alegria iron ore mines. 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)

	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Itabira site								
Conceição	524.6	46.1	105.9	47.9	630.5	46.4	295.5	51.9
Minas do Meio	235.8	51.7	81.6	48.5	317.4	50.9	471.6	54.6
Minas Centrais site								
Água Limpa(2)	34.2	41.8	10.1	42.1	44.2	41.9	45.1	41.7
Gongo Soco	40.0	66.7	10.8	66.2	50.8	66.6	54.8	65.4
Brucutu	247.5	51.0	288.2	48.7	535.7	49.8	652.2	49.0
Apolo	292.4	57.4	339.7	55.1	632.1	56.1	632.1	56.1
Mariana site								
Alegria	139.9	49.1	26.6	46.6	166.5	48.7	178.9	49.2
Fábrica Nova	451.1	45.6	349.0	44.1	800.1	45.0	830.9	45.2
Fazendão	235.2	49.8	95.7	50.1	330.9	49.9	337.8	49.9
Total Southeastern System	2,200.6	49.6	1,307.7	49.2	3,508.3	49.4	3,499.0	50.6

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture content: Itabira site 2%; Minas Centrais site 7%; Mariana site 4%. 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) Vale's equity interest in Água Limpa is 50.0% and the reserve figures have not been adjusted to reflect our ownership interest.

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

	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Minas Itabiritos site								
Segredo	131.9	51.7	162.3	48.2	294.3	49.8	299.4	49.8
João Pereira	217.0	42.4	300.4	41.4	517.4	41.8	527.6	41.9
Sapecado	354.3	46.3	208.7	42.9	563.0	45.0	231.7	53.0
Galinheiro	570.4	45.4	410.5	43.8	980.9	44.7	311.8	54.2
Vargem Grande site								
Tamanduá	245.4	54.2	244.0	51.2	489.3	52.7	502.5	52.9
Capitão do Mato	190.5	55.2	557.0	50.6	747.5	51.8	761.3	52.0
Abóboras	224.3	45.2	216.5	43.5	440.8	44.4	446.8	44.5
Paraopeba site								
Jangada	34.1	66.8	14.0	66.3	48.1	66.7	52.8	66.6
Córrego do Feijão	27.4	67.0	3.3	63.7	30.7	66.6	31.9	66.6
Capão Xavier	74.4	65.0	6.8	64.3	81.2	65.0	86.5	65.0
Mar Azul	15.5	58.1	1.4	58.2	16.8	58.1	19.0	58.1
Total Southern System	2,085.2	49.0	2,124.9	46.6	4,210.1	47.8	3,271.3	50.3

(1) Tonnage is stated in millions of metric tons of wet run-of-mine. Grade is % of Fe, based on the following moisture content: Minas Itabiritos site 5%; Vargem Grande site 5%; Paraopeba site 4%. Approximate drill hole spacing used to classify the reserves were: 100m × 100m to proven reserves and 200m × 200m to probable reserves.

Iron ore reserves per mine in the Midwestern System(1)(2)(3)

	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Urucum	7.7	62.6	27.2	62.1	34.9	62.2	35.4	62.2
Total Midwestern System	7.7	62.6	27.2	62.1	34.9	62.2	35.4	62.2

(1) The Midwestern System is comprised of the Urucum and Corumbá mine.

(2) We are conducting a review of Corumbá's reserve model.

(3) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture content: 3%. Grade is % of Fe. Approximate drill hole spacings used to classify the reserves were: 70m × 70m to proven reserves and 140m × 140m to probable reserves.

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

	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Serra Norte site								
N4W	1,167.0	66.5	279.2	66.1	1,446.2	66.5	1,486.7	66.5
N4E	275.5	66.5	88.7	66.0	364.2	66.4	384.6	66.4
N5	297.4	66.9	727.8	67.2	1,025.3	67.2	1,088.2	67.1
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	143.0	65.7	164.4	65.1	307.4	65.4	60.9	66.2

Total Northern System	4,928.7	66.7	2,453.9	66.6	7,382.7	66.7	7,260.0	66.7

(1) Tonnage is stated in millions of metric tons of wet run-of-mine, based on the following moisture content: Serra Norte 8%; Serra Sul 5%; Serra Leste 4%. Grade is 66.7% of Fe. Approximate drill hole spacings used to classify the reserves are: 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.

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Iron ore reserves per Samarco(1)(2)

	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Samarco								
Alegria Norte/Centro	681.3	44.0	548.0	40.7	1,229.3	42.5	1,252.1	42.6
Alegria Sul	423.0	39.6	377.1	38.5	800.1	39.1	816.8	39.1
Total Samarco	1,104.2	42.3	925.2	39.8	2,029.4	41.2	2,068.9	41.2

(1) Tonnage is stated in millions of metric tons of wet run-of-mine based on the following moisture content: 7%. Grade is % of Fe. Approximate drill hole spacings used to classify the reserves are: Alegria Norte/Centro, 150m × 100m to proven reserves and 200m × 300m 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.

Southeastern System iron ore mines

	Type	Operating since	Projected exhaustion date	Vale interest (%)
Itabira site				
Conceição	Open pit	1957	2025	100.0
Minas do Meio	Open pit	1976	2022	100.0
Minas Centrais site				
Água Limpa	Open pit	2000	2016	50.0
Gongo Soco	Open pit	2000	2022	100.0
Brucutu	Open pit	1994	2023	100.0
Apolo	Open pit		2039	100.0
Mariana site				
Alegria	Open pit	2000	2023	100.0
Fábrica Nova	Open pit	2005	2034	100.0
Fazendão	Open pit	1976	2044	100.0

Southern System iron ore mines

	Type	Operating since	Projected exhaustion date	Vale interest (%)
Minas Itabiritos site				
Segredo	Open pit	2003	2035	100.0
João Pereira	Open pit	2003	2035	100.0
Sapecado	Open pit	1942	2037	100.0
Galinheiro	Open pit	1942	2036	100.0
Vargem Grande site				
Tamanduá	Open pit	1993	2036	100.0
Capitão do Mato	Open pit	1997	2040	100.0
Abóboras	Open pit	2004	2033	100.0
Paraopeba site				
Jangada	Open pit	2001	2019	100.0
Córrego do Feijão	Open pit	2003	2015	100.0
Capão Xavier	Open pit	2004	2018	100.0
Mar Azul	Open pit	2006	2017	100.0

Midwestern System iron ore mines

Type	Operating since	Projected exhaustion date	Vale interest (%)

Urucum	Open pit	1994	2029	100.0

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Northern System iron ore mines				
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Serra Norte				
N4W	Open pit	1994	2037	100.0
N4E	Open pit	1984	2021	100.0
N5	Open pit	1998	2027	100.0
Serra Sul				
S11	Open pit		2065	100.0
Serra Leste				
SL1	Open pit		2064	100.0

Samarco iron ore mines				
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Samarco				
Alegria Norte/Centro	Open pit	2000	2052	50.0
Alegria Sul	Open pit	2000	2052	50.0

Manganese ore reserves

No new manganese ore reserves were added in 2011.

Manganese ore reserves(1)(2)								
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Azul	37.1	40.7	8.3	39.50	45.4	40.5	48.5	40.7
Urucum	0.0	0.0	6.2	45.13	6.2	45.1	6.6	45.0
Morro da Mina	8.9	25.3	5.9	24.81	14.8	25.1	15.1	24.3
Total	46.0	37.7	20.4	36.94	66.5	37.5	70.1	37.6

(1) Tonnage is stated in millions of metric tons of wet run-of-mine. Grade is % of Mn.

(2) The average moisture of the manganese ore reserves is: Azul (20.22%), Urucum (4.20%), Morro da Mina (3.38%).

The operating lifetime and projected exhaustion date of the manganese mines is shown below.

Manganese ore mines				
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Azul	Open pit	1985	2022	100.0
Urucum	Underground	1976	2020	100.0
Morro da Mina	Open pit	1902	2045	100.0

Coal reserves

Our coal reserve estimates have been provided on an in-place material basis after adjustments for mining 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. Some of our coal reserve estimates were prepared by the following independent consultants: IMC Mining Services (Integra Coal Open Cut and Integra Underground), Echelon Mining services (Isaac Plains), SRK Consulting

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(Carborough Downs) and Snowden Mining Industry Consultants Pty Ltd. (Moatize), each of whom has consented to the inclusion of these estimates herein.

		Coal ore reserves(1)					
	Coal type	Proven 2011 (tonnage)	Probable 2011 (tonnage)	Total 2011 (tonnage)	Total 2011 (calorific value)	Total 2010 (tonnage)	Total 2010 (calorific value)
Integra Coal:							
Integra Open-cut	Metallurgical & thermal	18.6	6.2	24.8	29.9	25.2	29.9
Integra Underground Middle Liddell Seam	Metallurgical		10.7	10.7		12.5	
Integra Underground Hebden Seam	Metallurgical		30.8	30.8		30.8	
Total Integra Coal		18.6	47.7	66.3		68.5	
Carborough Downs Underground	Metallurgical & PCI	35.1	5.2	40.3	31.7 (PCI)	42.3	31.7 (PCI)
Isaac Plains North Open Cut	Metallurgical, PCI & thermal	17.4	1.2	18.6	31.0 (PCI) 27.8 (thermal)	23.4	31.0 (PCI) 27.8 (thermal)
El Hatillo	Thermal	32.7		32.7	25.2	46.7	25.8
Moatize	Metallurgical & thermal l	419.9	532.0	951.9	27.2	954.0	27.2
Total		523.7	586.1	1,109.8		1,134.9	

(1) Tonnage is stated in millions of metric tons. Reserves are reported on a variable basis in regard to moisture: Integra Open Cut on in-situ estimated basis, Integra Underground on in-situ estimated basis + 2%, Carborough Downs on air dried basis, and Isaac Plains North on in-situ estimated basis + 2%. El Hatillo reserves are based on in-situ moisture and Moatize is reported on an air-dried 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 and PCI coals.

(2) 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.

Reserves at Integra Open Cut, the Middle Liddell Seam for Integra Underground, Carborough Downs and Isaac Plains decreased in 2011 due to mining depletion. Reserves for the Hebden Seam for Integra Underground remained the same. The reduction in the El Hatillo reserves reflects the mine ROM production in 2011, but also revisions to the geological model, underlying economic assumptions and mining plans. The reduction of reserves at Moatize reflects the mine production in the second half of 2011.

	Coal mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Integra Coal:				
Open-cut	Open pit	1991	2019	61.2
Middle Liddell Seam	Underground	1999	2016	61.2
Hebden Seam	Underground		2027	61.2
Carborough Downs	Underground	2006	2022	85.0
Isaac Plains	Open pit	2006	2026	50.0
El Hatillo	Open pit	2007	2018	100.0
Moatize	Open pit	2011	2046	95.0

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Nickel ore reserves

Our nickel reserve estimates are of in-place material after adjustments for mining 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	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury	59.8	1.20	45.6	1.14	105.4	1.18	112.3	1.20
Thompson	7.7	1.83	19.9	1.72	27.5	1.75	26.7	1.72
Voisey's Bay	18.7	2.80	3.1	0.65	21.8	2.50	24.1	2.58
Indonesia								
PTVI	72.1	1.84	37.3	1.70	109.4	1.79	113.7	1.79
New Caledonia								
VNC	100.4	1.34	26.4	1.85	126.8	1.44	126.4	1.44
Brazil								
Onça Puma	47.1	1.74	35.8	1.25	82.9	1.52	82.7	1.73
Total	305.8	1.59	168.1	1.46	473.8	1.54	485.9	1.59

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

In Canada, reserves at our Sudbury operations decreased due primarily to mining depletion and reclassification of mineral reserves to mineral resources and certain re-interpretations. Reserves at our Thompson operations increased slightly due to resources-to-reserves conversion that offset mine depletions incurred during the year. Reserves at our Voisey's Bay operations decreased primarily due to mining depletion that was partially offset by resources being converted to reserves.

Reserves at PTVI decreased as a result of adjustments for mining depletion and changes in ore modeling and pit designs that were partially offset by the conversion of resources to reserves.

Reserves grades at Onça Puma changed from 2010 estimates due to re-evaluation of dilution factors. At VNC, there was a slight increase in the reserve estimates from 2010 due to a change in the plant feed constraint that allowed for more high magnesia material than in prior estimates.

	Nickel ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2040	100.0
Thompson	Underground	1961	2026	100.0
Voisey's Bay	Open pit	2005	2023	100.0
Indonesia				
PTVI	Open cast	1977	2035	59.2
New Caledonia				
VNC	Open pit	2011	2041	74.0
Brazil				
Onça Puma	Open pit	2011	2044	100.0

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Copper ore reserves

Our copper 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.

	Copper ore reserves(1)							
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury	59.8	1.50	45.6	1.52	105.4	1.51	112.3	1.53
Thompson							26.7	0.10
Voisey's Bay	18.7	1.56	3.1	0.36	21.8	1.39	24.1	1.48
Brazil								
Sossego	133.4	0.83	20.8	0.67	154.1	0.81	165.7	0.84
Salobo	569.2	0.74	543.5	0.64	1,112.8	0.69	1,116.0	0.69
Total	781.1	0.83	613.0	0.71	1,394.1	0.78	1,444.8	0.77

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

In Canada, our copper ore reserve estimates decreased for the same reasons discussed above in connection with nickel reserves, since these deposits are also of polymetallic ore. In addition, we determined that there was not enough geological confidence to report copper as mineral reserves any longer in Thompson, although we have recovered there for many years and will continue to recover copper in concentrate as a by-product of the nickel operations. In Brazil, reserves at Sossego have decreased from last year due to mine depletions, partially offset by new drilling results that increased the mineral reserves. The change of reserves at Salobo is due to an updated mining plan that assumes higher operational costs relative to increases in assumed prices. The Salobo mine is currently in the pre-operating phase.

	Copper ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2040	100.0
Voisey's Bay	Open pit	2005	2023	100.0
Brazil				
Sossego	Open pit	2004	2023	100.0
Salobo	Open pit		2046	100.0

PGMs and other precious metals reserves

We expect to recover significant quantities of precious metals as by-products of our Canadian operations, Sossego and from the Salobo project. Our reserve estimates are of in-place material after

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adjustments for mining depletion and mining losses and recoveries, with no adjustments made for metal losses due to processing.

	Precious metals reserves(1)							
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury								
Platinum	59.8	0.7	45.6	1.2	105.4	0.8	112.3	0.9
Palladium	59.8	0.8	45.6	1.4	105.4	1.1	112.3	1.1
Gold	59.8	0.3	45.6	0.5	105.4	0.4	112.3	0.4
Brazil								
Sossego								
Gold	133.4	0.2	20.8	0.2	154.1	0.2	165.7	0.3
Salobo								
Gold	569.2	0.45	543.5	0.40	1,112.8	0.43	1,116.0	0.4
Total Gold	762.4	0.39	609.9	0.40	1,372.3	0.40	1,394.0	0.4

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

In Canada our mineral reserve estimates for platinum, palladium and gold decreased for the reasons discussed above in connection with nickel reserves. In Brazil, reserves at Sossego have decreased from last year due to mining depletions, partially offset by new drilling results that increased the mineral reserves. The change of reserves at Salobo is due to an updated mining plan that assumes higher operational costs relative to increases in assumed prices.

	Precious metals mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2040	100.0
Brazil				
Sossego	Open pit	2004	2023	100.0
Salobo	Open pit		2046	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 mining depletion and mining losses (or screening in the case of VNC) and recoveries, with no adjustments made for metal losses due to processing.

	Cobalt ore reserves(1)							
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Canada								
Sudbury	59.8	0.04	45.6	0.03	105.4	0.04	112.3	0.04
Voisey's Bay	18.7	0.14	3.1	0.03	21.8	0.12	24.1	0.12
New Caledonia								
VNC	100.4	0.12	26.4	0.08	126.8	0.11	126.4	0.11
Total	178.9	0.10	75.1	0.05	254.0	0.08	262.8	0.08

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

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Our cobalt reserve estimates decreased in 2011 for the reasons discussed above in connection with nickel reserves.

	Cobalt ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Canada				
Sudbury	Underground	1885	2040	100.0
Voisey's Bay	Open pit	2005	2023	100.0
New Caledonia				
VNC	Open pit		2041	74.0

Phosphate reserves

Our phosphate reserve estimates are of in-place material after adjustments for mining dilution, with no adjustments made for process recovery. The decrease in our phosphate reserve estimates reflects mine production and sales in 2011.

	Phosphate reserves(1)							
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Bayóvar	229.0	17.3	1.9	15.9	230.9	17.2	239.0	17.2
Catalão	52.9	10.3	7.6	10.2	60.5	10.3	66.7	10.4
Tapira	255.7	7.0	461.6	6.6	717.3	6.7	732.6	6.7
Araxá	142.8	11.7	4.7	9.4	147.5	11.6	155.9	11.6
Cajati	77.1	5.3	48.3	4.7	125.4	5.1	130.5	5.2
Salitre			205.7	11.4	205.7	11.4	206.0	11.4
Total	757.5	11.06	729.8	7.91	1,487.3	9.48	1,530.4	9.5

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

	Phosphate rock ore mine			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Bayóvar	Open pit	2010	2037	40.0(1)
Catalão	Open pit	1982	2020	100.0
Tapira	Open pit	1979	2054	100.0
Araxá	Open pit	1977	2027	100.0
Cajati	Open pit	1970	2035	100.0
Salitre	Open pit		2033	100.0

(1) Vale holds 51% of the voting capital and 40% of the total capital of MVM Resources International, B.V., the entity that controls Bayóvar.

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Potash ore reserves

Our 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.

	Potash ore reserves(1)							
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade	Tonnage	Grade
Taquari-Vassouras	8.5	28.0	3.0	28.0	11.5	28.0	13.4	28.0
Rio Colorado			360.8	34.2	360.8	34.2	360.8	34.2
Total	8.5	28.0	363.8	34.1	372.3	34.0	374.2	34.0

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

	Potash ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Taquari-Vassouras(1)	Underground	1986	2016	100.0
Rio Colorado	Solution mining		2039	100.0

(1) We have a 25-year lease, which was signed in 1991, with Petrobras.

Kaolin ore reserves

Our 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.

	Kaolin ore reserves(1)							
	Proven	2011	Probable	2011	Total	2011	Total	2010
	Tonnage	Brightness	Tonnage	Brightness	Tonnage	Brightness	Tonnage	Brightness
Morro do Felipe	29.8	86.7	12.2	86.7	42.0	86.7	31.2	86.7

(1) Tonnage is stated in millions of metric tons. Brightness is stated in percentage terms.

Reserves at Morro do Felipe increased to 42.0 million metric tons, primarily reflecting an update to the geological model with detailed new deposits.

	Kaolin ore mines			
	Type	Operating since	Projected exhaustion date	Vale interest (%)
Morro do Felipe	Open pit	1976	2060	61.5

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CAPITAL EXPENDITURES AND PROJECTS

We have an extensive program of investments in the organic growth of our businesses. During 2011, we made capital expenditures and other investments of US$17.994 billion, of which US$13.426 billion was organic growth, while US$4.568 billion was invested in maintaining existing operations. As previously disclosed, the 2012 investment budget approved by our Board of Directors in November 2011 is US$12.949 billion for project execution, US$2.357 billion for research and development (R&D) and US$6.106 billion for sustaining existing operations. The capital expenditures, including R&D expenses, are reported on the basis of financial disbursements. A large part of the capital expenditures budget will be invested in Brazil (63.7%) and in Canada (11.7%). The remainder is allocated to investments in Argentina, Australia, Chile, China, Guinea, Indonesia, Malaysia, Mozambique, New Caledonia, and Peru, among other countries.

	2010 expenditures (US$ million)	2011 expenditures (US$ million)	2012 budget (US$ million)	2012 budget (% of total)
Organic growth	US$9,375	US$13,426	US$15,309	71.5%
Project execution	8,239	11,684	12,949	60.5
Research and development	1,136	1,742	2,357	11.0
Investments to sustain existing operations	3,330	4,568	6,106	28.5
Total	US$12,705	US$17,994	US$21,411	100.0%

The following table summarizes by major business area the breakdown of our capital expenditures in 2010 and 2011 and our investment budget for 2012.

	2010 (US$ million)	2010 (% of total)	2011 (US$ million)	2011 (% of total)	2012 budget (US$ million)	2012 budget (% of total)
Bulk materials	US$7,046	55.5%	US$10,247	56.9%	US$11,903	55.6%
Ferrous minerals	6,079	47.8	9,049	50.3	10,002	46.7
Coal	967	7.6	1,197	6.7	1,901	8.9
Base metals	2,973	23.4	4,082	22.7	4,630	21.6
Fertilizer nutrients	843	6.6	1,347	7.5	2,050	9.6
Logistics for general cargo(1)	247	1.9	446	2.5	518	2.4
Energy	656	5.2	820	4.6	775	3.6
Steel	186	1.5	460	2.6	621	2.9
Other	755	5.9	592	3.3	914	4.3
Total	US$12,705	100.0%	US$17,994	100.0%	US$21,411	100.0%

(1) Investments in logistics dedicated to a particular business segment are included with that segment in our capital expenditure data.

The following table sets forth total expenditures in 2011 for our main investment projects and expenditures budgeted for those projects in 2012, together with estimated total expenditures for each project

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and the estimated start-up date of each project as of December 31, 2011. The information below describing the status of each project has generally not been updated to reflect developments since December 31, 2011.

Business area	Project(1)	Estimated Start-up	Actual 2011(2)	Expected capex 2012	Total(3)
				(US$ million)	
Iron ore mining and logistics	Carajás Additional 40 Mtpy	2H13	496	622	2,968
	CLN 150 Mtpy	1H14	1,486	890	3,477
	Carajás Serra Sul S11D	2H16	736	794	8,039
	Serra Leste	1H13	116	239	478
	Conceição Itabiritos	2H13	366	184	1,174
	Vargem Grande Itabiritos	1H14	371	429	1,645
	Conceição Itabiritos II	2H14	150	297	1,189
	Simandou I Zogota	1H12	178	380	1,260
	Teluk Rubiah	1H14	168	367	1,371
	Oman(4)	2011	278	17	1,356
Pellet plants	Tubarão VIII	2H12	187	239	968
	Samarco IV(5)	1H14			1,693
Coal mining and logistics	Moatize(4)	2011	696	64	1,882
	Moatize II	2H14	73	499	2,068
	Nacala Corridor	2H14	38	691	4,444
	Eagle Downs(5)	1H16	19	87	875
Copper mining	Salobo	1H12	586	296	2,337
	Salobo II	2H13	267	581	1,427
Nickel mining and refining	Long Harbour	2H13	1,066	1,208	3,600
	Totten	2H13	124	157	759
Potash mining and logistics	Rio Colorado	2H14	608	1,081	5,915
Energy	Biodiesel	2015	208	227	633
	Estreito(4)	2011	83	53	878
	Karebbe(4)	2011	93	5	410
	Belo Monte(5)	1H15	86	48	1,628
Steelmaking	CSP(4)	1H15	261	563	2,648

(1) Projects approved by the Board of Directors.

(2) All figures presented on a cash basis.

(3) Estimated total capital expenditure cost for each project.

(4) Projects delivered in 2011.

(5) Expected capex is relative to Vale's stake in each project.

Bulk materials and logistics projects

Iron ore mining and logistics projects:

Carajás Additional 40 Mtpy. Construction of an iron ore dry processing plant located in Carajás, in the Brazilian state of Pará. The installation license was issued and civil engineering works and earthworks services to install the conveyor belt are in progress. The project has an estimated nominal capacity of 40 Mtpy. The project is 48% complete, with total realized expenditures of US$1.5 billion. Start-up is expected for the second half of 2013.

CLN 150 Mtpy. Expansion of Northern system railway and port capacity, including the construction of a fourth pier at the Ponta da Madeira maritime terminal in the Brazilian state of Maranhão. Offshore civil engineering works at Ponta da Madeira maritime terminal have started, and we are assembling the ship loaders and conveyor belts. The civil engineering necessary for the installation of the car dumpers has concluded, and mechanical assembly has begun. Earthworks in the railway line and terminal are in progress. One of the required railway installation licenses is expected to be issued in the second half of 2012. The project will increase EFC's logistics nominal capacity to

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approximately 150 Mtpy. The project is 67% complete, with total realized expenditures of US$2.3 billion. Start-up is expected for the first half of 2014.

Carajás Serra Sul S11D. Development of a mine and processing plant, located in the Southern range of Carajás, in the Brazilian state of Pará. We are investing capital for earthworks services and building the access road, prior to the issuance of environmental permits. We expect to receive the preliminary environmental license in the first half of 2012, with the installation license expected to be issued in the first half of 2013. The project has an estimated nominal capacity of 90 Mtpy. The project is 25% complete, with total realized expenditures of US$1.1 billion. Start-up is expected for the second half of 2016.

Serra Leste. Construction of a new processing plant located in Carajás, in the Brazilian state of Pará. Civil engineering works for the plant and excavation are underway. We expect the installation licenses to be issued in the first half of 2012. The project has an estimated nominal capacity of 6 Mtpy. The project is 26% complete, with total realized expenditures of US$143 million. Start-up is expected for the first half of 2013.

Conceição Itabiritos. Construction of a concentration plant, located in the Southeastern System. The mills assembly was finalized and the issuance of the pending installation license for the energy transmission line is expected in the first half of 2012. The project has an estimated nominal capacity of 12 Mtpy. The project is 86% complete, with total realized expenditures of US$553 million. Start-up is expected for the second half of 2013.

Vargem Grande Itabiritos. Construction of a new iron ore treatment plant in the Southern System, with an estimated nominal capacity of 10 Mtpy. The installation license was issued in 2009. We expect to receive the installation license for the energy transmission line and for the electrical sub-station in the first half of 2012. The project is 46% complete, with total realized expenditures of US$429 million. Start-up is expected for the first half of 2014.

Conceição Itabiritos II. Adaptation of the plant to process low-grade itabirites, located in the Southeastern System. The heavy equipment was received and assembly has started. Civil engineering works for the installation of primary crushers are ongoing. The installation license has been issued. The project has an estimated nominal capacity of 19 Mtpy. The project is 20% complete, with total realized expenditures of US$159 million. Start-up is expected for the second half of 2014.

Simandou I Zogota. Development of the Zogota mine and processing plant in Simandou South, Guinea. The project has an estimated nominal capacity of 15 Mtpy. The project is in an early stage of development and first production is expected in 2012.

Teluk Rubiah. Construction of a maritime terminal with enough depth for the 400,000 dwt vessels and a stockyard in Teluk Rubiah, Malaysia. The stockyard will be capable of handling up to 30 Mtpy of iron ore products. The preliminary environmental license, construction and installation licenses have been issued. The operation license is expected to be issued in the first half of 2014. The project is on schedule and we are executing earthworks. The project is 14% complete, with total realized expenditures of US$215 million. Start-up is expected in the first half of 2014.

Pellet plant projects:

Tubarão VIII. Eighth pellet plant at our existing complex at the Tubarão Port, Espírito Santo, Brazil. We are assembling equipment and metallic structures. Issuance of the operation license is expected for the second half of 2012. We expect the plant to have production capacity of 7.5 Mtpy. The plant is 80% complete, with total realized expenditures of US$612 million. Start-up is expected in the second half of 2012.

Samarco IV. Construction of Samarco's fourth pellet plant, and an expansion of the mine, pipeline and maritime terminal infrastructure. The project has an estimated nominal capacity of 8.3 Mtpy, increasing Samarco's capacity to 30.5 Mtpy. The

project is 18% complete. The budget is fully sourced by Samarco. Start-up is expected for the first half of 2014.

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Coal mining and logistics projects:

Moatize II. New pit and duplication of the Moatize CHPP, as well as all related infrastructure, located in Tete, Mozambique. Geological research studies and a detailed engineering project are in progress. There are no pending installation licenses. The project will increase Moatize's total nominal capacity to 22 Mtpy (70% coking coal and 30% thermal). The project is 4% complete, with total realized expenditures of US$73 million. Start-up is expected in the second half of 2014.

Nacala Corridor. Railway and port infrastructure connecting Moatize site to the Nacala-à-Velha maritime terminal, located in Nacala, Mozambique. The project comprises the recovery of 682 km of the existing railway in Malawi and Mozambique, the construction of a maritime terminal and 230 km of new railways, composed by a 201 km stretch connecting Moatize to Nkaya, Malawi, and 29 km linking the railway to Nacala-à-Velha. The concession agreement with the government of Malawi for a railway crossing the country has been signed. Development of the engineering project is in progress. Vegetation clearing licenses were obtained for the construction of the railway and maritime terminal in Mozambique. The project has an estimated nominal capacity of 18 Mtpy. The project is in an early stage of development, with total realized expenditures of US$38 million. Start-up is expected in the second half of 2014.

Eagle Downs. New underground mine development including CHPP, as well as all related infrastructure, located in the Bowen Basin, Queensland, Australia. The project is planned to be developed in a 50/50 JV with Aquila Coal Pty Ltd, a subsidiary of Aquila Resources Limited. The project has an estimated nominal capacity of 4 Mtpy (100% coking coal). The project was approved by both JV participant boards and is in an early stage of development, with total realized expenditures of US$19 million. Start-up is expected for the first half of 2016.

Base metal projects

Copper mining projects:

Salobo. Development of mine, plant and related infrastructure, located in Marabá, in the Brazilian state of Pará. The primary and secondary crushers, primary screening and conveyor belt have been commissioned. The project has an estimated nominal capacity of 100,000 tpy of copper in concentrate. The project is 97% complete, with total realized expenditures of US$2.0 billion. Start-up is expected for the first half of 2012.

Salobo II. Salobo expansion, raising of the tailing dam height and increasing the mine capacity, located in Marabá, in the Brazilian state of Pará. Civil works at the flotation circuit are in progress and the construction of the ball mill was initiated. The plant operating license is expected to be issued in the second half of 2013. The project is expected to provide an additional estimated nominal capacity of 100,000 tpy of copper in concentrate. The project is 49% complete, with total realized expenditures of US$354 million. Start-up is expected in the second half of 2013.

Nickel mining and refining projects:

Long-Harbour. Construction of a hydrometallurgical facility in Long Harbour, Newfoundland and Labrador, Canada. The plant is under construction and electromechanical assembly is in progress. The plant will have an estimated nominal refining capacity of 50,000 tpy of finished nickel, and associated copper and cobalt. The project is 59% complete, with total realized expenditures of US$1.7 billion. Start-up is expected in the second half of 2013.

Totten. Nickel mine (re-opening) in Sudbury, Ontario, Canada. The project has an estimated nominal capacity of 8,200 tpy. The project is 51% complete, and US$402 million of expenditures have been realized. Start-up is expected for the second half of 2013.

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Fertilizers nutrients projects

Potash mining and logistics projects:

Rio Colorado. Investments in a solution mining system, located in Mendoza, Argentina, including the renovation of railway tracks (440 km), construction of a railway spur (350 km) and a maritime terminal in Bahia Blanca, Argentina. An employee camp has been built in Malargue, Mendoza. The environmental licenses for the construction of the new railway and agreements with four Argentinian provinces have been obtained. The issuance of an installation license is expected for the first half of 2012. The project has an estimated nominal capacity of 4.3 Mtpy of potash (KCl). The project is 27% complete, with total realized expenditures of US$826 million. Start-up is expected in the second half of 2014.

Energy projects

Biodiesels. Project to produce biodiesel from palm oil. Plantation of 80,000 ha of palm trees located in the Brazilian state of Pará. The biodiesel plant's FEL III is expected for July 2013, while the preliminary environmental license and construction and installation license issuance are all expected for the second half of 2013. The project has an estimated nominal capacity of 360,000 tpy of biodiesel. US$343 million of expenditures have been realized. Start-up is expected for 2015.

Belo Monte. The Belo Monte Hydroelectric Power Plant will be built on the Xingu River, in the Brazilian state of Pará and will have an installed capacity of 11,233 MW. Vale has a 9% stake in NESA, the company established to develop and operate the Belo Monte hydroelectric plant. Vale's share of Belo Monte capacity will supply Vale's demand on the northern region of Brazil. The project is in an early stage of development, with total realized expenditures of US$85 million. Start-up is expected in the first half of 2015.

Steel projects

Companhia Siderúrgica do Pecém ("CSP"). Development of a steel slab plant in the Brazilian state of Ceará in partnership with Dongkuk Steel Mill Co. ("Dongkuk") and Posco, two major steel producers in South Korea. Vale holds 50% of the joint venture. The project implementation started in December 2011. Preliminary environmental and installation licenses were already obtained. The project will have an estimated nominal capacity of 3.0 Mtpy. Start-up is expected in the first half of 2015.

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

In order to conduct mining activities, we are generally required to obtain some form of governmental permits, which differ in form depending on the jurisdiction but may include concessions, licenses, claims, tenements, leases or permits (all of which we refer to below as "concessions"). Some concessions are of indefinite duration, but many have specified expiration dates and may not be renewable. The legal and regulatory regime governing concessions differs among jurisdictions, often in important ways. For example in many jurisdictions, including Brazil, mineral resources belong to the State and may only be extracted pursuant to a concession. In other jurisdictions, including Canada, a substantial part of our mining operations is conducted pursuant to mining rights we own or pursuant to leases, often from government agencies.

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The table below summarizes our principal mining concessions and other similar rights. In addition to the concessions described below, we have exploration licenses and Brazilian exploration applications with priority covering 7.03 million hectares in Brazil and 18.2 million hectares in other countries.

Location	Concession or other right	Approximate area covered (in hectares)	Expiration date
Brazil	Mining concessions(1)	650,810	Indefinite
Canada	Mining concessions (total)	265,804	2011-2032
Ontario	Mineral leases	20,994	2012-2032
	Patented mineral rights	82,969	None
	Mining license of occupation	3,075	Indefinite
Manitoba	Order in Council leases	109,043	2020-2025
	Mineral leases	4,854	2013
	Potash leases	6,533	2016-2030
	Patented mining claims	378	
Newfoundland and Labrador	Mining leases	1,599	2027
Saskatchewan	Potash leases	27,404	2029-2032
	Petroleum and natural gas leases	8,955	2013-2016
Indonesia	Contract of work(2)	190,510	2025
Australia	Mining tenements	26,917	2011-2041
New Caledonia	Mining concessions	21,269	2016-2051
Peru	Mining concessions(3)	187,617	Indefinite
Colombia	Mining concessions	10,730	2028-2032
Argentina	Mining concessions	88,707	Indefinite
Chile	Mining concessions	58,903	Indefinite
Mozambique	Mining concessions	23,780	2032
Zambia	Mining concessions(4)	68,550	2012-2033
China	Mining concessions(5)	12,383	2034
DRC	Mining concessions(4)	9,200	2039
Guinea	Mining concessions	102,400	2035

(1) Includes mining applications.

(2) Under the Mining Law that came into effect in 2009, we may be entitled to apply for at least one 10-year extension.

(3) The Peruvian mining regime comprises only a single license type. The area reported reflects only licenses involving mining activities.

(4) 50-50 joint venture with African Rainbow Minerals Limited.

(5) Joint Venture with Henan Longyu Energy Resources Co., Ltd. Vale has a minority equity interest of 25%.

Many concessions impose specific obligations on the concessionaire governing such matters as how operations are conducted and what investments are required to be made. Our ability to maintain our mineral rights depends on meeting these requirements, which often involve significant capital expenditures and operating costs.

Regulation of mining activities

Mining and mineral processing are subject to extensive regulation, which differs in each jurisdiction in which we operate. Our major operations are subject to legislation and regulations that apply to mining activities, which in many countries include state or provincial law in addition to national or federal law. Many of our concessions, particularly for large operations, impose additional obligations on us as the concessionaire.

The jurisdictions in which we operate typically have government agencies that are charged with granting mining concessions and monitoring compliance with mining law and regulations. For example, mining activities in Brazil are supervised by the National Department of Mineral Production (*Departamento Nacional de Produção Mineral DNPM*), an agency of the federal Ministry of Mines and Energy.

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Changes in mining legislation can have significant effects on our operations. Among the jurisdictions in which we currently have major operations, there are several proposed or recently adopted changes in mining legislation that could materially affect us. These include the following:

The Brazilian government is planning to propose changes to the Brazilian Mining Code, which if adopted may have important implications for mining operations in Brazil or require additional capital expenditures.

In Indonesia, a Mining Law, which came into effect in January 2009, introduced a new licensing regime and called for certain adjustments to mining contracts with the Indonesian government. Regulations implementing the Mining Law have gradually been promulgated by the government, but more are expected. The trend is towards a more regulated environment in the country, including benchmark price or reference price rules for nickel products, which have previously been unregulated. In addition, regulations requiring mining companies to process commodities before exporting them and mandating foreign companies to divest a portion of their stake to domestic entities have also recently been promulgated. In addition, the Indonesian Government has issued a list of nine principal items it intends to adjust in existing contracts of work, including area adjustments, taxes and non-tax state revenue obligations, domestic value added requirements, the duration of any extension, application of a license form for any extensions, priority for local and national contractors and restrictions on use of affiliated companies for mining services. PTVI has submitted to the government its positions regarding these nine items, but no further discussions were initiated by the government during 2011. PTVI continues to monitor developments with respect to the Mining Law and its implementing regulations and assess the impacts that these may have on PTVI's current operations and its future prospects in Indonesia. Until all of the implementing regulations are promulgated, we will be unable to fully determine how and to what extent PTVI's Contract of Work and operations will be affected.

In New Caledonia, a mining law was passed in March 2009 requiring new mining projects to obtain formal authorization rather than simply a declaration. Our application for authorization (replacing a 2005 declaration) must be made by April 2012 and, once submitted, we should obtain the authorization by April 2015. We believe it is unlikely that the application for the authorization will be rejected, but there is a risk that new conditions will be imposed.

In Guinea, a mining code adopted in 2011 imposes on all mining projects a requirement for 15% government participation. Additionally, the new code creates an obligation for an applicant for a mining concession to present a retrocession plan under which 50% of the area it researched during the exploration phase is retroceded to the government.

In Mozambique, the Ministry of Natural Resources is following other African countries in proposing a new mining code with more detailed provisions that reinforce the rights of local communities, give preference to domestic services and establish the possibility of government participation in the case of strategic projects, which have not yet been defined.

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 additional 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 development of a Best Practices Guide for Environmental Licensing and the Environment, the deployment of highly-skilled specialist teams, closer interaction with environmental regulators and the creation of an Executive Committee to expedite internal decisions regarding licensing.

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Environmental regulations affecting our operations relate, among other matters, to emissions into the air, soil and water; recycling and waste management; protection and preservation of forests, coastlines, natural caverns, watersheds and other features of the ecosystem; water use; climate change and decommissioning and reclamation. In many cases, the mining concessions or environmental permits under which we operate impose specific environmental requirements on our operations. Environmental regulations can sometimes change and ongoing compliance can require significant costs for capital expenditures, operating costs, reclamation costs and compliance. For example, in Brazil, a suit challenging a Brazilian environmental decree that permits mining in certain subterraneous areas may adversely affect our ability to conduct some mining operations or even our reserves.

Environmental legislation is becoming stricter worldwide, which could lead to greater costs for environmental compliance. For instance, if we are required to modify installations, substitute carbon-intensive fuels and process inputs, develop new operational procedures or purchase new equipment, our environmental compliance costs could increase. In particular, we expect heightened attention from various governments to reducing greenhouse gas emissions as a result of concern over climate change. Some important environmental regulation and compliance initiatives are described below, but it is unclear whether additional operating or capital expenditures will be required to comply with enacted amendments or what effect these regulations will have on our business, financial results or cash flow from operations:

Our operations in Canada and at PTVI in Indonesia are subject to air emission regulations that address, among other things, sulfur dioxide ("SO2"), particulates and metals. In Canada, we are making significant capital investments to ensure compliance with these emissions standards. In Indonesia, PTVI and the Ministry of Environment have agreed upon an SO2 emission reduction plan, which is currently being implemented and is scheduled for completion in 2013.

The Canadian federal government's efforts to legislate greenhouse gas emission reduction targets for the industrial sectors have slowed down. The three provinces in which Vale operates, Ontario, Manitoba and Newfoundland, have made limited progress in setting greenhouse gas emission targets, with the exception of Manitoba, which has set a provincial target based on 1990 levels. The legislation enacted by the Manitoba government is not anticipated to impact our operations. The Ontario government has enacted legislation that requires annual reporting of greenhouse gas emissions. The provinces of Ontario and Manitoba are considering emissions trading schemes to limit greenhouse gas emissions. The three provinces have begun consulting with various stakeholders with respect to climate change initiatives and are also focusing on adaptation strategies.

In Canada, a number of studies have been completed or are in progress in Sudbury and Port Colborne related to contamination of soil and water from past and continuing activities. We are taking steps, in partnership with other stakeholders, to remediate the ecological impact of our activities.

The Australian government has recently introduced a carbon pricing scheme which will operate initially like a carbon tax with a fixed (but increasing) carbon permit price and will then transition into a cap and trade scheme after three years. The scheme takes effect on July 1, 2012 and will impact Vale's Australian operations.

In October 2009, Indonesia adopted legislation on Environmental Protection and Management. It sets out a broad regulatory structure and provides that many important details will be clarified in later implementing regulations.

Brazil adopted a decree under the federal carbon emissions law in December 2010 that contemplates specific limits on carbon emissions to be established in late 2011 and phased in through 2020. The law establishes a voluntary commitment to cut Brazil's greenhouse gas emissions between 36.1% and 38.9% by 2020, based on 2020 projected emissions, and several

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regulated industries, including the steel, forestry, agriculture and power generation sectors, have designed plans to reduce their greenhouse gas emissions. By 2012, the government plans to issue rules establishing specific limits on carbon emissions from other sectors of the economy, including mining and fertilizers. The Mining and Energy Ministry, with the participation of the Brazilian Mining Association (*Instituto Brasileiro de Mineração IBRAM*) presented the mining sector plan in December 2011.

As part of the Global Reporting Initiative, which provides a reporting framework for economic, environmental and social sustainability, we launched a Sustainability Action Plan (PAS) in 2008. The PAS deals with issues related to water resources, waste treatment and disposal, emissions and energy, which are also associated with the target variable compensation of all employees. The outcome of the PAS indicators provides the Board with relevant inputs for its decision-making process regarding the investments needed for improvement in these areas as well as further exploring their potential.

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:

In 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% on bauxite, potash and manganese ore; and 1% on gold. The Brazilian government is preparing to propose changes in the CFEM regime. Any changes must be incorporated into a final proposal by the DNPM, which is then subject to approval by the Brazilian National Congress. We are currently engaged in several administrative and legal proceedings alleging that we have failed to pay the proper amount of CFEM. See *Additional information Legal proceedings CFEM-related proceedings*.

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 company income tax purposes.

In Indonesia, our subsidiary PTVI pays a royalty fee on, among other items, its nickel production on the concession area and has made certain other commitments. The royalty payment was based on sales volume (US$78 per metric ton of contained nickel matte, and US$140 or US$156 per metric ton of contained cobalt, based on total production). During 2011, the royalty payment was equal to 0.44% of revenues from the sale of nickel in matte products, while the average yearly royalty payment for the period from 2008 to 2011 was equal to 0.5% of revenues from the sale of nickel in matte.

In Australia, royalty is payable on revenues from the sale of minerals. In Queensland, it is 7% of the value (net of freight and late dispatch costs) up to A$100 per ton and 10% of the value thereafter. In New South Wales, it 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.

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The Australian government has introduced a mineral resource rent tax ("MRRT"), which applies beginning in July 2012. The MRRT will tax profits generated from the exploitation of coal and iron ore resources in Australia. The tax will be levied at an effective rate of 22.5% of assessable profit and will be deductible for company income tax purposes. The difference between the MRRT and royalties paid to each state government is that the royalties are based on the volume and value of the resource, whereas the MRRT is based on profits. However, companies will be given a credit for any state-based royalties paid where the MRRT is payable.

In December 2011, the Brazilian states of Pará and Minas Gerais created a new tax on mineral production (*Taxa de Fiscalização de Recursos Minerais TFRM*), due beginning in April 2012. For 2012, the rate of TFRM will be (i) R$6.906 per ton of mineral produced in the state of Pará, and (ii) R$2.3291 per ton of mineral transferred or sold in the state of Minas Gerais. Industry associations believe that the TFRM is unconstitutional and plan to initiate legal proceedings challenging the applicability of the legislation.

Regulation of other activities

In addition to mining and environmental regulation, we are subject to comprehensive regulatory regimes for some of our other activities, including rail transport, electricity generation, and oil and gas. We are also subject to more general legislation on workers' health and safety, safety and support of communities near mines, and other matters.

Our Brazilian railroad business is subject to regulation and supervision by the Brazilian Ministry of Transportation and the transportation regulatory agency (*Agência Nacional de Transportes Terrestres ANTT*), and operates pursuant to concession contracts granted by the federal government. The concession contracts impose certain shareholder ownership limitations. The concession contract for FCA limits shareholder ownership to 20% of the voting capital of the concessionaire, unless such limit is waived by ANTT. We own 99.9% of FCA, which ANTT has authorized. The 20% ownership limitation does not apply to our EFVM, EFC and FNS railroads. ANTT also sets different tariff ceilings for railroad services for each of the concessionaires and each of the different products transported. So long as these limits are respected, the actual prices charged can be negotiated directly with the users of such services.

The MRS concession contract provides that each shareholder can only own up to 20% of the voting capital of the concessionaire, unless otherwise permitted by ANTT. As a result of our acquisitions of CAEMI and Ferteco, our share in the voting capital of MRS surpassed this threshold. As a result, Vale waived its voting and veto rights with respect to MRS shares in accordance with a 2006 ANTT resolution. We continue to have some voting rights with respect to shares owned by a subsidiary.

Our railroad concession contracts have a duration of 30 years and are renewable. The FCA and MRS concessions expire in 2026, and the concessions for EFC and EFVM expire in 2027. We also own the subconcession for commercial operation for 30 years of a 720-kilometer segment of the FNS railroad, in Brazil. This concession expires in 2037.

In 2011, ANTT approved new resolutions, which (i) expanded the trackage rights for concessionaires operating in the railway network and confirmed the ability of non-concessionaires to make investments in the railway network in order to accommodate increased demand, (ii) increased concessionaire obligations and customers rights, (iii) redefined the methodology for assessment of productivity targets by concessionaires and (iv) established a mechanism for ANTT to adjudicate disputes among concessionaires and between concessionaires and non-concessionaires with respect to railway use. Rail concessionaires and the National Association of Rail Carriers (*Associação Nacional dos Transportadores Ferroviários ATNF*), filed a petition with ANTT claiming that such regulatory changes would violate the concession agreements. Additionally, rail concessionaires are discussing with ANTT certain technical and economic aspects of these recent regulations in order to clarify the content of the new regulations, to conform them with Brazilian federal law and the relevant concession agreements, and to protect the investments made by concessionaires.

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In January 2012, ANTT submitted for public comment a proposed regulation to the tariffs charged by the rail concessionaires that would reduce the ceiling for the tariffs able to be charged by concessionaires, which could affect some of our contracts. We will provide comments to ANTT and will continue to work with ANTT so that any approved regulation conforms to the terms and conditions set forth at the time our concession contracts were executed and to applicable law.

In connection with the approval in 2006 of our acquisition of Vale Canada, we made a number of undertakings that expired in October 2011 to the Canadian Minister of Industry under the Investment Canada Act. We believe we were substantially in compliance with these undertakings, which included locating our global nickel business in Toronto, Canada; enhancing investments in a number of areas in Canada; and honoring agreements with provincial governments, local governments, labor unions and aboriginal groups.

Some of our products are subject to regulations applicable to the marketing and distribution of chemicals and other substances. For example, the European Commission has adopted a European Chemicals Policy, known as REACH ("Registration, Evaluation, and Authorization of Chemicals"). Under REACH, manufacturers and importers were required to register new substances prior to their entry into the European market and in some cases may be subject to an authorization process. A company that fails to comply with the REACH regulations could face restrictions to commercialize its products in Europe. We have complied with registration requirements for the substances we import into or manufacture in the EU in 2011 and continue to take measures to manage our exposure to the authorization process.

II. OPERATING AND FINANCIAL REVIEW AND PROSPECTS

Overview

We recorded strong performance in 2011, which is reflected in all-time high figures for operating revenue, operating margin, cash generation and net earnings. Our shipments of iron ore and pellets, which totaled almost 300 million metric tons, were our highest ever, while our sales of nickel and copper were the highest since 2008.

Vale is deeply committed to creating shareholder value, with a strong focus on efficient capital management. To that end, we have implemented several initiatives aimed at minimizing risks of delays and cost overruns in the execution of our projects and have taken a more proactive stance towards returning excess cash to shareholders.

In successfully generating record levels of cash while prudently allocating our capital resources we continue to meet the challenge for growth companies: to finance growth, to maintain a sound balance sheet and to meet shareholders' expectations for capital return.

Below are the main highlights of Vale's performance in 2011:

- gross operating revenue of US$60.4 billion;
- operating income of US$30.1 billion;
- operating margin, measured as the ratio of operating income to net operating revenues, of 48.5% excluding the gain on the sale of our aluminum assets in February 2011;
- record return of capital to shareholders of US$12.0 billion, through cash dividends of US$9.0 billion, equal to US$1.74 per share, and US$3.0 billion in share repurchases;
- net income of US$22.9 billion, or US$4.33 per preferred and common share; and
- strong financial position, supported by cash holdings of US$3.5 billion, availability of significant medium and long-term credit lines and a low-risk debt portfolio.

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Demand and prices

The following table sets forth our average realized prices for our principal products for each of the periods indicated.

	Year ended December 31,				
	2007	**2008**	**2009**	**2010**	**2011**
	(US$ per metric ton, except where indicated)				
Iron ore	45.33	67.32	55.99	103.50	136.07
Iron ore pellets	78.62	131.76	73.75	161.29	193.79
Manganese	107.34	350.46	147.06	230.22	165.70
Ferroalloys	1,311.48	2,709.60	1,395.26	1,547.84	1,443.01
Nickel	37,442.28	21,662.14	14,596.55	21,980.19	22,680.41
Copper	6,611.27	6,331.07	5,229.39	7,730.09	8,420.73
Potash	264.09	591.18	521.46	410.56	505.28
Platinum (US$/oz)	1,314.25	1,557.07	1,073.98	1,661.20	1,716.81
Cobalt (US$/lb)	24.56	31.01	10.03	15.09	15.63
Coal:					
Thermal coal	53.73	85.38	66.60	70.40	95.54
Metallurgical coal	67.37	170.55	115.55	149.96	235.27
Phosphates:					
MAP				565.34	679.65
TSP				451.80	585.98
SSP				221.36	281.53
DCP				570.49	679.63
Nitrogen				450.86	612.01

Iron ore and iron ore pellets

Demand for our iron ore and iron ore pellets is a function of global demand for carbon steel. Demand for carbon steel, in turn, is strongly influenced by global industrial production. Iron ore and iron ore pellets are priced based on a wide array of quality levels and physical characteristics. Various factors influence price differences among the several types of iron ore, such as the iron content of specific ore deposits, the various beneficiation and purifying processes required to produce the desired final product, particle size, moisture content and the type and concentration of contaminants (such as phosphorus, alumina and manganese ore) in the ore. Fines, lump ore and pellets typically command different prices.

Demand from China has been a principal driver of world demand and of prices. Chinese iron ore imports reached 686.1 million metric tons in 2011, 10.8% above the 619.1 million metric tons imported in 2010 and 9.3% higher than 2009 levels, due mainly to the continued growth in Chinese steel production throughout 2011. We expect China's economic growth to continue at a high rate during 2012, mainly driven by domestic demand.

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.

Manganese and ferroalloys

The prices of manganese ore and ferroalloys are mainly influenced by trends in the carbon steel market. Ferroalloy prices are also influenced by the prices of the main production inputs, including manganese ore, power and coke. We sell manganese ore mainly at spot prices or at prices established on a quarterly basis. Ferroalloy prices are negotiated on a quarterly basis.

Nickel

Nickel is an exchange-traded metal, listed on the LME. Most nickel products are priced using a discount or premium to the LME price, depending on the nickel product's physical and technical

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characteristics. Demand for nickel is strongly affected by stainless steel production, which represents, on average, 60-65% of global nickel consumption.

We have short-term fixed-volume contracts with customers for the majority of our expected annual nickel sales. These contracts, together with our sales for non-stainless steel applications (alloy steels, high nickel alloys, plating and batteries), provide stable demand for a significant portion of our annual production. In 2011, 66% of our refined nickel sales were made into non-stainless steel applications, compared to the industry average for primary nickel producers of 36%, bringing more stability to our sales volumes. As a result of our focus on such higher-value segments, our average realized nickel prices for refined nickel have typically exceeded LME cash nickel prices.

Primary nickel (including ferro-nickel, nickel pig iron and nickel cathode) and secondary nickel (i.e., scrap) are competing nickel sources for stainless steel production. The choice between different types of primary and secondary nickel is largely driven by their relative price and availability. In recent years, secondary nickel has accounted for about 43-48% of total nickel used for stainless steels, and primary nickel has accounted for about 52-57%. In 2011, Chinese nickel pig iron and ferro-nickel production is estimated to have exceeded 250,000 metric tons, representing 16% of world primary nickel supply, compared to 11% of the world's supply in 2010.

Long-term market fundamentals for nickel are expected to remain positive. While a number of nickel projects will be ramping-up in the short-term, future project development is becoming increasingly challenging. Nickel is widely used in consumer and industrial applications, and its use tends to grow as a country's economy develops. We anticipate continued income growth within emerging economies will drive higher nickel consumption over the medium-term.

Copper

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

Supply growth has struggled to keep pace with growing copper demand, with average mine growth of only 1.4% per annum over the past five years. These circumstances led to a strong 17% rise in copper prices in 2011, relative to 2010. We anticipate market fundamentals to remain strong as demand growth continues and the supply response remains challenging.

Fertilizer nutrients

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

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

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Aluminum

We have a 22.0% interest in Hydro, a major aluminum producer, which we acquired in February 2011 when we transferred the major part of our aluminum businesses to Hydro. For the periods prior to the transaction, our sales of aluminum were made at prices based on the LME of the previous month. Our sales of alumina were based on a percentage of the aluminum price traded on the LME, and our prices for bauxite were determined by a formula linked to the price of aluminum for the three-month futures contracts on the LME and to the price of alumina FOB Australia.

Coal

Demand for metallurgical coal is driven by demand for steel, with growth expected especially in Asia. Demand for thermal coal is closely related to electricity consumption, which will continue to be driven by global economic growth, particularly in emerging market economies. Since April 2010, prices for metallurgical coal have been established on a quarterly basis for the majority of the seaborne term contract volumes, although some sellers have begun introducing monthly pricing and a minority of the seaborne trade volumes continue to employ annual pricing. Most of our term contracts have been priced on a quarterly basis since April 2010. Price negotiations for thermal coal are held both on a spot and an annual basis.

Logistics

Demand for our transportation services in Brazil is primarily driven by Brazilian economic growth, mainly in the agricultural and steel sectors. We earn our logistics revenues primarily from fees charged to customers for the transportation of cargo via our railroads, port and ships. Our railways generate most of these revenues. Nearly all of our logistics revenues are denominated in *reais* and subject to adjustments for changes in fuel prices. Prices in the Brazilian market for railroad services are subject to ceilings set by the Brazilian regulatory authorities, but they primarily reflect competition with the trucking industry.

Production and sales volumes

Our financial performance depends, among other factors, on the volume of production at our facilities. We publish a quarterly production report, which is available on our website and filed with the SEC on Form 6-K. Increases in the capacity of our facilities resulting from our capital expenditure program have an important effect on our performance. Our results are also affected by acquisitions and dispositions of businesses or assets, and they may be affected in the future by new acquisitions or dispositions. For more information on acquisitions since the beginning of 2011, see *Information on the Company Business overview Significant changes in our business*. We had no dispositions of businesses in 2011.

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

	Year ended December 31,				
	2007	2008	2009	2010	2011
	(thousand metric tons)				
Iron ore	262,687	264,023	229,174	254,902	257,287
Iron ore pellets	33,670	32,218	18,087	39,512	41,861
Manganese	708	759	986	1,119	1,032
Ferroalloys	488	396	253	401	386
Nickel	268	276	223	174	252
Copper	300	320	216	208	302
Potash	674	499	792	682	568
Platinum	345	411	233	97	446
Cobalt	2.494	3.087	1.854	0.902	2.721
Coal:					
Thermal coal	603	1,405	3,083	4,234	5,342
Metallurgical coal	1,894	2,682	2,590	3,150	2,330
Phosphates:					
MAP				703	907
TSP				461	594
SSP				1,533	2,501
DCP				284	556
Nitrogen				747	1,278

Currency price changes

Our results of operations are affected in several ways by changes in currency exchange rates. The most important of these are the following:

Most of our revenues are denominated in U.S. dollars, while most of our costs of goods sold are denominated in other currencies, principally the *real* (59% in 2011), the U.S. dollar (19% in 2011) and the Canadian dollar (15% in 2011). As a result, changes in exchange rates affect our costs and operating margins. Our margins are adversely affected by a decline in the value of the U.S. dollar.

Most of our long-term debt is denominated in currencies other than the *real* (US$14.703 billion at December 31, 2011), principally the U.S. dollar. Because our functional currency for accounting purposes is the Brazilian *real*, changes in the value of the U.S. dollar against the *real* result in an exchange gain or loss on our net liabilities.

We had *real*-denominated debt of US$7.997 billion at December 31, 2011. Since most of our revenue is in U.S. dollars, we use swaps to convert our debt service from *reais* to U.S. dollars. Changes in the value of the U.S. dollar against the *real* result in fair value variation on these derivatives, affecting our financial results. For more information on our use of derivatives, see *Risk management*.

A decline in the value of the U.S. dollar tends to result in: (i) lower operating margins and (ii) higher financial results due to currency gains on our net U.S. dollar-denominated liabilities and fair value gains on our currency derivatives. Conversely, an increase in the value of the U.S. dollar tends to result in: (i) better operating margins and (ii) lower financial results, due to exchange losses on our net U.S. dollar-denominated liabilities and fair value losses on our currency derivatives.

The U.S. dollar depreciated against both the *real* and the Canadian dollar during the first half of 2011 but began to appreciate in the second half of the year, after the aggravation of the Eurozone's debt crisis in late July. As of December 31, 2011, the U.S. dollar had appreciated 12.1% against the *real* and 2.2% against the Canadian dollar relative to December 31, 2010. The average value of the U.S. dollar in 2011, compared to 2010, was 4.8% lower against the *real* and 4.4% lower against the Canadian dollar. These currency price

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changes affected our operating margins and resulted in higher foreign exchange gains and gains on derivatives, as described under *Critical accounting policies and estimates Derivatives*.

Operating expenses

Our principal operating expenses consist of: (i) cost of goods sold, (ii) selling, general and administrative expenses and (iii) research and development expenses. Our cost of goods sold consists of costs of energy (fuel and electric energy), materials (such as components for railroad and mining equipment), outsourced services (especially ore and waste removal, transportation and maintenance), purchased products for processing or resale (such as iron ore, iron ore pellets, nickel and aluminum products), personnel, and depreciation and depletion. Our selling, general and administrative expenses consist principally of personnel expense, sales expense and depreciation. Our research and development expenses consist primarily of investments related to mineral exploration and studies for the development of projects, which are recorded as expenses until the economic viability of the related mining activities can be established.

Results of operations 2011 compared to 2010

Revenues

Our net operating revenues increased 30.2%, to US$58.990 billion, in 2011, primarily as a result of (i) higher prices for our major products, especially for iron ore and other bulk materials, (ii) the increase in nickel volumes following the end of labor strikes and resumption of our nickel production in Ontario and (iii) the inclusion of a full year of results for fertilizers compared to seven months in 2010. These effects were partly offset by the effect of the sale of our aluminum assets in February 2011. Of a total increase of US$13.697 billion in gross revenues, US$9.575 billion was attributable to higher prices for iron ore and iron ore pellets.

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

	Year ended December 31,		
	2010	2011	% change
	(US$ million)		
Bulk Materials:			
Iron ore	US$26,384	US$35,008	32.7
Iron ore pellets	6,402	8,150	27.3
Manganese	258	171	(33.7)
Ferroalloys	664	561	(15.5)
Coal	770	1,058	37.4
Subtotal	34,478	44,948	30.4
Base Metals:			
Nickel and other products(1)	4,712	8,118	72.3
Copper concentrate(2)	934	1,126	20.6
Aluminum products(3)	2,554	383	(85.0)
Subtotal	8,200	9,627	17.4
Fertilizers:			
Potash	280	287	2.5
Phosphates	1,211	2,395	97.8
Nitrogen	337	782	132.0
Others fertilizer products	18	83	361.1
Subtotal	1,846	3,547	92.1
Logistics:			
Railroads	1,107	1,265	14.3
Ports	353	461	30.6
Shipping	5		
Subtotal	1,465	1,726	17.8
Other products and services(4)	492	541	10.0
Gross revenues	46,481	60,389	29.9
Value added tax	(1,188)	(1,399)	17.8

Net operating revenues	US$45,293	US$58,990	30.2

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

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

(3) Reflects aluminum operations sold in February 2011.

(4) Includes kaolin, pig iron and energy.

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

Operating revenue by destination

	2010		2011	
	(US$ million)	(% of total)	(US$ million)	(% of total)
North America				
Canada	US $1,126	2.4%	US $1,403	2.3%
United States	828	1.8	1,672	2.8
Mexico	74	0.2	102	0.2
	2,028	4.4	3,177	5.3
South America				
Brazil	8,150	17.5	10,914	18.1
Other	810	1.7	1,108	1.8
	8,960	19.3	12,022	19.9
Asia				
China	15,379	33.1	19,571	32.4
Japan	5,240	11.3	7,238	12.0
South Korea	1,934	4.2	2,779	4.6
Taiwan	1,179	2.5	1,281	2.1
Other	1,059	2.2	989	1.6
	24,791	53.3	31,858	52.8
Europe				
Germany	3,092	6.7	3,792	6.3
United Kingdom	1,060	2.3	1,351	2.2
Italy	1,043	2.2	1,908	3.2
France	716	1.5	801	1.3
Other	3,001	6.4	3,585	5.9
	8,912	19.2	11,437	18.9
Rest of the world	1,790	3.9	1,895	3.1
Total	US$ 46,481	100.0%	US$ 60,389	100.0%

Revenues by segment

Bulk materials

The 30.4% increase in revenues from sales of bulk materials primarily reflected higher prices for iron ore and iron ore pellets. Our average realized prices were up 31.5% for iron ore and 20.2% for iron ore pellets, due primarily to strong demand from China while demand remained slow elsewhere, particularly in Europe. Volume sold was also up for iron ore (0.9%) and for iron ore pellets (5.9%).

Revenues from bulk materials were also positively affected by higher prices for coal. Our average realized prices were up 35.7% for thermal coal, based on demand from the power industry, and 56.9% for metallurgical coal, based on demand from the steel industry, especially in China. The volume of metallurgical coal sold was adversely affected by heavy rains and flooding in Australia in the early part of 2011, while the volume of thermal coal sold increased based on higher production in Colombia and the start of production at Moatize.

Revenues from sales of both manganese and ferroalloys declined on lower prices and lower volumes sold.

Base metals

The 17.4% increase in gross revenues from sales of base metals primarily reflected higher volumes of nickel sold. With the end of labor strikes at our production sites in Sudbury and Voisey's Bay in the second half of 2010, the volume of nickel sold was 44.8% higher in 2011. The average sale price for nickel also

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increased 3.2%, reflecting an increase in the LME price due to continued strong demand. Revenues from sales of copper concentrate were also higher, based on higher prices. These effects were partly offset by the sale of our aluminum business in February 2011, because for 2011 we had only two months of aluminum sales.

Fertilizers

We acquired our principal phosphate operations in May 2010, and the 92.1% increase in revenues from sales of fertilizers in 2011 primarily reflects a full year of these operations compared to seven months in 2010. In addition, prices were up for both phosphates (13.1% higher average realized price) and nitrogen (35.7% higher average realized price), due to strong demand especially from the Brazilian agricultural sector.

Logistics

Gross revenues from sales of logistics services increased 17.8%. Revenues from railroad transportation increased 14.3%. Revenues from port operations increased 30.6% due to higher imports for the steel industry.

Operating costs and expenses

	Year ended December 31,		
	2010	**2011**	**% change**
	(US$ million)		
Cost of ores and metals	US$ 13,326	US$ 17,898	34.3
Cost of aluminum products	2,108	289	(86.3)
Cost of logistic services	1,040	1,402	34.8
Cost of fertilizer products	1,556	2,701	73.6
Others	784	1,283	63.6
Cost of goods sold	18,814	23,573	25.3
Selling, general and administrative expenses	1,701	2,334	37.2
Research and development	878	1,674	90.7
Gain on sale of assets		(1,513)	
Other costs and expenses	2,205	2,810	27.4
Total operating costs and expenses	US$ 23,598	US$ 28,878	22.4

Cost of goods sold

The following table summarizes the components of our cost of goods sold for the periods indicated.

	Year ended December 31,		
	2010	**2011**	**% change**
	(US$ million)		
Outsourced services	US$ 2,740	US$ 4,244	54.9
Materials costs	2,861	3,758	31.4
Energy:			
Fuel	1,880	2,182	16.1
Electric energy	1,211	967	(20.1)
Subtotal	3,091	3,149	1.9
Acquisition of iron ore and pellets	963	1,411	46.5
Acquisition of other products:			
Nickel	358	606	69.3
Aluminum	285	18	(93.7)
Other	58	239	312.1
Subtotal	701	863	23.1
Personnel	2,081	3,138	50.8

Depreciation and depletion	2,803	3,735	33.3
Others	3,574	3,275	(8.4)
Total	US$ 18,814	US$ 23,573	25.3

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The largest factors in the 25.3% increase in cost of goods sold were the resumption of normal nickel operations in Ontario, the inclusion of a full year of the phosphate business acquired in 2010 and the start-up of Onça Puma. Out of the total increase of US$4.759 billion, these three factors accounted for US$3.501 billion. Additional important factors were the appreciation on average of the Brazilian *real* against the U.S. dollar during 2011, which accounted for US$764 million of additional cost of goods sold, and higher sales volumes, which accounted for US$268 million of additional cost of goods sold.

The increases in costs of goods sold attributable to the resumption of Ontario operations and the start-up of Onça Puma were primarily in the following line items: outsourced services (US$441 million), materials (US$367 million), energy (US$242 million), personnel (US$492 million) and depreciation (US$502 million).

The increases in costs of goods sold attributable to the full year of fertilizer operations were primarily in the following line items: outsourced services (US$277 million), materials (US$656 million), energy (US$237 million), personnel (US$159 million) and depreciation (US$230 million), partially offset by the purchase price allocation in inventories in connection with our acquisition in 2010.

The increases in costs were partially offset by the sale of our aluminum assets, which reduced costs by US$1.819 billion, primarily in these line items: energy costs (US$712 million), materials (US$494 million) and product acquisitions (US$268 million). The reduction in energy costs was particularly significant.

These factors were partially offset by our efforts to reduce costs by optimizing the flow of materials, optimizing plant and labor utilization, and cutting administrative costs, among other measures.

In addition to the general factors described above: (i) higher outsourced services costs were affected by increased freight prices, (ii) higher costs for acquisition of products from third parties reflected higher nickel purchases because of operational problems at the Copper Cliff smelter and higher prices of iron ore and iron ore pellets, and (iii) higher personnel costs reflected the signing of a new collective agreement in Brazil.

Selling, general and administrative expenses

Selling, general and administrative expenses increased by 37.2%, or US$633 million, as a result of higher head count due to acquisitions, the signing of a new collective bargaining agreement in Brazil and the appreciation of the Brazilian *real* against the U.S. dollar.

Research and development expenses

Research and development expenses increased by 90.7%, which reflects expenditures for feasibility and other studies for new projects, mineral exploration, natural gas exploration and the development of new processes and technological improvements.

Other costs and expenses

Other costs and expenses increased by US$605 million, mainly due to pre-operating and start-up expenses related to our Onça Puma and Vale New Caledonia projects and contingency expenses.

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Operating income by segment

The following table provides information about our operating income by segment and as a percentage of revenues for the years indicated.

	Year ended December 31,			
	2010		2011	
	Segment operating income (loss) (US$ million)	(% of net operating revenues)	Segment operating income (loss) (US$ million)	(% of net operating revenues)
Bulk materials:				
Iron ore	US$ 17,347	66.7%	US$ 24,030	69.6%
Iron ore pellets	3,511	57.2	4,427	56.2
Manganese ore	105	41.8	(39)	
Ferroalloys	270	44.9	52	10.1
Coal	(169)		(484)	
Base metals:				
Nickel and other products	165	3.5	1,073	13.2
Copper concentrate	197	21.8	146	13.2
Aluminum products	286	11.3	73	19.3
Fertilizers:				
Potash	(29)		(87)	
Phosphates	(27)		243	10.6
Nitrogen	(41)		6	0.9
Other fertilizer products	1	8.3	70	100.0
Logistics:				
Railroads	85	9.2	(139)	
Ports	47	15.4	48	11.6
Shipping	(8)			
Other products and services	(45)		(820)	
Subtotal	21,695	47.9%	28,599	48.5%
Gain on sale of assets			1,513	
Total	US$ 21,695	47.9%	US$ 30,112	51.0%

Operating income as a percentage of net operating revenues increased from 47.9% in 2010 to 51.0% in 2011. In general, all segments benefited from higher prices and volumes sold. The improvement in operating margin in nickel also reflected the resumption of normal operations after the end of the labor disruption in Canada. Lower margins for manganese and ferroalloys reflected weak markets and lower volumes.

Non-operating income (expenses)

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

	Year ended December 31,	
	2010	2011
	(US$ million)	
Financial income	US$ 290	US$ 718
Financial expenses	(2,646)	(2,465)
Gains on derivatives, net	631	75
Foreign exchange and monetary gains (losses), net	344	(1,641)
Non-operating income (expenses)	(US$ 1,381)	(US$ 3,313)

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We had net non-operating expenses of US$3.313 billion in 2011, compared to net US$1.381 billion in 2010. The principal factor in the change was the high level of foreign exchange losses in 2011. This and the other factors in the change are described below:

The net impact of foreign exchange and monetary variations was a charge of US$1.641 billion, due to appreciation of the U.S. dollar (in which most our debt is denominated) against the Brazilian *real* (which is our functional currency). This compares with a gain of US$344 million in 2010, when there was a small depreciation of the U.S. dollar.

The increase in financial income reflected the high level of cash we built up during late 2010 and 2011, prior to our dividend payments and share repurchases in the fourth quarter of 2011.

Financial expenses declined by 6.8%, mainly due to a favorable change in the amount recognized for change in the fair value of our outstanding shareholder debentures.

The net effect of fair value changes in derivatives had a positive impact on earnings of US$75 million in 2011 and US$631 million in 2010. This reflected the following categories of derivatives transactions:

Currency and interest rate swaps We recognized net expense of US$59 million in 2011, compared to net income of US$771 million in 2010. These swaps are primarily to convert debt denominated in other currencies into U.S. dollars to protect our cash flow from exchange rate volatility.

Nickel derivatives We recognized net income of US$103 million in 2011 and net expense of US$84 million in 2010. These derivatives are entered into as part of our nickel price protection program.

Bunker oil derivatives We recognized net income of US$37 million in 2011. These derivatives were structured to minimize the volatility of the cost of maritime freight.

Income taxes

For 2011, we recorded net income tax expense of US$5.282 billion, compared to US$3.705 billion in 2010. The effective tax rate on our pretax income was 19.7%, lower than the statutory rate, mainly because of the tax benefit of shareholder distributions categorized as interest on shareholders' equity. For more information, see Note 6 to our consolidated financial statements. Exchange variations directly impact the exchange gains or losses recognized on transactions between the parent company and certain subsidiaries with lower statutory tax rates. Although those gains and losses are eliminated from reported consolidated pretax amounts in the consolidation and currency re-measurement process, they are not eliminated for tax purposes since in Brazil there is no consolidated income tax regime. Our effective tax rate has historically been lower than the Brazilian statutory rate because: (i) income of some non-Brazilian subsidiaries is subject to lower rates of tax; (ii) we are entitled under Brazilian law to deduct the amount of our distributions to shareholders that we classify as interest on shareholders' equity; (iii) we benefit from tax incentives applicable to our earnings on production in certain regions of Brazil; and (iv) functional currency movements on some non-Brazilian subsidiaries are not taxable under Brazilian law. In addition, some of the foreign exchange variations that affect our operating results are not taxable.

Affiliates and joint ventures

Our equity in the results of affiliates and joint ventures resulted in a net gain of US$1.135 billion in 2011, compared to a net gain of US$987 million in 2010. Our joint venture Samarco represented US$878 million of the 2011 amount, and the increase in 2011 is attributable to higher sales volumes and higher prices for iron ore pellets.

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Results of operations 2010 compared to 2009

Revenues

Our net operating revenues increased 94.3%, to US$45.293 billion, in 2010, primarily as a result of higher prices for our major products. In response to strong demand, volumes sold increased for iron ore and other bulk materials, but not for nickel and copper due largely to the effect of the labor dispute at our Sudbury and Voisey's Bay operations, which has now ended. Of a total increase of US$22.542 billion in gross revenues, US$15.571 billion was attributable to higher prices for iron ore and iron ore pellets.

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

	Year ended December 31,		
	2009	2010	% change
	(US$ million)		
Bulk Materials:			
Iron ore	US$ 12,831	US$ 26,384	105.6
Iron ore pellets	1,352	6,402	373.5
Manganese	145	258	77.9
Ferroalloys	372	664	78.5
Coal	505	770	52.5
Subtotal	15,205	34,478	126.8
Base Metals:			
Nickel and other products (1)	3,947	4,712	19.4
Copper concentrate (2)	682	934	37.0
Aluminum products	2,050	2,554	24.6
Subtotal	6,679	8,200	22.8
Fertilizers:			
Potash	413	280	(32.2)
Phosphates		1,211	
Nitrogen		337	
Other fertilizer products		18	
Subtotal	413	1,846	347.0
Logistics:			
Railroads	838	1,107	32.1
Ports	264	353	33.7
Shipping	2	5	
Subtotal	1,104	1,465	32.7
Other products and services (3)	538	492	(8.6)
Gross revenues	23,939	46,481	94.2
Value added tax	(628)	(1,188)	89.2
Net operating revenues	US$ 23,311	US$ 45,293	94.3

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

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

(3) Includes kaolin, pig iron and energy.

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

Operating revenue by destination

	2009		2010	
	(US$ million)	(% of total)	(US$ million)	(% of total)
North America				
Canada	US$ 886	3.7%	US$ 1,126	2.4%
United States	832	3.5	828	1.8
Mexico	24	0.1	74	0.2
	1,742	7.3	2,028	4.4
South America				
Brazil	3,655	15.3	8,150	17.5
Other	342	1.4	810	1.7
	3,997	16.7	8,960	19.3
Asia				
China	9,003	37.6	15,379	33.1
Japan	2,412	10.1	5,240	11.3
South Korea	883	3.7	1,934	4.2
Taiwan	681	2.8	1,179	2.5
Other	654	2.7	1,059	2.2
	13,633	56.9	24,791	53.3
Europe				
Germany	1,085	4.5	3,092	6.7
United Kingdom	492	2.1	1,060	2.3
Italy	335	1.4	1,043	2.2
France	336	1.4	716	1.5
Belgium	336	1.4	440	0.9
Other	1,452	6.1	2,562	5.5
	4,036	16.9	8,912	19.2
Rest of the world	531	2.2	1,790	3.9
Total	US$ 23,939	100.0%	US$ 46,481	100.0%

Revenues by segment

Iron ore. Gross revenues from sales of iron ore increased 105.6% in 2010 compared to 2009, primarily as a result of an 84.9% increase in the average sale price and an 11.2% increase in volume sold. The increase in the average sales price resulted from strong demand for iron ore. The increase in volume was a consequence of the worldwide economic recovery. Given strong demand pressure, the market for iron ore has been very tight, with rising spot prices and a decreasing stock-to-consumption ratio in China relative to last year.

Iron ore pellets. Gross revenues from sales of iron ore pellets increased 373.5%, driven by a 118.5% increase in volume sold due to increased utilization of production capacity and a 118.7% increase in the average sales price due to strong demand.

Manganese ore. Gross revenues from sales of manganese ore increased 77.9%, driven by a 56.5% increase in the average sale price and a 13.5% increase in volume sold due to the demand from the steel industry, partially offset by stoppage occurred in mines for operational maintenance.

Ferroalloys. Gross revenues from sales of ferroalloys increased 78.5%, due primarily to a 60.7% increase in volume sold in connection with the recovery of the steel industry and a 10.9% increase in the average sales price.

Coal. Gross revenues from sales of coal increased 52.5%, mainly due to the consolidation of sales from Vale Colombia, which Vale acquired in the first quarter of 2009, as well as higher average sales price reflecting better market conditions. The improvement in sales prices for metallurgical coal reflected new quarterly index-based pricing arrangements with our customers similar to those we adopted in our iron ore business. Metallurgical coal revenues increased by 57.9% due to high prices (29.8% higher than in 2009) and

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higher volumes sold (21.6% higher than in 2009). Thermal coal revenues increased by 44.7% due to higher prices (5.7% higher than in 2009) and higher volumes sold (37.3% higher than in 2009).

Nickel and other products. Gross revenues from this segment increased 19.4%, mainly due to an increase in prices, partially offset by a decrease in volumes as a result of the labor strikes at our production plants in Sudbury and Voisey's Bay. The segment includes sales of nickel (representing 57.5% of base metals gross revenues for 2010) and sales of copper that is a by-product of our nickel operations. Gross revenues from nickel sales increased 17.6%, primarily due to a 50.6% increase in the average sales price due to an increase in the LME price, which was partially offset by a 22.8% decrease in volume sold. Gross revenues from copper sales increased 50.1%, primarily due to a 59.5% increase in the average sales price, which was partially offset by a 23.0% decrease in the volume sold.

Copper concentrate. Gross revenues from sales of copper concentrate increased 37.0%, reflecting a 40.5% increase in the average sales price as a result of structural limitations on growth in the supply of concentrates. The increase was partially offset by a 2.6% decrease in volume sold.

Aluminum products. Gross revenues from sales of aluminum-related products increased 24.6%, primarily reflecting an increase in the average sales price as a result of an increase in the LME price. We transferred our aluminum business in Albras, Alunorte and CAP, among other items, to Hydro in February 2011.

Potash. Gross revenues from sales of potash decreased 32.2%, mainly due to a 21.2% decrease in the average sales price and a 13.9% decrease in volume sold explained by the recovery of inventories.

Phosphates and nitrogen. We had revenues from sales of phosphates and nitrogen for the first time in 2010 due to the acquisition of fertilizer assets in Brazil.

Logistics services. Gross revenues from sales of logistics services increased 32.7%. Revenues from railroad transportation increased 32.1%, primarily reflecting the rise in transportation of agricultural products and steel industry inputs and products in 2010. Revenues from port operations increased 33.7% due to changes in the mix of goods carried.

Other products and services. Gross revenues from sales of other products and services decreased 8.6%, primarily due to the classification of kaolin within discontinued operations in the first quarter of 2010.

Operating costs and expenses

	Year ended December 31,		
	2009	**2010**	**% change**
	(US$ million)		
Cost of ores and metals	US$ 9,853	US$ 13,326	35.2
Cost of aluminum products	2,087	2,108	1.0
Cost of logistic services	779	1,040	33.5
Cost of fertilizer products	173	1,556	799.4
Others	729	784	7.5
Cost of goods sold	13,621	18,814	38.1
Selling, general and administrative expenses	1,130	1,701	50.5
Research and development	981	878	(10.5)
Other costs and expenses	1,522	2,205	44.9
Total operating costs and expenses	US$ 17,254	US$ 23,598	36.8

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Cost of goods sold

The following table summarizes the components of our cost of goods sold for the periods indicated.

	Year ended December 31,		
	2009	2010	% change
	(US$ million)		
Outsourced services	US$ 2,264	US$ 2,740	21.0
Materials costs	2,698	2,861	6.0
Energy:			
Fuel	1,277	1,880	47.2
Electric energy	844	1,211	43.5
Subtotal	2,121	3,091	45.7
Acquisition of iron ore and pellets	155	963	521.3
Acquisition of other products:			
Nickel	271	358	32.1
Aluminum	279	285	2.2
Other	38	58	52.6
Subtotal	588	701	19.2
Personnel	1,939	2,081	7.3
Depreciation and depletion	2,332	2,803	20.2
Others	1,524	3,574	134.5
Total	US$ 13,621	US$ 18,814	38.1

Our total cost of goods sold increased 38.1% from 2009 to 2010. The increase is attributable to the increase in volume sold and to exchange rate variations, partially offset by our continuous efforts to reduce costs. Of the US$5.193 billion increase in cost of goods sold, higher volume sold and exchange rate variations were responsible for US$1.775 billion and US$1.323 billion, respectively. Also contributing to the increase was a higher level of purchases of third-party products for resale in order to meet excess demand, as well as our acquisition of fertilizer assets. These factors were partially offset by our efforts to reduce costs by optimizing the flow of materials, optimizing plant and labor utilization, and cutting administrative costs, among other measures.

Outsourced services costs (primarily for operational services such as waste removal, cargo freight and maintenance of equipment and facilities) increased 21.0%, driven primarily by higher volume sold and the appreciation of the Brazilian *real* against the U.S. dollar.

Materials costs increased 6.0%, driven primarily by higher volume sold and the appreciation of the Brazilian *real* against the U.S. dollar, partially offset by lower maintenance expense in 2010 reflecting accelerated expenditures in 2009.

Energy costs increased 45.7%, driven primarily by higher volume sold, higher average prices and the appreciation of the Brazilian *real* against the U.S. dollar.

Costs for the acquisition of products from third parties increased 124.0%, driven primarily by the purchase of iron ore and iron ore pellets. In 2009, Vale did not purchase iron ore pellets from third parties, due to the lower level of demand during the financial crisis.

Personnel costs increased 7.3%, due primarily to higher production volumes and the appreciation of the Brazilian *real* against the U.S. dollar, partially offset by lower production of nickel.

Depreciation and depletion expense increased 20.2%, driven primarily by the general increase in volume sold and the appreciation of the Brazilian *real* against the U.S. dollar, partially offset by lower volumes of nickel sold due to the strikes.

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Other costs of goods sold increased 134.5%, primarily reflecting higher expenditures for mining royalties, inventory adjustments in the ferrous minerals business, the effects of fair value inventory adjustments made as part of the purchase price allocation of US$98 million in connection with our acquisition of the fertilizers business and increased demurrage costs as a result of greater activity during 2010.

Selling, general and administrative expenses

Selling, general and administrative expenses increased by 50.5%, or US$571 million, due primarily to higher volumes sold, increased personnel expenses, outsourced services and exchange rate variations.

Research and development expenses

Research and development expenses decreased by 10.5%. The US$103 million decrease primarily reflects changes in the status of some gas and energy projects that we determined were viable, so the related expenditures were recorded as capital expenditures rather than expenses, as in prior periods.

Other costs and expenses

Other costs and expenses increased by US$683 million, mainly due to provisions for losses on property, plant and equipment and disposal of materials, start-up expenses related to our New Caledonia operations and pre-operating expenses related to our Onça Puma, Salobo and Moatize projects.

Operating income by segment

The following table provides information about our operating income by segment and as a percentage of revenues for the years indicated.

	Year ended December 31,			
	2009		2010	
	Segment operating income (loss) (US$ million)	(% of net operating revenues)	Segment operating income (loss) (US$ million)	(% of net operating revenues)
Bulk materials:				
Iron ore	US$6,659	52.6%	US$17,347	66.7%
Iron ore pellets	19	1.5	3,511	57.2
Manganese ore	31	21.7	105	41.8
Ferroalloys	34	10.4	270	44.9
Coal	(105)		(169)	
Base metals:				
Nickel and other products	(361)		165	3.5
Copper concentrate	129	19.5	197	21.8
Aluminum products	(191)		286	11.3
Fertilizers:				
Potash	180	45.5	(29)	
Phosphates			(27)	
Nitrogen			(41)	
Others fertilizer products			1	8.3
Logistics:				
Railroads	65	9.3	85	9.2
Ports	36	15.9	47	15.4
Shipping	(7)		(8)	
Other products and services	(432)		(45)	
Total	US$6,057	26.0%	US$21,695	47.9%

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Operating income as a percentage of net operating revenues increased from 26.0% in 2009 to 47.9% in 2010. In general, the segments benefited from higher prices and volumes sold, as summarized in more detail below.

The increase in operating margin for iron ore and iron ore pellets primarily reflects higher average sales prices and volumes sold.

The increase in operating margins for manganese and ferroalloys is attributable to higher sales prices and volumes sold as a result of the recovery of the steel industry.

The decrease in operating margin for coal is attributable to higher expenses related to the pre-operating phase of Vale Moçambique.

The increase in operating margins for nickel and other products is attributable to higher market prices.

The negative operating margin for our fertilizer segment is attributable primarily to the fair value allocated to inventories as part of the purchase accounting adjustments in connection with the 2010 acquisitions.

The increase in operating margin in the aluminum products segment resulted primarily from higher average sales prices.

Non-operating income (expenses)

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

	Year ended December 31,	
	2009	**2010**
	(US$ million)	
Financial income	US$ 381	US$ 290
Financial expenses	(1,558)	(2,646)
Gains (losses) on derivatives, net	1,528	631
Foreign exchange and monetary gains, net	675	344
Gain on sale of assets	40	
Non-operating income (expenses)	US$ 1,066	US$ (1,381)

We had net non-operating expenses of US$1.381 billion in 2010, compared to net non-operating income of US$1.066 billion in 2009. The change in net non-operating income (expenses) was affected by the following factors:

A decrease in financial income of US$91 million, mainly due to a lower average cash balance.

An increase in financial expenses of US$1.088 billion, principally due to fair value changes in our liability under our shareholder debentures, IOF (financial operations tax) charges related to the conversion of our mandatorily convertible notes due June 2010 and higher financial interest due to a higher average level of debt.

Lower foreign exchange and indexation gains due to foreign exchange loss, resulting from the combination of lower cash balances, treasury positions in U.S. dollars in 2010 and appreciation of the Brazilian *real* against the U.S. dollar in 2010.

No gain on sales of assets in 2010, compared to a US$40 million gain in 2009. The net gain in 2009 was mainly attributable to the sale of shares of Usiminas.

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Income taxes

For 2010, we recorded net income tax expense of US$3.705 billion, compared to US$2.100 billion in 2009. The effective tax rate on our pretax income was 18%, lower than the statutory rate, mainly because of a retroactive tax benefit eligible for recognition this year related to our Carajás iron ore operations and the tax benefit of shareholder distributions categorized as interest on shareholders' equity. For more information, see Note 6 to our consolidated financial statements.

Exchange variations directly impact the exchange gains or losses recognized on transactions between the parent company and certain subsidiaries with lower statutory tax rates. Although those gains and losses are eliminated from reported consolidated pretax amounts in the consolidation and currency re-measurement process, they are not eliminated for Brazilian tax purposes since in Brazil there is no consolidated income tax regime. Our effective tax rate has historically been lower than the Brazilian statutory rate because: (i) income of some non-Brazilian subsidiaries is subject to lower statutory rates of tax; (ii) we are entitled under Brazilian law to deduct the amount of our distributions to shareholders that we classify as interest on shareholders' equity; (iii) we benefit from tax incentives applicable to our earnings on production in certain regions of Brazil; and (iv) functional currency movements on some non-Brazilian subsidiaries are not taxable under Brazilian law. In addition, some of the foreign exchange variations that affect our operating results are not taxable.

Affiliates and joint ventures

Our equity in the results of affiliates and joint ventures resulted in a net gain of US$987 million in 2010, compared to a net gain of US$433 million in 2009. Our joint venture Samarco represents US$798 million of the 2010 amount, and the increase in 2010 is attributable to higher sales volume and higher prices for iron ore pellets.

LIQUIDITY AND CAPITAL RESOURCES

Overview

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

For 2012, we have budgeted capital expenditures of US$21.4 billion, and announced a minimum dividend payment of US$6.0 billion to be paid in two installments of US$3.0 billion, with the first installment in April and the second in October. We paid US$9.0 billion in dividends during 2011 and repurchased US$3.0 billion of our common and preferred shares during the second half of 2011.

We expect our operating cash flow and cash holdings to be sufficient to meet these anticipated requirements. We also regularly review acquisition and investment opportunities and, when suitable opportunities arise, we make acquisitions and investments to implement our business strategy. We may fund these investments with borrowings.

Sources of funds

Our principal sources of funds are operating cash flow and borrowings. Our operating activities generated cash flows of US$24.5 billion in 2011.

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Our major new borrowing transactions in 2011 and to date in 2012 are summarized below:

In January 2012, our wholly owned finance subsidiary Vale Overseas issued US$1 billion notes due 2022, guaranteed by Vale, with a coupon of 4.375% per year, payable semi-annually. In April 2012, Vale Overseas reopened the notes and issued an additional US$1.250 billion.

In August 2011, we entered into an agreement with a syndicate of financial institutions to finance the acquisition of five large ore carriers of 400,000 DWT and two capesize bulkers of 180,000 DWT. The agreement provides a secured term loan facility of up to approximately US$530 million, which corresponds to 80% of the contract price of the vessels. As of December 31, 2011, Vale had drawn US$178 million under the facility. The banks also have the benefit of an insurance policy provided by K-Sure (Korea Trade Insurance Corporation).

In January 2011, we entered into an agreement with a group of commercial banks with the guarantee of the official Italian credit agency, Servizi Assicurativi Del Commercio Estero S.p.A SACE, to provide us with a US$300 million facility with a final tenor of 10 years to guarantee lines of credit provided by commercial banks. As of December 31, 2011, we had drawn down all amounts available under this facility.

In addition to the transactions described above, during 2011 we also borrowed US$1.761 billion under our existing financing agreements.

In February 2011, we concluded the transfer to Hydro of a substantial portion of our aluminum assets, including our interests in Albras, Alunorte and CAP, together with off-take rights, outstanding commercial contracts and net debt of US$655 million. In this transaction we received US$503 million in cash and 22% of Hydro's outstanding common shares. Also as part of the transaction, we transferred the Paragominas bauxite mine and all of our other Brazilian bauxite mineral rights (apart from rights owned through our stake in MRN) to Paragominas, 60% of which we transferred to Hydro in exchange for US$578 million in cash. We will transfer our remaining interest in Paragominas to Hydro in two equal tranches in 2014 and 2016, each in exchange for US$200 million, subject to certain contingent adjustments.

In April 2011, we entered into a new revolving credit agreement with a syndicate of banks that added US$3 billion to the total amount available under our revolving credit facilities, which can be drawn by Vale S.A., Vale Canada and Vale International. As of December 31, 2011, none of the borrowers had drawn any amounts under these facilities.

Uses of funds

Capital expenditures

Capital expenditures amounted to US$18.0 billion in 2011, and we have budgeted US$21.4 billion for 2012. Our actual capital expenditures may differ from the budgeted amount for a variety of reasons, including unexpected changes in currency prices. These capital expenditure figures include some amounts that are treated as current expenses for accounting purposes, such as expenses for project development, maintenance of existing assets and research and development. For more information about the specific projects for which we have budgeted funds, see *Capital expenditures and projects*.

Distributions

We paid total dividends of US$9 billion in 2011 (including distributions classified as interest on shareholders' equity). In January 2011, we paid an extraordinary dividend of US$1 billion and announced a minimum dividend for the year of US$4 billion, consisting of US$2 billion in April 2011 and US$2 billion in October 2011. Subsequently, we also paid additional dividends of US$3 billion in August 2011 and

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US$1 billion in October 2011. The minimum dividend we have announced for 2012 is US$6.0 billion, payable in two equal installments in April and October.

Tax payments

We paid US$7.293 billion in income tax during 2011. This amount includes US$3.746 billion in social contribution tax (*Contribuição Social sobre o Lucro Líquido CSLL*) that we paid as a result of a recent adverse decision by a Brazilian court, in order to avoid a penalty that would otherwise have applied 30 days after the decision. Vale continues to dispute the merits of this proceeding, which relates to the exemption from CSLL for export revenues. The amount we paid had previously been provisioned.

Share repurchases

We repurchased US$3 billion of our common and preferred shares during the second half of 2011. For more information, see *Purchase of equity securities by the issuer and affiliated purchasers*.

Acquisitions

In December 2011, we concluded a tender offer to acquire up to 100% of the publicly held shares of our subsidiary Vale Fertilizantes. As a result of the public offer, we acquired 83.8% of the publicly held common shares and 94.0% of the publicly held preferred shares of Vale Fertilizantes, which correspond to 0.1% of the total common shares and 29.8% of the total preferred shares of Vale Fertilizantes. Both the common and preferred shares were acquired for R$25.00 per share, amounting to a total of R$2.1 billion (US$1.1 billion). Shortly thereafter, Vale Fertilizantes' registration as a publicly listed company in Brazil was cancelled. The shareholders of Vale Fertilizantes held a general shareholders meeting in January 2012 and approved the redemption of the remaining free floating common and preferred shares. As a result, Vale holds 100% of the common shares and 100% of the preferred shares of Vale Fertilizantes. For more information, see *Significant changes in our business*.

Debt

At December 31, 2011, we had aggregate outstanding debt of US$23.055 billion. Our outstanding long-term debt (including the current portion of long-term debt and accrued charges) was US$23.033 billion, compared with US$24.414 billion at the end of 2010. At December 31, 2011, US$648 million of our debt was secured by liens on some of our assets. At December 31, 2011, the average debt maturity was 9.81 years, compared to 9.92 years in 2010.

Our short-term debt consists primarily of U.S. dollar-denominated trade financing with commercial banks. At December 31, 2011, we had US$22 million of outstanding short-term debt.

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

U.S. dollar-denominated loans and financing (US$3.189 billion at December 31, 2011). This category includes export financing lines, loans from export credit agencies, and loans from commercial banks and multilateral organizations. The largest facility is a pre-export financing facility linked to future receivables from export sales, which was originally entered in the amount of US$6.0 billion. The outstanding amount at December 31, 2011 was US$650 million.

U.S. dollar-denominated fixed rate notes (US$10.483 billion at December 31, 2011). Through our finance subsidiary Vale Overseas Limited, we have issued in public offerings several series of fixed-rate debt securities with a Vale guarantee, totaling US$9.131 billion. Our subsidiary Vale Canada has outstanding fixed rate debt in the amount of US$1.351 billion.

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Euro-denominated fixed rate notes (US$970 million at December 31, 2011). On March 24, 2010, we issued €750 million of fixed-rate notes in a global public offering. These notes are due in 2018 and have a coupon of 4.375% per year, payable annually.

Real-*denominated non-convertible debentures (US$2.505 billion at December 31, 2011).* In November 2006, we issued non-convertible debentures in the amount of approximately US$2.600 billion, in two series, with four- and seven-year maturities. The first series, approximately US$700 million at issuance, matured in 2010. The second series, approximately US$1.900 billion at issuance, matures in 2013 and bears interest at the Brazilian CDI interest rate plus 0.25% per year. At December 31, 2011, the total amount of the second series was US$2.157 billion.

Other debt (US$5.553 billion at December 31, 2011). We have outstanding debt, principally owed to BNDES and Brazilian commercial banks, denominated in Brazilian *reais* and other currencies.

We also have a variety of credit lines. At December 31, 2011, these included the following:

A credit line for US$530 million with a syndicate of financial institutions to finance the acquisition of five large ore carriers and two capesize bulkers at two Korean shipyards. As of December 31, 2011, we had drawn US$178 million under this facility.

A credit line for US$1 billion with Export Development Canada to finance our investment program. As of December 31, 2011, we had drawn US$500 million under this facility.

A US$1.2 billion facility with The Export-Import Bank of China and the Bank of China Limited to finance the construction of 12 very large ore carriers. As of December 31, 2011, we had drawn US$467 million under this facility.

Framework agreements signed in May 2008 with the Japan Bank for International Cooperation ("JBIC") and Nippon Export and Investment Insurance ("NEXI") for US$5 billion of financing for mining, logistics and power generation projects. We have a fully drawn US$300 million export facility, through our subsidiary PTVI, with Japanese financial institutions to finance the construction of the Karebbe hydroelectric power plant on the Larona River in Sulawesi, Indonesia.

Credit lines for R$7.3 billion, or US$4.0 billion, with BNDES to help finance our investment program. As of December 31, 2011, we had drawn the equivalent of US$1.496 billion under this facility.

Facilities with BNDES totaling R$877 million, or US$492 million, to finance the acquisition of domestic equipment. As of December 31, 2011, we had drawn the equivalent of US$329 million under these facilities.

We have revolving credit facilities with syndicates of international banks. At December 31, 2011, the total amount available under these facilities was US$4.1 billion. A portion of these facilities, US$1.1 billion, will expire in May 2012. As of December 31, 2011, we had not drawn any amounts under these facilities, but US$107 million of letters of credit were issued and outstanding under a facility of Vale Canada.

Some of our long-term debt instruments contain financial covenants. Our principal covenants require us to maintain certain ratios, such as debt to EBITDA and interest coverage. We believe that our existing covenants will not significantly restrict our ability to borrow additional funds as needed to meet our capital requirements.

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Shareholder Debentures

At the time of the first stage of our privatization in 1997, we issued shareholder revenue interests known in Brazil as "*debentures participativas*" to our then-existing shareholders. The terms of the debentures were established to ensure that our pre-privatization shareholders, including the Brazilian government, would participate alongside us in potential future financial benefits that we derive from exploiting certain mineral resources that were not taken into account in determining the minimum purchase price of our shares in the privatization. In accordance with the debentures deed, holders have the right to receive semi-annual payments equal to an agreed percentage of our net revenues (revenues less value-added tax, transport fee and insurance expenses related to the trading of the products) from certain identified mineral resources that we owned at the time of the privatization, to the extent that we exceed defined thresholds of sales volume relating to certain mineral resources, and from the sale of mineral rights that we owned at that time. Our obligation to make payments to the holders will cease when the relevant mineral resources are exhausted.

We have been making semi-annual payments to holders of shareholder debentures, which reached US$7 million in 2009, US$10 million in 2010 and US$14 million in 2011. See Note 20 to our consolidated financial statements for a description of the terms of the debentures.

CONTRACTUAL OBLIGATIONS

The following table summarizes our contractual obligations at December 31, 2011. This table excludes other common non-contractual obligations that we may have, including pension obligations, deferred tax liabilities and contingent obligations arising from uncertain tax positions, all of which are discussed in the notes to our consolidated financial statements.

		Payments due by period			
	Total	Less than 1 year	2013-2014	2015-2016	Thereafter
			(US$ million)		
Long-term debt(1)	US$22,700	US$1,162	US$4,415	US$2,559	US$14,564
Short-term debt	22	22			
Short-term debt associated with assets held for sale	8	8			
Interest payments(2)	14,324	1,311	2,353	1,891	8,769
Operating lease obligations(3)	1,537	153	255	220	909
Purchase obligations(4)	16,396	7,858	4,640	1,753	2,145
Total	US$54,987	US$10,514	US$11,663	US$6,423	US$26,387

(1) Amounts include the current portion of long-term debt and do not include accrued charges.

(2) Consists of estimated future payments of interest on our loans, financings and debentures, calculated based on interest rates and foreign exchange rates applicable at December 31, 2011 and assuming (i) that all amortization payments and payments at maturity on our loans, financings and debentures will be made on their scheduled payments dates, and (ii) that our perpetual bonds are redeemed on the first permitted redemption date.

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

(4) Obligations to purchase materials. Amounts are based on contracted prices, except for purchases of iron ore from mining companies located in Brazil, which are based on Q1 2012 average prices.

OFF-BALANCE SHEET ARRANGEMENTS

At December 31, 2011, we did not have any off-balance sheet arrangements as defined in the SEC's Form 20-F. For information on our contingent liabilities see Note 20 to our consolidated financial statements.

CRITICAL ACCOUNTING POLICIES AND ESTIMATES

We believe that the following are our critical accounting policies. We consider an accounting policy to be critical if it is important to our financial condition and results of operations and if it requires significant

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judgments and estimates on the part of our management. For a summary of all of our significant accounting policies, see Note 3 to our consolidated financial statements.

Mineral reserves and useful life of mines

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

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

Environmental and site reclamation costs

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

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

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

Our Environmental Department defines the rules and procedures that should be used to evaluate our asset retirement obligations. The future costs of retirement of our mines and sites are reviewed annually, in each case considering the actual stage of exhaustion and the projected exhaustion date of each mine and site. The future estimated retirement costs are discounted to present value using a credit-adjusted risk-free interest rate. At December 31, 2011, we estimated the fair value of our aggregate total asset retirement obligations to be US$1.77 billion.

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Impairment of long-lived assets and goodwill

We have made acquisitions that included a significant amount of goodwill, as well as intangible and tangible assets. Under generally accepted accounting principles, except for goodwill and indefinite-life intangible assets, all long-lived assets, including these acquired assets, are amortized over their estimated useful lives, and are tested to determine if they are recoverable from operating earnings on an undiscounted cash flow basis over their useful lives whenever events or changes in circumstances indicate that the carrying value may not be recoverable. Factors that could trigger an impairment review include the following:

- significant underperformance relating to expected historical or projected future operating results of entities or business units;
- significant changes in the way we use the acquired assets or our overall business strategy; or
- significant negative industry or macroeconomic trends.

When we determine that the carrying value of definite-life intangible assets and long-lived assets may not be recoverable based upon verification of one or more of the above indicators of impairment, we measure any impairment loss based on a projected discounted cash flow method using a discount rate estimated pursuant to technical criteria to be commensurate with the risk inherent in our current business model.

We are required to assign goodwill to reporting units and to assess each reporting unit's goodwill for impairment at least annually and whenever circumstances indicating that recognized goodwill might not be fully recovered are identified. On September 15, 2011, FASB issued Accounting Standards Update (ASU) No. 2011-08, Intangibles Goodwill and Other (Topic 350): Testing Goodwill for Impairment. The standard provides the option to first assess qualitative factors to determine whether it is necessary to further perform the first and second steps of the goodwill impairment test. In assessing the qualitative factors, if it is more likely than not that the fair value of the reporting unit exceeds its carrying amount, the first and second steps of the goodwill impairment test are not required and no goodwill impairment charge is required. Otherwise, the entity will be required to perform the first and second steps of the goodwill impairment test to assess whether an impairment exists. In the first step of a goodwill impairment test, we compare a reporting unit's fair value with its carrying amount to identify any potential goodwill impairment loss. If the carrying amount of a reporting unit exceeds the unit's fair value, we carry out the second step of the impairment test to measure the amount, if any, of the unit's goodwill impairment loss. Goodwill arising from a business combination with a continuing non-controlling interest is tested for impairment by using an approach that is consistent with the approach that the entity used to measure the non-controlling interest at the acquisition date. For equity investees we determine annually whether there is an other-than-temporary decline in the fair value of the investment.

For impairment test purposes, management determined discounted cash flows based on approved budget assumptions. Gross margin projections were based on past performance and management's expectations of market developments. Information about sales prices is consistent with the forecasts included in industry reports, taking into account quoted prices when available and appropriate. The discount rates used reflect specific risks relating to the relevant assets in each reporting unit, depending on their composition and location.

Recognition of additional goodwill impairment charges in the future would depend on several estimates, including market conditions, recent actual results and management's forecasts. This information will be obtained when our assessment is updated during the fourth quarter of 2012, or earlier if impairment indicators are identified. It is not possible at this time to determine whether an impairment charge will be taken in the future and if it were to be taken, whether such charge would be material.

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Derivatives

We are required to recognize all derivative financial instruments, whether designated in hedging relationships or not, on our balance sheet and to measure such instruments at fair value. The gain or loss in fair value is included in current earnings, unless the derivative to which the gain or loss is attributable qualifies for hedge accounting. We have entered into cash flow hedges that qualify for hedge accounting. Unrealized fair value adjustments to cash flow hedges are recognized in other comprehensive income. We use well-known market participants' valuation methodologies to compute the fair value of instruments. To evaluate the financial instruments, we use estimates and judgments related to present values, taking into account market curves, projected interest rates, exchange rates, forward market prices and their respective volatilities, when applicable. We evaluate the impact of credit risk on financial instruments and derivative transactions, and we enter into transactions with financial institutions that we consider to have a high credit quality. The exposure limits to financial institutions are proposed annually by the Executive Risk Committee and approved by the Board of Executive Officers. The financial institution's credit risk tracking is performed making use of a credit risk valuation methodology that considers, among other information, published ratings provided by international rating agencies and other management judgments. During 2011, we implemented hedge accounting partially for strategic nickel hedge and for a foreign exchange hedge. At December 31, 2011, we had US$37 million of realized gains related to derivative instruments designated as cash flow hedges. In 2011, we recorded to the income statement gains of US$75 million in relation to derivative instruments.

Income taxes

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

When we prepare our consolidated financial statements, we estimate our income taxes based on regulations in the various jurisdictions where we conduct business. This requires us to estimate our actual current tax exposure and to assess temporary differences that result from deferring treatment of certain items for tax and accounting purposes. These differences result in deferred tax assets and liabilities, which we show on our consolidated balance sheet. We must then assess the likelihood that our deferred tax assets will be recovered from future taxable income. To the extent we believe that recovery is not likely, we establish a valuation allowance. When we establish a valuation allowance or increase this allowance in an accounting period, we record a tax expense in our statement of income. When we reduce the valuation allowance, we record a tax benefit in our statement of income.

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

Contingencies

We disclose material contingent liabilities unless the possibility of any loss arising is considered remote, and we disclose material contingent assets where the inflow of economic benefits is probable. We discuss our material contingencies in Note 20 to our consolidated financial statements.

We record an estimated loss from a loss contingency when information available prior to the issuance of our financial statements indicates that it is probable that a future event will confirm that an asset has been impaired or a liability has been incurred at the date of the financial statements, and the amount of the loss

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can be reasonably estimated. In particular, given the nature of Brazilian tax legislation, the assessment of potential tax liabilities requires significant management judgment. By their nature, contingencies will only be resolved when one or more future events occurs or fails to occur, and typically those events will occur a number of years in the future. Assessing such liabilities, particularly in the Brazilian legal environment, inherently involves the exercise of significant management judgment and estimates of the outcome of future events.

The provision for contingencies at December 31, 2011, totaling US$1.686 billion, consists of provisions of US$751 million for labor, US$248 million for civil, US$654 million for tax and US$33 million for other claims.

Employee post-retirement benefits

We sponsor defined benefit pension plans covering some of our employees. The determination of the amount of our obligations for pension benefits depends on certain actuarial assumptions. These assumptions are described in Note 18 to our consolidated financial statements and include, among others, the expected long-term rate of return on plan assets and increases in salaries. In accordance with U.S. GAAP, actual results that differ from our assumptions and are not a component of net benefit costs for the year are recorded in other comprehensive income (loss).

RISK MANAGEMENT

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

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

The Executive Risk Management Committee is responsible for supporting the Board of Executive Officers in performing risk analysis and for issuing opinions regarding proper risk management. The committee is also responsible for the supervision and revision of the principles and instruments of company-wide risk management, in addition to reporting periodically to the Board of Executive Officers regarding the major risks we are exposed to and the impact of new investments, projects and disinvestments in our risk profile. As of April 2012, the members of the Executive Risk Management Committee were: Tito Botelho Martins, Chief Financial Officer and Executive Director for Investor Relations, Procurement and Shared Services, José Carlos Martins, Executive Officer responsible for Ferrous Minerals Operations and Marketing, Sonia Zagury, Corporate Finance Director, Efrem José Daumas Junior, Planning, Development and Continuous Improvement Director and Roberto Moretzsohn, Marketing and Sales Base Metals Director.

Under our risk management policy, we may assign specific risk limits to certain management activities that require market, credit or sovereign risk limits. Those limits will be observed and evaluated using certain risk metrics, including Value at Risk (VaR).

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Market risk

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

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

Considering the nature of our business and operations, the main market risk factors that we are exposed to are: interest rates, foreign exchange rates, product prices and input costs.

We recognize all derivatives on our balance sheet at fair value, and the gain or loss in fair value is recognized in our current earnings, except as described in the next paragraph. Fair value accounting of derivatives may introduce unintended volatility in our quarterly earnings. However, it does not generate volatility in our cash flows, given the nature of our derivatives transactions.

Under the Standard Accounting for Derivative Financial Instruments and Hedging Activities, all derivatives, whether designated as hedging relationships or not, are required to be recorded on the balance sheet at fair value, and the gain or loss in fair value is included in current earnings, unless the derivative is designated as in a hedging relationship, thereby qualifying as hedge accounting. In order to be deemed an effective hedging relationship, a change in the fair value of the derivative must be offset by an equal and opposite change in the fair value of the underlying hedged item. In accordance with these requirements, we perform effectiveness tests in order to assess the effectiveness of the hedging relationships and quantify ineffectiveness for all designated hedges.

At December 31, 2011, Vale had outstanding positions designated as hedging relationships, or more specifically, cash flow hedges. A cash flow hedge is a hedge of the exposure to the variability in expected future cash flows that is attributable to a particular risk, such as a forecasted purchase or sale. If a derivative is designated as cash flow hedge, the effective portion of the change in the fair value of the derivative is recorded in other comprehensive income and recognized in the income statement at the time the hedged item is recorded, enabling gains and losses on the hedging instrument to be recognized in the income statement in the same period as offsetting losses or gains on the hedged item. However, the ineffective portion of changes in the fair value of the derivatives designated as hedges is recognized in the income statement. Consequently, if a portion of a derivative contract is excluded for purposes of effectiveness testing, the value of such excluded portion is recognized on the income statement.

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The asset (liability) balances at December 31, 2011 and 2010 and the movement in fair value of derivative financial instruments are shown in the following table.

	Interest rates (LIBOR)/ Currencies	Aluminum products	Copper/ Coal	Nickel	Freight	Fuel/ Natural gas	Total
Fair value at January 1, 2010	US$870	US$(87)	US$	US$(28)	US$29	US$49	US$833
Financial settlement	(1,329)	63	3	97	(25)	(35)	(1,226)
Unrealized gains (losses) in the year	832	(36)	(5)	(137)	(5)	3	652
Effect of exchange rate changes	18	(1)		1	(1)	(1)	16
Unrealized gain (loss) at December 31, 2010	US$391	US$(61)	US$(2)	US$(67)	US$(2)	US$16	US$275
Fair value at January 1, 2011	US$391	US$(61)	US$(2)	US$(67)	US$(2)	US$16	US$275
Financial settlement	(435)	4	2	(89)	2	(49)	(565)
Unrealized gains (losses) in the year	(95)			317		37	259
Effect of exchange rate changes	(107)	57					(50)
Unrealized gain (loss) at December 31, 2011	US$(246)	US$	US$	US$161	US$	US$4	US$(81)

Foreign exchange rate and interest rate risks

Our cash flows are exposed to the volatility of several currencies against the U.S. dollar. While most of our product prices are indexed to U.S. dollars, most of our costs, disbursements and investments are indexed to currencies other than the U.S. dollar, principally the Brazilian *real* and the Canadian dollar. We frequently use derivative instruments, primarily forward transactions and swaps, in order to reduce our potential cash flow volatility arising from this currency mismatch.

We use swap transactions to effectively convert debt linked to Brazilian *reais* into U.S. dollars. These transactions typically have similar or sometimes earlier settlement dates than the final maturity dates of the associated debt instruments. Likewise, the notional amounts of the swap transactions are similar to the principal and interest payments of the debt, subject to liquidity market conditions. The swaps with shorter settlement dates are then renegotiated over time so that their final maturity matches, or approaches, the debt's final maturity. At each settlement date, the results of the swap transactions partially offset the impact of the foreign exchange rate in Vale's obligations, helping stabilize the cash disbursements in U.S. dollars.

In the event of an appreciation (depreciation) of the Brazilian *real* against the U.S. dollar, the negative (positive) impact on our *real*-denominated debt obligations (interest and/or principal payment) measured in U.S. dollars will be partially offset by an associated positive (negative) effect from any existing swap transaction, regardless of the U.S. dollar/*real* exchange rate on the payment date. The same rationale applies to debt denominated in other currencies and their respective swaps.

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

Our floating rate debt denominated in *reais* includes debentures issued in the Brazilian market and loans provided by BNDES and commercial local banks. Interest on these obligations is mainly based on the CDI (Interbank Deposit Certificate), the benchmark interest rate in the Brazilian interbank market, and the TJLP, the benchmark Brazilian long-term interest rate.

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The following table sets forth our floating and fixed rate long-term debt, categorized by Brazilian *reais* and other currencies, and as a percentage of our total long-term debt portfolio at the dates indicated, except for accrued charges and translation adjustments, as reflected in our consolidated financial statements.

	At December 31,			
	2010		2011	
	(US$ million, except percentages)			
Floating rate debt:				
Real-denominated	7,476	30.2%	7,595	33.5%
Denominated in other currencies	4,969	20.1%	3,250	14.3%
Denominated in other currencies associated with assets held for sale(1)	702	2.8%		
Fixed rate debt:				
Real-denominated	123	0.5%	400	1.8%
Denominated in other currencies	11,503	46.4%	11,455	50.4%
Subtotal	24,773	100.0%	22,700	100.0%
Accrued charges	343		333	
Accrued charges associated with assets held for sale(1)	3			
Total	25,118		23,033	

(1) We transferred our aluminum business in Albras, Alunorte and CAP, among other items, to Hydro in February 2011, in exchange for a 22.0% equity interest in Hydro as part of the consideration.

The following table provides information about our debt obligations as of December 31, 2011. It presents the principal cash flows and related weighted average interest rates of these obligations by expected maturity date. Weighted average variable interest rates are based on the applicable reference rate at December 31, 2011. Actual cash flows of these debt obligations are denominated mainly in U.S. dollars or *reais,* as indicated.

	Weighted average interest rate(1)(2)	2012	2013	2014	2015	2016	To 2040	Total	Fair value cash flow at December 31, 2011(3)
	(%)	(US$ million)							
US$-denominated									
Fixed rate:									
Bonds	6.49	402	124		300	952	8,461	10,239	11,597
Loans	8.50						39	39	39
Floating rate:									
Loans	6.63	123	145	173	173	173	828	1,615	1,705
Trade finance	1.86	375	435	35	35	35	660	1,575	1,598
Subtotal		900	704	208	508	1,160	9,988	13,468	14,939
***Real*-denominated**									
Fixed rate loans	3.95	9	29	42	51	53	216	400	474
Floating rate loans	8.52	235	2,440	952	364	362	2,878	7,231	7,235
Subtotal		244	2,469	994	415	415	3,094	7,631	7,709
Denominated in other currencies									
Fixed rate									
Eurobonds	4.93						970	970	1,034
Loans	8.67	9	3	23	24	27	121	207	207

Floating rate loans	3.31	9	8	6	5	5	28	61	61
Subtotal		18	11	29	29	32	1,119	1,238	1,301
No maturity							363	363	363
Total		1,162	3,184	1,231	952	1,607	14,564	22,700	24,312

(1) Weighted average interest rates do not take into account the effect of the derivatives.

(2) Weighted average variable interest rates are based on the applicable reference rate at December 31, 2011.

(3) Includes only long-term debt obligations.

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As of December 31, 2011, the total principal amount and interest of our *real*-denominated debt converted through swaps into U.S. dollars was US$6.0 billion and the total principal amount and interest of our euro-denominated debt converted through swaps into U.S. dollars was US$649 million, with an average cost in U.S. dollars of 3.22% per year after swap transactions and with maturity until September 2029. Most of those contracts are subject to semi-annual interest payments.

Protection program for real-denominated debt indexed to CDI

In order to reduce cash flow volatility, we entered into swap transactions to convert to U.S. dollars the cash flows on debt instruments denominated in *reais* linked to CDI. In those swaps, Vale pays either fixed rates or floating LIBOR rates in U.S. dollars and receives payments linked to CDI.

These instruments were used to convert cash flows from: debentures issued in 2006 with a nominal value of R$5.5 billion (US$2.5 billion at the disbursement date), credit export notes issued in 2008 with a nominal value of R$2.0 billion (US$1.1 billion at the disbursement date) and procurement financing obtained in 2006 and 2007 with a nominal value of R$1.0 billion (US$464 million at the disbursement dates).

Flow	Notional value at December 31, 2011	Notional value at December 31, 2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	Fair value at December 31, 2010
	(million)					(US$ million)	
CDI vs. fixed rate swap							
Receivable	R$ 5,542	R$ 5,542	CDI	103.03%	2015	3,049	3,447
Payable	US$3,144	US$3,144	USD	3.87%		(3,252)	(3,248)
Total						(203)	199
CDI vs. floating rate swap							
Receivable	R$ 428	R$ 428	CDI	103.51%	2015	242	272
Payable	US$ 250	US$ 250	LIBOR	0.99%		(260)	(262)
Total						(18)	10

Protection program for real-denominated debt indexed to TJLP

In order to reduce cash flow volatility, we entered into swap transactions to convert to U.S. dollars the cash flows related to indebtedness to BNDES indexed to TJLP. In these swaps, we pay either fixed or floating rates in U.S. dollars and receive payments linked to TJLP.

Flow	Notional value at December 31, 2011	Notional value at December 31, 2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	Fair value at December 31, 2010
	(million)					(US$ million)	
TJLP vs. fixed rate swap(1)							
Receivable	R$ 3,107	R$ 2,418	TJLP	1.37%	2019	1,567	1,244
Payable	US$1,611	US$1,228	USD	2.65%		(1,576)	(1,180)
Total						(9)	64
TJLP vs. floating rate swap(1)							
Receivable	R$ 774	R$ 739	TJLP	0.96%	2019	372	371
Payable	US$ 365	US$ 372	LIBOR	(1.14)%		(309)	(343)
Total						63	28

(1) Due to TJLP derivatives market liquidity constraints, some swap trades were done through CDI equivalency.

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Protection program for real-denominated fixed debt

In order to hedge against cash flow volatility, we entered into a swap transaction to convert the cash flows from loans with BNDES in Brazilian *reais* linked to a fixed rate into U.S. dollars linked to a fixed rate. In these swaps, we receive fixed rates in *reais* and pay fixed rates in U.S. dollars.

Flow	Notional value at December 31, 2011	2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	2010
	(million)					(US$ million)	
BRL fixed rate vs. USD fixed rate swap							
Receivable	R$ 615	R$ 204	Fixed	4.64%	2016	277	94.2
Payable	US$355	US$121	USD	(1.20)%		(300)	(93.6)
Total						(23)	0.6

Foreign exchange cash flow hedges

We entered into swap transactions to mitigate our exchange rate exposure arising from the currency mismatch between our revenues in U.S. dollars and our disbursements and investments in *reais*. Those transactions were designated as cash flow hedges.

Flow	Notional value at December 31, 2011	2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	2010
	(million)					(US$ million)	
Receivable	R$ 820	R$ 880	Fixed	6.2%	2011	427	522
Payable	US$450	US$510	USD	0%		(440)	(500)
Total						(13)	22

Protection program for euro-denominated floating rate debt

We entered into a swap transaction to convert the cash flows from a 2003 euro-denominated loan linked to EURIBOR (Euro Interbank Offered Rate) to U.S. Dollars linked to LIBOR. In this trade, we received floating rates in euros (EURIBOR) and paid floating rates in U.S. dollars (LIBOR). This program ended in 2011.

Flow	Notional value at December 31, 2011	2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	2010
	(million)					(US$ million)	
Receivable		€ 2	EUR		2011		3.2
Payable		US$3	USD				(2.7)
Total							0.5

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Protection program for euro-denominated fixed rate debt

We entered into a swap transaction to convert cash flows from loans in euros linked to a fixed rate to U.S. dollars linked to a fixed rate. In this swap, we receive fixed rates in euros and pay fixed rates in U.S. dollars. This trade was used to convert the cash flow of a debt denominated in euros, with a notional amount of €750 million that was issued in 2010.

Flow	Notional value at December 31, 2011	Notional value at December 31, 2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	Fair value at December 31, 2010
	(million)					(US$ million)	
Receivable	€ 500	€ 500	EUR	4.375%	2014	723	760
Payable	US$675	US$675	USD	4.712%		(759)	(769)
Total						(36)	(9)

Protection program for US$ floating rate debt

Our wholly owned subsidiary Vale Canada entered into a swap to convert U.S. dollar floating rate debt into U.S dollar fixed rate debt in connection with debt issued in 2004 with a notional amount of US$200 million. In this swap, we paid fixed rates in U.S. dollars and received floating rates in LIBOR. This program ended in 2011.

Flow	Notional value at December 31, 2011	Notional value at December 31, 2010	Index	Average rate	Final maturity	Fair value at December 31, 2011	Fair value at December 31, 2010
	(million)					(US$ million)	
Receivable		US$100	USD		2011		100
Payable			USD				(104)
Total							(4)

Protection program for interest rates

In the fourth quarter of 2011, we entered into a forward transaction relating to 10-year U.S. treasury notes in order to help protect against certain insurance debt costs that are indexed to this rate.

Flow	Notional value at December 31, 2011	Notional value at December 31, 2010	Buy/Sell	Average rate	Final maturity	Fair value at December 31, 2011	Fair value at December 31, 2010
	(million)					(US$ million)	
Forward	US$900		Buy	1.9423%	2012	(5.3)	

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Foreign exchange protection program for fixed price coal sales

In order to reduce cash flow volatility associated with a fixed price coal contract, we entered into an Australian dollar forward purchase contract to equalize production cost and revenue currencies exposure. This program ended in 2011.

Flow	Notional value at December 31, 2011	2010	Buy/Sell	Average rate (AUD/USD)	Final maturity	Fair value at December 31, 2011	2010
	(million)					(US$ million)	
Forward		AUD$7	Buy		2011		2

Protection program for cash investment yield exposure

In order to link the returns of part of the cash invested on the Brazilian market to U.S. dollar yield, we entered into a swap transaction to convert *real*-denominated cash investments in CDI to a fixed rate in U.S. dollars. In these swaps, we received U.S. dollars at fixed rates and paid *reais* linked to CDI. This program ended in December 2011.

Foreign exchange protection program for Vale's bid offer for assets in the African copperbelt

In order to reduce the volatility of South African *rands* on the value of a bid, denominated in U.S. dollars, we had placed for assets in the African copperbelt, we entered into *rand*-denominated forward purchase transactions in April 2011. On July 2011, we terminated our offer to purchase these assets. The transactions relative to this program were settled on July 2011.

Foreign exchange protection program for cash flow

In order to hedge cash flow volatility, we entered into a swap transaction to convert part of our cash flow linked to *reais* to a fixed rate in U.S. dollars. In those swaps, Vale paid fixed rates in U.S. dollars and received fixed rates in *reais*. This program ended in December 2011.

Product price and input cost risk

We are also exposed to market risks associated with commodity price volatility. In line with our risk management policy, we also employ risk mitigation strategies, including forward transactions, futures contracts and zero-cost collars, to mitigate against the effects of commodity price volatility on our cash flows.

Nickel sales hedging program

In order to reduce cash flow volatility in 2011 and 2012, we entered into forward-sale transactions that were accounted for as cash flow hedges. These transactions fixed the prices of part of the sales in the period.

Flow	Notional amount at December 31, 2011	2010	Buy/Sell	Average strike (USD/ton)	Final maturity	Fair value at December 31, 2011	2010
	(ton)					(US$ million)	
Forward	19,998	18,750	Sell	25,027	2012	125	(52)

Nickel fixed price program

We entered into derivatives in connection with fixed price nickel sales contracts to preserve exposure to nickel price fluctuations. These transactions are intended to achieve a minimum price equal to the average LME price on the date of product delivery. These transactions normally involve buying nickel forwards (over-the-counter) or futures (exchange traded) contracts and are usually settled on the settlement dates of

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the related commercial contracts. We also have contracts subject to margin calls for some nickel trades executed by Vale Canada, but the total cash amount as of December 2011 was not material. Whenever the "Nickel sales hedging program", described above, is executed, this program is interrupted.

Flow	Notional amount at December 31,		Buy/Sell	Average strike (USD/ton)	Final maturity	Fair value at December 31,	
	2011	2010				2011	2010
	(ton)					(US$ million)	
Nickel futures	162	2,172	Buy	21,346	2012	(0.4)	13

Nickel purchase protection program

In order to reduce cash flow volatility and eliminate the mismatch between the pricing of purchased nickel (concentrate, cathode, sinter and other) and the pricing of the final product sold to our customers, we entered into hedging transactions. The items purchased are raw materials utilized to produce refined nickel. The transactions are usually implemented by the sale of nickel forward or future contracts at LME or over-the-counter operations.

Flow	Notional amount at December 31,		Buy/Sell	Average strike (USD/ton)	Final maturity	Fair value at December 31,	
	2011	2010				2011	2010
	(ton)					(US$ million)	
Nickel futures	228	108	Sell	18,744	2012	0.03	(0.2)

Bunker oil purchase protection program

In order to reduce the impact of bunker oil price fluctuation on our freight costs, we have entered into bunker oil derivatives, usually through forward purchases and swaps. We had no open positions on December 31, 2011.

Flow	Notional amount at December 31,		Buy/Sell	Average strike (USD/metric ton)	Final maturity	Fair value at December 31,	
	2011	2010				2011	2010
	(metric ton)					(US$ million)	
Forward		240,000	Buy		2011		11

Copper scrap purchase protection program

This program was implemented in order to reduce cash flow volatility due to the quotation period mismatch between the pricing period of copper scrap purchase and the pricing period of sale of final products to customers. Copper scrap, combined with other raw materials or inputs, is used to produce copper by Vale Canada, our wholly owned subsidiary. This program usually is implemented by the sale of forwards or futures on the LME or over-the-counter operations.

Flow	Notional amount at December 31,		Buy/Sell	Average strike (USD/lbs)	Final maturity	Fair value at December 31,	
	2011	2010				2011	2010
	(lbs)					(US$ million)	
Forward	892,869	386,675	Sell	3.5	2012	0.1	(0.3)

Embedded derivatives raw material and intermediate products purchase

Our cash flow is also exposed to various market risks associated with certain of our contracts that contain embedded derivatives or behave as derivatives. These derivatives may be embedded in, but are not limited to, commercial contracts, purchase agreements, leases, bonds, insurance policies and loans.

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Our wholly owned subsidiary Vale Canada has nickel concentrate and raw materials purchase agreements, in which there are provisions tied to the movement of nickel and copper prices, which function as embedded derivatives.

Flow	Notional amount at December 31, 2011	Notional amount at December 31, 2010	Buy/Sell	Average strike (USD/ton)	Final maturity	Fair value at December 31, 2011	Fair value at December 31, 2010
	(ton)					(US$ million)	
Nickel forwards	1,951	1,960	Sell	18,337	2012	(0.36)	(1.0)
Copper forwards	6,653	6,389		7,495		0.48	(3.2)
Total						0.12	(4.2)

Credit risk

Commercial credit risk management

We are exposed to credit risk arising from trade receivables, derivative transactions, payment guarantees and cash investments. Our credit risk management process provides a framework for assessing and managing counterparties' credit risk and for maintaining our risk at an acceptable level. In order to protect against commercial credit exposure, our Board of Executive Officers sets annually global credit risk limits and working capital limits, both monitored on a monthly basis, and the risk management department approves credit risk limits for each counterparty.

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

Based on the counterparty's credit risk, or based on our consolidated credit risk profile, risk mitigation strategies may be used to minimize credit risk in order to meet the risk level approved by the Board of Executive Officers. The main credit risk mitigation strategies include credit risk insurance, mortgages, letters of credit and corporate guarantees, among others.

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

Treasury credit risk management

To manage the credit exposure arising from cash investments and derivative instruments, our Executive Board approves, on an annual basis, credit limits by counterparty. Furthermore, the risk management department controls our portfolio diversification, the aggregate exposure related to counterparty credit spread volatility and the overall credit risk of the treasury portfolio. All positions are monitored daily and are reported monthly to the Executive Risk Management Committee and to the Board of Executive Officers.

To calculate the exposure we face to a counterparty that has entered into several derivative transactions with us, we consider the aggregate exposure of each derivative transaction executed with this counterparty. We also assess the creditworthiness of its counterparties in treasury operations, employing an internal methodology similar to that used for commercial credit risk management, which aims to define a default probability for each counterparty based on market prices, credit ratings and the counterparty's financial information.

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Our credit risk management processes provide a framework for assessing and managing counterparty credit risk and for maintaining our risk at an acceptable level. The Executive Risk Management Committee analyzes and recommends to the Board of Executive Officers the maximum credit risk exposure to trade receivables and the maximum credit risk exposure to financial institutions that are acceptable at both the counterparty and at the portfolio level.

Operational risk

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

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

More specifically, our operational risk management involves a consistent and systematic process to assess and manage risks that could prevent the Company from reaching its business objectives. The most important events are analyzed to understand the causes and respective controls that can prevent the event and/or respond and recover from the event. Standard risk measures such as the Most Foreseeable Loss and the Residual Risk, both based on Vale's Risk Matrix, are part of the risk management process, which enables consistent discussions by our management regarding whether additional resources are required to lower risk levels. The most significant risks identified in the process are reported to the Executive Risk Management Committee where decisions are made and action plans approved to further reduce risks where necessary.

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III. SHARE OWNERSHIP AND TRADING

MAJOR SHAREHOLDERS

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

The following table sets forth information regarding ownership of Vale shares as of March 31, 2012 by the shareholders we know beneficially own more than 5% of any class of our outstanding capital stock, and by our directors and executive officers as a group.

	Common shares owned	% of class	Preferred shares owned	% of class
Valepar(1)	1,716,435,045	52.7%	20,340,000	1.0%
BNDESPAR(2)	218,386,481	6.7%	69,432,771	3.3%
Aberdeen Asset Managers Limited(3)	1,257,000	Less than 1.0%	105,832,561	5.0%
Directors and executive officers as a group	54,344	Less than 1.0%	931,154	Less than 1.0%

(1) See the following tables for information about Valepar's shareholders.

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

(3) Based on a reported beneficial ownership dated March 23, 2012. Aberdeen Asset Managers Limited is a subsidiary of Aberdeen Asset Management plc.

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

The table below set forth information regarding ownership of Valepar common shares as of March 31, 2012.

	Common shares owned	% of class
Valepar shareholders		
Litel Participações S.A.(1)	637,443,857	49.00%
Eletron S.A.(2)	380,708	0.03
Bradespar S.A.(3)	275,965,821	21.21
Mitsui(4)	237,328,059	18.24
BNDESPAR(5)	149,787,385	11.51
Total	1,300,905,830	100.00%

(1) Litel owns 200,864,272 preferred class A shares of Valepar, which represents 71.41% of the preferred class A shares. LitelA, an affiliate of Litel, owns 80,416,931 preferred class A shares of Valepar, which represents 28.59% of the preferred class A shares. LitelB, also an affiliate of Litel, owns 21,932,068 preferred class C shares of Valepar, which represents 29.25% of the preferred class C shares.

(2) Eletron owns 27,755 preferred class C shares of Valepar, which represents 0.04% of the preferred class C shares.

(3) Bradespar is controlled by a control group consisting of Cidade de Deus Cia. Comercial Participações, Fundação Bradesco, NCF Participações S.A. and Nova Cidade de Deus Participações S.A. Bradespar owns 12,532,065 preferred class C shares of Valepar, which represents 16.71% of the preferred class C shares. Brumado Holdings Ltda., a subsidiary of Bradespar, owns 7,587,000 preferred class A shares of Valepar, which represents 10.12% of the class.

(4) Mitsui owns 17,302,209 preferred class C shares of Valepar, which represents 23.08% of the preferred class C shares.

(5)

BNDESPAR owns 15,598,969 preferred class C shares of Valepar, which represents 20.80% of the preferred class C shares.

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The table below sets forth information regarding ownership of Litel Participações S.A., one of Valepar's shareholders, as of March 31, 2012.

	Common shares owned	% of class
Litel Participações S.A. shareholders(1)		
BB Carteira Ativa	193,740,121	78.40%
Carteira Ativa II	53,387,982	21.60
Caixa de Previdência dos Funcionários do Banco do Brasil	19	
Others	219	
Directors and executive officers as a group	4	
Total	247,128,345	100.00%

(1) Each of BB Carteira Ativa and Carteira Ativa II is a Brazilian investment fund. BB Carteira Ativa is 100.00% owned by Caixa de Previdência dos Funcionários do Banco do Brasil ("Previ"). Carteira Ativa II is 59.36% owned by Funcef, 35.81% owned by Petros and 4.84% owned by Fundação Cesp. Each of Previ, Petros, Funcef and Fundação Cesp is a Brazilian pension fund.

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

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

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

any amendment of Vale's bylaws;

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any increase of Vale's capital stock by share subscription, creation of a new class of shares, change in the characteristics of the existing shares or any reduction of Vale's capital stock;

any issuance of debentures of Vale, whether or not convertible into shares of Vale, participation certificates upon compensation (*partes beneficiárias*), call options (*bônus de subscrição*) or any other security of Vale;

any determination of issuance price for any new shares of capital stock or other security of Vale;

any amalgamation, spin-off or merger to which Vale is a party, as well as any change to Vale's corporate form;

any dissolution, receivership, bankruptcy or any other voluntary act for financial reorganization or any suspension thereof;

the election and replacement of Vale's Board of Directors, including the Chairman of the Board, and any executive officer of Vale;

the disposal or acquisition by Vale of an equity interest in any company, as well as the acquisition of any shares of capital stock of Vale or Valepar;

the participation by Vale in a group of companies or in a consortium of any kind;

the execution by Vale of agreements relating to distribution, investment, sales exportation, technology transfer, trademark license, patent exploration, license to use and leases;

the approval and amendment of Vale's business plan;

the determination of the compensation of the executive officers and directors of Vale, as well as the duties of the Board of Directors and the Board of Executive Officers;

any profit sharing among the members of the Board of Directors or Board of Executive Officers of Vale;

any change in the corporate purpose of Vale;

the distribution or non-distribution of any dividends (including distributions classified as interest on shareholders' equity) on any shares of capital stock of Vale other than as provided in Vale's bylaws;

the appointment and replacement of Vale's independent auditor;

the creation of any "in rem" guarantee, granting of guarantees including rendering of sureties by Vale with respect to obligations of any unrelated party, including any affiliates or subsidiaries;

the passing of any resolution on any matter which, pursuant to applicable law, entitles a shareholder to withdrawal rights;

the appointment and replacement by the Board of Directors of any representative of Vale in subsidiaries, companies related to Vale or other companies in which Vale is entitled to appoint directors and officers; and

any change in the debt to equity threshold, as defined in the shareholders' agreement.

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

RELATED PARTY TRANSACTIONS

We have arm's-length commercial relationships in the ordinary course of our business with Mitsui, a shareholder of Valepar (our controlling shareholder) and we have arm's-length financial relationships in the ordinary course of our business with Bradesco, which is controlled by the same controlling group as Bradespar, also a shareholder of Valepar.

BNDES is the parent company of one of our major shareholders, BNDESPAR. We and BNDES, the Brazilian state-owned development bank, are parties to a contract relating to authorizations for mining exploration. This contract, which we refer to as the Mineral Risk Contract, provides for the joint development of certain unexplored mineral deposits that form part of our Northern System (Carajás), as well as proportional participation in any profits earned from the development of such resources. Iron ore and manganese ore deposits already identified at the time we entered into the Mineral Risk Contract (in March 1997) were specifically excluded from the contract. In 2007, the Mineral Risk Contract was extended indefinitely, with specific rules for all exploration projects and exploration targets and mineral rights covered under the contract. In addition, BNDES has provided us with a R$7.3 billion, or US$4.3 billion, credit facility to help us finance our investment programs; BNDES holds a total of R$679.4 million, or US$363.6 million, in debentures of our subsidiary Salobo Metais S.A. with a subscription right, subject to certain conditions, for Salobo's preferred shares in exchange for such debentures; and its subsidiary BNDESPAR holds a total of R$1.406 billion, or US$816 million, in debentures, exchangeable into FNS shares, that were issued to finance the expansion of the FNS railroad. BNDES has also participated in certain of our other financing arrangements. For more information on our transactions with BNDES, see *Operating and financial review and prospects Liquidity and capital resources*.

For information regarding investments in affiliated companies and joint ventures and for information regarding transactions with major related parties, see Notes 14 and 24 to our consolidated financial statements.

DISTRIBUTIONS

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

For 2012, our Board of Executive Officers has proposed a minimum dividend of US$6.0 billion. We pay the same amount per share on both common and preferred shares in accordance with our bylaws. This dividend is payable in two equal installments in April and October 2012. The first installment of this dividend, in the amount of US$3.0 billion, will be paid on April 30, 2012.

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

Distributions classified as dividends which are paid to ADR and HDR holders and to non-resident shareholders will not be subject to Brazilian withholding tax, except that a distribution from profits generated prior to December 31, 1995 will be subject to Brazilian withholding tax at varying rates. Distributions classified as interest on shareholders' equity which are paid to ADR and HDR holders and to non-resident shareholders are currently subject to Brazilian withholding tax. See *Additional information Taxation Brazilian tax considerations.*

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

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

The following table sets forth the cash distributions we paid to holders of common shares and preferred shares for the periods indicated. Amounts have been restated to give effect to stock splits that we carried out in subsequent periods. We have calculated U.S. dollar conversions using the commercial selling rate in effect on the date of payment. Amounts are stated before any applicable withholding tax.

			Reais per share		U.S. dollars per share at
Year	**Payment date**	**Dividends**	**Interest on equity**	**Total**	**payment date**
2005	April 29	0.28		0.28	0.11
	October 31	0.22	0.17	0.39	0.18
2006	April 28	0.12	0.17	0.29	0.14
	October 31	0.01	0.28	0.29	0.14
2007	April 30	0.22	0.13	0.35	0.17
	October 31	0.01	0.38	0.39	0.22
2008	April 30	0.20	0.24	0.44	0.26
	October 31	0.14	0.51	0.65	0.30
2009	April 30	0.52		0.52	0.24
	October 30		0.49	0.49	0.29
2010	April 30		0.42	0.42	0.24
	October 31		0.56	0.56	0.34
2011	January 31		0.32	0.32	0.19
	April 29		0.61	0.61	0.38
	August 26	0.93		0.93	0.58
	October 31	0.39	0.63	1.02	0.58

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TRADING MARKETS

Our publicly traded share capital consists of common shares and preferred shares, each without par value. Our common shares and our preferred shares are publicly traded in Brazil on the BM&FBOVESPA, under the ticker symbols VALE3 and VALE5, respectively. Our common shares and preferred shares also trade on the LATIBEX, under the ticker symbols XVALO and XVALP, respectively. The LATIBEX is a non-regulated electronic market created in 1999 by the Madrid stock exchange in order to enable trading of Latin American equity securities.

Our common ADSs, each representing one common share, and our preferred ADSs, each representing one preferred share, are traded on the New York Stock Exchange ("NYSE"), under the ticker symbols VALE and VALE.P, respectively. Our common ADSs and preferred ADSs are traded on Euronext Paris, under the ticker symbols VALE3 and VALE5, respectively. JPMorgan Chase Bank serves as the depositary for both the common and the preferred ADSs. On March 31, 2012, there were 1,479,147,397 ADSs outstanding, 737,366,804 common ADSs and 741,780,593 preferred ADSs, representing 22.6% of our common shares and 35.2% of our preferred shares, or 27.6% of our total share capital.

Our common HDSs, each representing one common share, and our preferred HDSs, each representing one class A preferred share, are traded on the HKEx, under the stock codes 6210 and 6230, respectively. JPMorgan Chase Bank serves as the depositary for both the common and the preferred HDSs. On March 31, 2012, there were 1,153,600 HDSs outstanding, consisting of 1,122,200 common HDSs and 31,400 preferred HDSs.

SHARE PRICE HISTORY

The following table sets forth trading information for our ADSs, as reported by the New York Stock Exchange and our shares, as reported by the BM&FBOVESPA, for the periods indicated. Share prices in the table have been adjusted to reflect stock splits.