10.1 An international brand

For 65 years, the CVRD logo was spread out across the four corners of the world: on train cars, on ships, on train stations, on calendars, on appointment books and pens, on the doors of offices and in trade contracts. However, when joining together those letters, everyone – whether engineers, geologists, the company CEO, office assistants, secretaries, mine workers, locomotive engineers, shareholders, or passengers at a station – saw only one thing: Vale. Popularly, CVRD was always Vale.

On November 29, 2007, at Copacabana Fort in Rio de Janeiro, Vale CEO Roger Agnelli brought together around 1,000 employees to announce one of the biggest changes in the company’s history. The reasons for the modification may be summed up in just one word: globalization. The word “Vale” is easily read throughout the world and, as of 2006, when it acquired Canadian company Inco, Vale was expanding across the globe.

From that point onward, Vale changed its name and logo. The logo shows a stylized letter “V” that can represent either a mining pit or a heart. The easy-to-read brand reinforced Vale’s image as a global company. No longer were different brands and images used in different areas.” Vale – modern and plural – was unified.

At its changed its brand, Vale was a company that would end 2007 with net income of US$11.8 billion, up 62.8% from the previous year and new records in all sectors. Vale was now present in more than 30 countries and was developing an extensive mineral prospecting program, with projects in 21 countries around the world. The company was mainly looking for new deposits of copper, manganese ore, iron ore, nickel, bauxite, phosphate, potash, coal, uranium, diamonds and platinum group metals.3 The sum of all the results obtained in the year made the company the world’s second largest mine.10

10.2 A global company

Vale and Brazil entered 2007 with good growth prospects. At the start of the year, the United Nations issued its annual report, in which the United Nations Conference on Trade and Development (UNCTAD)6 ranked the country the 12th largest foreign investor in the world in 2006. That year, a total of US$31 billion was invested by Brazilian companies. Brazil had left behind companies in important powers, such as Australia, China and Russia, which invested US$22 billion, US$18 billion and US$16 billion, respectively.8 Vale played a major role in Brazil’s high position in the UN ranking, as the company accounted for more than 50% of that year’s investment. This was largely due to the acquisition of Canadian company Inco, the world’s fifth biggest takeover in 2006.

The UN report diagnosed the new times being experienced by Brazil. The economy had not been dynamic in the 1980s and 1990s, with growth rates below the world average, but this had now

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2 - ibid.


4 - Vale’s 2008 Sustainability Report.


6 - The United Nation’s annual investment report is published by the United Nations Conference on Trade and Development (UNCTAD), the UN’s economic development arm.

7 - Vale’s 2006 and 2007 Form 20-F reports.


9 - ibid.

10 - Vale’s 2007 Sustainability Report.
changed. In the 2000s, Brazil’s annual GDP growth rate increased from 1.7% to around 4% in 2006. 10 Vale’s share of the total volume traded by Brazil on the seaborne market in 2007 reached approximately 32.5%. The company confirmed its variation as a growth driver of the Brazilian economy, and this would become even more palpable with the results it would achieve year after year.

In 2007, Vale’s gross operating revenues increased by 62.6% to US$33.11 billion. Segmented investments, the pursuit of excellence in work methods and the good moment the country was experiencing made it possible to predict an even better future for the company.

The former “country of the future,” as Brazil had been described by Austrian writer Stefan Zweig, was now joining the list of emerging countries that were leading global growth. As declared by the UN report, “external investment by Brazilian companies is to some extent part of an expansion and consolidation process that is also occurring at home. Brazilian companies are looking to consolidate their industries, such as mining and steel, by buying foreign competitors in order not to lose markets or become targets themselves.” 13

The investment made by purchasing the Canadian company marked Vale’s entry into the international nickel market, making it the world’s second biggest producer of the metal. 14 For the first time, the 2007 figures encompassed the annual performance of Vale Inco, which was very strong, with revenues from nickel activities reaching US$11.78 billion. This amount was four times higher than the previous year’s figure of US$2.8 billion, due to the fact that Vale Inco’s results were only incorporated in the last quarter of 2006. In 2007, 60.3% of total nickel sales were delivered to customers in Asia, 26.5% in North America, 11.6% in Europe and 1.6% in other locations. 15

Over the course of 2007, Vale’s shares were the most traded among all foreign companies on the New York Stock Exchange, surpassing even those of BHP Billiton, the global leader in the mining sector. 16 Average daily trading volumes were around US$725.5 million. This was partly related to the company’s strong performance in iron ore production in Brazil and its sales arrangements with Asian steelmakers, which in February 2008 agreed to an average price increase of 68%.

As a consequence of its expansion program, in April 2008 Vale announced a partnership with Columbia University to establish a research and technical training center. 18 A program for training young geologists and engineers developed professionals to conduct work in locations such as Kazakhstan. 19

Vale’s presence outside Brazil was not restricted to commercial investments. In May 2008, an earthquake measuring 7.8 on the Richter scale hit southwest China, killing around 90,000 people. 20

Vale donated US$1.4 million to the...
International Red Cross to help the victims of the tragedy. In addition to this direct donation, Vale undertook to build three “Vale Hope Schools” in Sichuan Province, through a contribution of US$400,000.

On June 4, 2010, Vale’s Executive Director of Ferrous Metals, José Carlos Martins and China Country Manager, Michael Zhu, leading a group of company employees, attended the opening ceremony of the Vale Hope School in Yingging Town, the last of the three schools handed over in Sichuan. The 6,500-m² elementary school has ten classrooms on three floors and is designed for 200 students.

Strike in Canada

By 2008, Vale had more than 62,000 employees across the world. The Human Resources Department, with the support of the Legal Department, faced the challenge of administering and concluding various types of labor relations existing in different countries. Relations between employees and companies differ from one country to another, and multinationals are subject to the rules of the countries where they operate.

A significant number of employees at Vale’s Canadian nickel operations in Sudbury and Port Colborne, Ontario went on strike from July 2009 to July 2010. Some mining operation employees in Voisey’s Bay, Newfoundland and Labrador also went on strike, from August 2009 to January 2011.

Collective agreements lasting five years were made with the unions representing the striking employees, offering incentives to improve these operations’ long-term productivity and competitiveness, as well as their capacity to continue generating value. These agreements include a defined-contribution pension plan for new employees and adjustments to variable pay programs to enable Vale to achieve strategic objectives and reward performance, among various other improvements implemented.

African expansion: Moatize, Mozambique

Mozambique was the first place outside Brazil to receive a branch of the Vale Foundation, whose purpose is to contribute to integrated development in the regions where Vale operates. The Foundation’s investments in the African country have prioritized projects in the areas of health, farming, infrastructure, sport and education. In addition, an initial 1,108 families were resettled in Moatize, Tete Province, the coal-rich central region of Mozambique. This process was finalized in 2010 with the resettling of 1,365 families.

Seeking better results for the local community, Vale’s investment in the resettlement involved building schools, health centers and police stations, enabling the creation of functional neighborhoods for the new residents. The projects included the refurbishment of the Provincial Hospital, Moatize Health Center and the Moatize Intermediate Institute of Geology and Mines, as well as the development of local farming. The company worked in a range of areas to integrate the social, cultural and economic life of the region. For example, Vale organized a training course in Moatize for Mozambican teachers and school principals, which was completed by around 1,000 participants.

To enable the coal mine to be developed in Moatize, families were moved from the communities of Malabwe, Chipanga, Bagamoio and Mithete. Based on various studies and a socioeconomic census conducted to identify the people to be resettled, two areas were selected to receive the families: the rural area of Cateme, and the urban neighborhood of 25 de Setembro. The process of producing...
a Resettlement Action Plan involved extensive public engagement and participation. Before resettlement began, three public hearings were conducted, as well as 20 theater performances in the predominant local language (Nyungwe), 4,927 home visits to families and leaders for mobilization and social assistance purposes, and 639 social consultations. During the process, alternative solutions were considered to avoid or minimize physical or economic displacement.

The following infrastructure was built or modernized for the communities in both the new Cateme and 25 de Setembro areas: houses, an elementary school, a high school, a library, houses for school principals and teachers, information technology rooms, laboratories, a health and maternity center, a police station, streets, and electric power facilities along main roads.

Equipped with 18 classrooms and a library, Cateme Elementary School is designed for around 1,200 students. Armando Emílio Guebuza High School, in the same neighborhood, is designed for 650 students. It has 12 classrooms, a library, accommodations for 270 boarding students, an information technology room and one hectare for practical classes on horticulture, composting and processing of cassava flour. Both schools are administered by the Mozambican government’s District Education Department.

Improvements are made regularly to the infrastructure in the resettled people’s communities and Vale is taking measures to support families, together with the government authorities, to meet their demands. Examples of such improvements include house repairs, maintenance of drainage systems, public roads and the water supply system, expansion of the electricity network, the construction of sports facilities, investment in health and farming, and the development of solutions to support public transport.

Actions are also being implemented to establish alternative ways of generating income, such as poultry farming, beekeeping, agricultural training, and vocational courses.

In Tete, Vale has participated in meetings held at the foot of a baobab tree—locally considered the “tree of life” due to its water storage capacity. The tree is found in various parts of Africa and many specimens reach 40 meters in height and 10 meters in diameter. In a tradition arising in ancient African tribes, many community decisions are taken around this tree. When the Vale Foundation arrived in Mozambique, this traditional custom became part of the company’s community relationship practices. Knowing how to incorporate local culture into its operating methods was essential to a company seeking to expand around the world.

In March 2009, Vale laid the foundation stone of the Moatize Project. A little over two years later, in September 2010, it bought a 51% stake in Sociedade de Desenvolvimento do Corredor do Norte S.A. (SDCN), a company controlling two railroad systems on the east coast of Africa. The amount paid was US$13 million. Through two subsidiaries, SDCN participated in two railroad systems in Africa, extending for a total of approximately 1,600 kilometers, in Mozambique and Malawi. It will also be necessary to construct some additional stretches of track, as well as a new port in the Nacala region. The acquisition of SDCN was designed to permit expansion in Moatize and the creation of logistic infrastructure, supporting the company’s operations in central and eastern Africa. After constructing these new stretches, the two systems will be interconnected at a point near the Moatize mineral province.

The first batch of coal from Moatize Mine left Mozambique on September 14, 2011, on board the ship Orion Express, which sailed
Oman

At the same time that it was laying the foundation stone in Moatize, in 2008 Vale also began constructing a pelletizing plant and distribution center in the Middle East, at the Port of Sohar Industrial Complex in Oman, a country on the Arabian Peninsula. The facility was opened in March 2012.28

The Middle East as a whole was a growing purchaser of the company’s products, especially pellets, due to the type of furnace predominantly used by steel plants in the region. In May 2008, Vale announced a strategic partnership with the government of Oman through the sale of a 30% stake in Vale Oman Pelletizing Company LLC (VOPC) for US$125 million.29

Oman covers slightly more than 300,000 square kilometers and it has a vast coastline, enormous oil reserves and frontiers with Saudi Arabia and the United Arab Emirates, two major commercial powers in the region. Under the plans drawn up by Vale, ore processed in two pelletizing plants (each capable of producing 4.5 million metric tons of pellets per year)30 would be transported from an iron ore and pellet distribution center in Oman (able to store 40 million metric tons) to customers in Asia and the Middle East.

For the strategy to succeed, ideal conditions would be needed in order for the products to be ready for export at a reasonable cost. Part of the response to this need was provided in September 2011, when an iron terminal at the Port of Sohar was completed, for use by Vale. Sohar’s favorable location, next to deep waters outside the Persian Gulf, enabled Vale to take Valemax vessels, capable of transporting 400,000 metric tons, from Brazil to the Omani port. From there, the iron ore would be transferred onto smaller ships and taken to nearby locations. In addition to Sohar, only nine ports across the world are currently capable of receiving bulk carriers of Valemax size31.

Together with direct actions for exporting its products, Vale offered a series of reciprocal benefits to Omani society. One example is an agreement signed by Vale, between the government of Oman and the Federal University of Viçosa in Minas Gerais, Brazil, to attempt to solve pest problems affecting fruit crops. Signed in October 2010, the agreement provided for an investment of around R$10 million over four years. Vale brokered the agreement through the Vale Institute of Technology (Instituto Tecnológico Vale, or ITV).32

Created in 2009, ITV has the objective of coordinating science and technology actions, with an emphasis on long-term research carried out in partnership with scientific communities on a national and international scale.33 Within a short period of activity, ITV had signed 97 research and development agreements and provided more than 50 research scholarships. ITV’s participation in foreign initiatives has not been restricted to Oman. The Institute has also established partnerships with 36 institutions in Brazil and other

28 - See Vale’s 2009 Form 20-F Report.
29 - Idem.

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countries, such as Brazilian agricultural research agency Embrapa, the National Council for Scientific and Technological Development (CNPq), the Massachusetts Institute of Technology (MIT), and École Polytechnique Fédérale de Lausanne (EPFL) in Switzerland.34

Guinea and Zambia

In Guinea, West Africa, Vale is investing in an iron mining project. In 2010, the company unveiled the Simandou Project, which will involve developing one of the best untapped world-class iron ore deposits on the planet. Simandou is also the biggest integrated iron ore mining and infrastructure project in the whole of Africa, and it also involves education and human and economic development programs.

The first phase of the project involves developing Zogota mine in southern Simandou. Its planned total production capacity is 15 million metric tons per year and total investment will be US$1.260 billion. The aim of the Simandou Project is to replicate in Africa the successful mine-railroad-port model developed in Brazil for iron ore operations.

In 2010, Vale launched the Konkola North copper project in the Zambian Copper Belt, through a joint venture with African Rainbow Minerals (ARM). The project's estimated nominal production capacity is 45,000 metric tons per year of copper in concentrate. Start-up is planned for 2013 and maximum capacity should be reached in 2015. Construction work began in August 2010.

At first, the South and East Limb mines will be developed, and then the deeper, larger layers of higher grade ore will be mined. Vale has a 50% interest in the joint venture that controls the project. At the end of the 2000s, Vale was also present on the African continent conducting prospecting in Congo (copper, cobalt and manganese), Angola (copper and nickel) and South Africa (coal and manganese).


Australia

Vale also expanded into Australia and, as in Mozambique, coal was once more the point of entry. In April 2007, Vale paid US$656 million to acquire 100% of AMCI Holdings Australia Pty. The company, which operated assets and possessed projects in the area of coal exploration, was renamed Vale Australia.35 The acquisition of AMCI, which had nominal production capacity of 8 million metric tons per year and reserves of 103 million metric tons, was another step in Vale's new mining policy. It also confirmed the company's efforts to become a global player in coal, especially metallurgical coal, which is fundamental to steel production.36

Once the AMCI deal and the creation of Vale Australia had been finalized, in 2007 the company was capable of producing 10 million metric tons of coal per year, including its joint ventures in China (which contributed up to 2 million metric tons per year). Around 85% of the coal produced by Vale's new Australian operations was of the metallurgical type, the remainder being thermal coal. At that time, of global annual coal production of 5 billion metric tons, just 10% was metallurgical coal.37

Two years later, in September 2009, mining began using the longwall method (in which the machinery itself functions as excavation tunnels)38 at Carborough Downs coal mine. Using this method significantly reduced the work accident risk and enabled higher output – it was estimated that the project would increase the nominal annual production capacity considerably to 4.8 million metric tons in 2011.39

36 - See Vale’s 2006 and 2007 Form 20-F Reports.
Previous page: Integra coal mine, Australia. Above: Tres Valles copper plant, Chile. Left: Carborough Downs coal mine, Australia.
Good performance in Asia – boosted by sales in China – was repeated, though to a lesser extent, in the rest of the world. European customers, for example, accounted for 22.1% of the company’s sales in 2007.44

Vale’s commercial relationship with China grew even closer with the completion of the Dalian nickel processing plant in northeast China. Operations at the plant, capable of producing 35,000 metric tons of refined nickel per year, started up in April 2008.

Presence on five continents
Growing trade with China contributed to the expansion in Vale’s international transactions. At the start of 2008, the company had operations, offices and joint ventures spread across five continents. By 2011, the company had a presence in more than 35 countries and had 136,000 employees and long-term contractors.

After 70 years, Vale was now present in Angola, Argentina, Australia, Austria, Barbados, Canada, Chile, China, the Democratic Republic of Congo, France, Gabon, Guinea, India, Indonesia, Japan, Kazakhstan, Liberia, Malaysia, Mongolia, Mozambique, New Caledonia, Oman, Paraguay, Peru, the Philippines, Singapore, South Africa, South Korea, Switzerland, Taiwan, Thailand, the United Arab Emirates, the United Kingdom, the United States and Zambia.

Notwithstanding its numerous achievements as its international trade expanded, the company also faced occasional difficulties and surprises. The main setback was triggered in the second half of 2008.

Chile and Colombia
In the fourth quarter of 2008, production began at the Tres Valles copper unit.40 Located in Salamanca in the Coquimbo region of Chile, the operation includes mines and a plant producing copper cathode (metal plate). There are two copper oxide mines: the Don Gabriel open-pit mine and the Papomono underground mine. To aid the company invested US$140 million in the project.41

In December 2008, Vale acquired 100% of the coal assets of Cementos Argos S.A. (Argos), in Colombia, for a total sum of US$206 million.42

In 2012, in line with its continuous efforts to optimize its portfolio of assets, Vale sold its coal operations in Colombia to CPC SAS, an affiliate of Colombian Natural Resources SAS, for US$407 million in cash.

China: international challenge
By the start of 2008, China had become the world’s main consumer of mineral resources. In 2007, the country alone was responsible for approximately 40% of global demand for bauxite iron ore, 24.2% of global nickel demand, 33% of aluminium demand and 26.3% of copper demand.43 The percentage of Vale’s total gross revenue arising from sales to Chinese customers was 17.7% in 2007. Adding to the percentage of total gross revenue from Asian countries other than China, which was 20.5% in the same year, Asia therefore accounted for 41% of Vale’s sales.

40 - Vale, p. 23.
42 - Vale’s 2009 Form 20-F Report.
43 - Idem.

Employee handling copper plate at Tres Valles, Chile, 2011.
10.3 Results of the recession of 2008-2009

In 2008, the global economy was shaken by a crisis rated by specialists as on a par with the crash of 1929. In an ever more globalized world in which businesses are interconnected, crossing frontiers, crises spread like waves. A crisis that began in the real estate market in the United States expanded in a relatively steady manner over the course of 2007 and became a global problem the following year.

Before experiencing the effects of the recession, Vale had been growing rapidly. In 2007, all of the company’s business areas performed strongly. Gross revenue from iron ore sales grew by 18.8% in relation to 2006, thanks to an average rise of 13.3% in sales prices and a 4.4% increase in the volume sold. The same occurred in the iron ore pellet area, where gross revenue rose by 38.4%, largely due to a 32.8% increase in the volume sold.45

In January 2007, in Carajás, Pará, work on expanding the operation’s annual iron ore production capacity to 100 million metric tons was finalized. After this, the Board of Directors approved a new project to increase output to 150 million metric tons per year. In 2007, iron ore production in Carajás reached 91.7 million metric tons, up from 81.8 million the previous year. Brucutu Mine in Minas Gerais, opened in September 2006, produced 22 million metric tons of iron ore in the year following its inauguration.46

Potash, kaolin, copper and aluminum grew at a similar pace in 2007. Gross potash revenue rose by 24.5%, driven by a 35.4% rise in average sales prices. Kaolin sales expanded by 9.2%, thanks to an 18.9% increase in average prices. Meanwhile, profits from copper concentrate rose by 3% between 2006 and 2007, from US$779 million to US$810 million, due to a 4.7% rise in average sales prices. Aluminum revenues expanded by 14.3%.47

Manganese sales rose by 80% in 2007, reflecting a 52.6% leap in average sales prices and a 9.1% decline in volume. This reduction was caused by a temporary shutdown at April Mine in Carajás between July and December 2007. Vale’s ferroalloy business saw revenue growth of 40%, due to a 47.9% increase in average sales prices and a 6.5% fall in volumes, which was largely the result of a shutdown at the company’s ferroalloy plant in France between August and September 2007, due to technical problems.48

The excellent results obtained in 2007 continued into 2008, despite the sudden slowdown in the economy, particularly in the fourth quarter of the year. The global crisis took some time to affect Vale’s performance. In 2008, the good results attained in previous years were maintained, and indeed Vale’s revenues, operating profit and net profit all rose for a sixth consecutive year.49 Gross annual operating revenue rose by 16.3% to US$38.5 billion, while net operating revenue grew by 16.1%. The following sales records were also set in 2008: 264 million metric tons of iron ore; 276,000 metric tons of nickel; 310,000 metric tons of copper; 4.2 million metric tons of aluminum; 3.0 million metric tons of cobalt; 2.4 million troy ounces (unit of measurement used for precious metals, equivalent to 31.1 grams) of precious metals; 411,000 troy ounces of platinum group metals; and 4.1 million metric tons of coal. New markets made a fundamental contribution to these results, enabling Vale to minimize the effects of the crisis.

China accounted for 28.7% of iron ore and pellet shipments in 2008, and the figure for Asia as a whole was 47.4%. After this came Europe (24.4%) and Brazil (13%). During the year, 56.2% of total revenues were earned in its largest region, with the rest earned in 22 other regions.49

45 - See Vale’s 2007 Form 20-F Report.
46 - Idem.
47 - Idem.
48 - Idem.
49 - See Vale’s 2008 Form 20-F Report.
In 2008, the good results attained in previous years were maintained, and indeed Vale’s operations, net profit and net profit all rose for a sixth consecutive year.

Vale was not immune from the crisis. Its share of the seaborne iron ore market fell from 30.2% to 24.0%, reflecting the strong impact of the global recession on the European steel industry, one of the company’s major iron ore markets.2 That wasn’t all: the recession hit practically all areas of Vale’s business. Production of primary aluminum fell by 57.8%, from US$3.85 billion in 2008 to US$1.7 billion in 2009.6 Net income declined from US$1.2 billion to US$1.0 billion. Likewise, the benchmark price of iron ore fines and pellets fell by 28.2% and 44.5%, respectively.50 In 2009, gross iron ore revenue shrank by 27.8%, due to a 32.7% decline in sales volumes and a reduction in average prices. Gross revenue from iron ore pellets fell by 66.8% as a result of price reductions caused by lower demand.56 A 45.5% fall in gross manganese ore revenue mainly occurred due to price declines in 2009, although this was partially offset by a 1% rise in sales volumes due to strong Chinese demand.59 Gross revenue from ferroalloy operations fell by 69.3%, thanks to a 48.5% decrease in average sales prices and a 36.1% drop in sales volumes.63 Likewise, the revenue from ferroalloy operations fell by 69.3%, thanks to a 48.5% decrease in average sales prices and a 36.1% drop in sales volumes.63

Vale’s CEO, Murilo Ferreira, in 2011.
After selling a stake in Usiminas in 2008, Vale continued with its restructuring policy, disposing of its remaining 2.93% interest in the company in the second quarter of 2009. The US$273 million transaction made a positive contribution in 2009. As a result of a strategic review of its nickel refining and distribution operations, in December 2009 Vale sold its American subsidiary, the International Metals Reclamation Company (INMETCO), for US$38.6 million. 70 Also in the nickel sector, Vale disposed of its 65% interest in Chinese company Jinco Nonferrous Metals Co. Ltd. (Jinco) for US$6.5 million. The same month, Vale entered into an agreement to sell its 76.7% stake in Inco Advanced Technology Materials (Dalian) and its 77% interest in Inco Advanced Technology Materials (Shenyang), which operates nickel foam plants in China, for US$7 million, to affiliate companies of other shareholders. 71

In January of that year, Vale reached an agreement to sell its manganese and iron ore exploration rights (as well as related properties) in Bahia for a total sum of US$16 million. It also sold three small hydroelectric plants, used to supply some of the power consumed by the company’s ferroalloy plants in Minas Gerais, for US$20 million. 72 At the same time, wholly owned subsidiary Valesul made an agreement to sell its aluminum assets to Alumínio Nordeste S.A., a Metalis group company. Among the assets included in the deal were an anode plant, a reduction facility, industrial and administrative service areas, a foundry and inventories. 73

10.4 The art of overcoming crises: investments and disinvestments
The disinvestment program continued in July 2010, when Vale sold its 86.2% stake in Pará Pigimentos S.A. (PPSA), as well as other kaolin mining rights in Pará, to Imerys S.A. for US$74 million.74 In February 2011, all of the aluminum operations of Alunorte and Companhia de Alumina do Pará (CAP) were transferred to Norwegian company Norsk Hydro.75 According to the terms of the agreement, Vale, through its wholly owned subsidiaries, transferred to Hydro a 51% stake in Alunorte, a 57% interest in Alumina and 61% of CAP.76 Through this transaction, Vale received US$531 million in cash and 23% of Norsk Hydro’s outstanding common shares.77

Investments: new equity stakes and operations

While it was willing to dispose of businesses that were no longer priorities, Vale also perceived that, to resume its growth, it could not give up on its diversification and investment drive. In 2009, the company began to see the results of its investment in constructing the Carajás Hydrometallurgical Plant. Located at the Sossego mining unit in Pará and completed in December 2008, the plant was designed to test industrial-scale processing of complex copper ores to produce copper cathodes.78

Vale’s Vargem Grande pelletizing plant in Nova Lima, Minas Gerais was completed in the first half of 2009. This plant, built with the capacity to produce 7 million metric tons of iron ore per year, now operates with an annual production capacity of 10 million metric tons.79

The company made an important acquisition in September 2009, when it completed its purchase of 100% of Rio Tinto’s iron ore operations in Corumba, Mato Grosso do Sul. The US$750 million deal included associated logistics assets.80 In 2009, Vale defined Corumbá iron ore mine as “a world-class asset characterized by its high grade reserves, rich in lump ore, convertible by a direct reduction process. Its logistics assets meet 71% of the operation’s transportation needs.”81 In 2008, Corumbá Mine produced 2 million metric tons of iron ore.82

The purchase of these assets in Corumbá brought yet another country onto Vale’s map. Pangueú’s logistics area, the acquisition included a contract for transporting goods along a 42-kilometer railroad – whose concession belongs to America Latina Logística (ALL) – and an iron ore loading port to ship products down the Paraná and Paraguayan rivers to Paraguayan and Argentinean customers. Two more river ports were leased and, through a port in Buenos Aires Province, the ore reaches the seafarer market.83

In 2010, the iron and manganese mines of Corumbá – under Vale’s control since 1994, when it acquired a 100% stake in Urucum Mineração S.A. – were transformed into the Center-West. The company now has four integrated mine-railroad-port systems in Brazil: South, Southeast, North and Center-West.

In the third quarter of 2009, Vale entered into an agreement with German group ThyssenKrupp Steel Europe AG in order to raise its stake in ThyssenKrupp CSA Siderúrgica do Atlântico Leste (TKCSA) from 10% to 26.87%, for an investment of US$1.42 billion. TKCSA was building an integrated steel plate mill, with nominal production capacity of 5 million metric tons of plate per year, in the Santa Cruz neighborhood in the West Zone of Rio de Janeiro. As a strategic partner of ThyssenKrupp, Vale was TKCSA’s sole and exclusive iron ore supplier.84

In November 2007, Vale signed a memorandum of understanding with Guangxi Steel, one of South Korea’s largest steel producers, to build a steel plate mill in the Brazilian state of Ceará, at the Porto Industrial and Port Complex in São Gonçalo do Amarante. Called the Ceará Steel Company (Companhia Siderúrgica de Ceará), the operation will have an initial production capacity of 2.5 million metric tons per year.85

Elsewhere in Brazil, Vale created in expanding the production capacity of Camargos Complex in Pará. As of the first quarter of 2010, the company began operating new facilities there that added 20 million metric tons to the site’s annual iron ore production capacity.86

Vale and MMV

In May 2007, Vale increased its stake in Minas Gerais-based subsidiary Mineração Brasileira Unidos S.A. (MBB). The company whose direct stake in MMB was 49%, considered the subsidiary’s iron ore assets “among the best in the world.”87 The other 51% of the company belonged to Empreendimentos Brasileiros de Mineração S.A. (EBM). As of May 2007, Vale had an 86% interest in EBM’s capital. Through new transactions, the company acquired a further 6.25% of EBM’s equity and signed an agreement guaranteeing it the use of the remaining 13.75% stake for the next 30 years.88
MBR was the second largest iron ore producer and exporter in Brazil, with a strong presence in the seaborne market. It sold to practically all iron ore consuming markets in the world, exporting around 90% of its output.62 It had been growing steadily, and its reserves exceeded 1.6 billion metric tons of hematite and 4.4 billion metric tons of high-grade ilmenite. Operating in the Iron Quadrangle region of Minas Gerais, MBR exported its goods from its own maritime terminal on Guaíba Island in Sepetiba Bay, Rio de Janeiro State.63

10.5 The boom of 2010

Vale’s commercial leap forward in 2010, a year in which the company attained its best ever results, can be summed up by its export volumes. That year, Vale’s net Brazilian exports (its total exports from the country minus its total imports) were around US$29 billion. For comparison, during the same year, Brazil’s total soybean exports (including grains, bran and other byproducts) were less than US$17 billion. The difference is even greater when Vale’s net exports are compared with those of products such as automobiles (including passenger cars, tractors, engines, parts and components) and aircraft, which together amounted to less than US$15 billion.69 Vale’s 2010 exports were therefore almost twice as large as automobile and aircraft exports combined. Although 2010 was a record year, Vale’s importance as a major Brazilian exporter was apparent throughout the decade (Table 1).

Vale, as a large Brazilian exporter, played a major role in improving the country’s solvency and sustainability indicators, particularly in terms of international reserves and the external debt. Brazil’s large trade surpluses and ample liquidity in international financial markets helped the country to improve its external debt indicators, and allowed the Central Bank to dispense with International Monetary Fund (IMF) support in 2005.90

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**TABLE 1**

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<th>TABLE 1</th>
<th>VALE’S EXPORTS COMPARED WITH OTHER SELECTED PRODUCTS ($US MILLION)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>VALE’S EXPORTS</td>
</tr>
<tr>
<td>2001</td>
<td>3,387</td>
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<tr>
<td>2002</td>
<td>3,173</td>
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<tr>
<td>2003</td>
<td>4,229</td>
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<tr>
<td>2004</td>
<td>5,534</td>
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<tr>
<td>2005</td>
<td>7,021</td>
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<tr>
<td>2006</td>
<td>9,656</td>
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<tr>
<td>2007</td>
<td>12,492</td>
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<tr>
<td>2008</td>
<td>17,606</td>
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<tr>
<td>2009</td>
<td>13,719</td>
</tr>
<tr>
<td>2010</td>
<td>29,090</td>
</tr>
</tbody>
</table>

* Soybeans include grains, cracked soy, bran, oil and oil extraction residues; sugar includes cane, raw and refined sugar; meat includes various processed forms of chicken, pork and beef; automobiles include passenger cars, tractors, engines, parts and components; and aircraft includes civil aircraft and transport aircraft. Source: Vale (results, financial information and press releases), Central Bank of Brazil and MDIC/Secex.

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63 - Idem.
69 - In this comparison, imports are not subtracted, as before, but instead total export data are analyzed.
Brazil was experiencing a new situation, as its total external debt and expanded its international reserves (Graph 1) in a context of growing exports. The result was an overall improvement in indicators. The direct effect of this was strengthened solvency in the face of external financial commitments and greater credibility in international markets, reflected by the country’s investment grade rating.91

By analyzing Brazil’s main external economic data, one can perceive that at the end of the millennium’s first decade, Brazil was a fundamental company for the development of the country, capable of harnessing favorable international circumstances, with higher demand and prices, to consolidate its contribution to domestic growth.

In December of the same year, the Central Bank announced new measures, this time to reduce credit, further slowing down the economy in order to control inflation. These measures included an increase in banks’ compulsory deposits (with the Central Bank) to remove R$61 billion from the economy, restrictions on long-term loans to individuals, and removal of support from the Credit Guarantee Fund (Fundo Garantidor de Crédito, or FGC) to small banks.97 By the end of the year, the Brazilian economy had created 2.86 million formal jobs, according to the Ministry of Work. This was a new record, surpassing the previous record of 1.6 million new jobs set in 2007.98

91 - As attested to by ratings agencies Moody’s Investors Service and Standard & Poor’s.

Vale experienced its best ever annual results, with record operating revenue, operating margin and net income. Operating revenue reached US$46.5 billion, while operating profit measured by EBIT (earnings before interest and taxes) amounted to US$21.7 billion.

In the light of the emerging economies’ strong performance, alongside the continued economic crisis in rich countries, the IMF decided to reassign more than 6% of its voting quotas from developed to developing countries, increasing their influence in the institution’s decision making. China then became the third largest member of the Fund, whose executive committee has 24 member countries.95

The overheating Brazilian economy then began to present side effects, and in May 2010, public spending cuts of R$10 billion were announced by the Brazilian government. The idea was to contain inflation and respect the domestic economy’s production capacity. Two months previously, the federal government had already announced a R$21.8 billion reduction in the 2010 budget.96


End of the storm
Driven by strong results in emerging economies – major generators of demand for minerals and metals – the global economy saw fast growth in 2010, rising above the low levels recorded in late 2008 and early 2009.92 The Brazilian economy followed the same path, ending 2010 with annual growth of 7.5%, according to IBGE. In current terms, the sum of all income produced in the country came to R$3.67 trillion. Per capita GDP reached R$19,016.93 It was a firm response to the crisis experienced since mid-2008.

Brazil’s rate of expansion was surpassed by China (which experienced growth of 10.3%) and India (8.6%), but it extended the growth seen in South Korea (6.1%), Japan (3.9%), the USA (2.8%) and the euro zone region (1.7%).94

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93 - Idem.
94 - Idem.

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93 - Idem.
94 - Idem.
The biggest net profit in the history of mining

In 2010, Vale experienced its best-ever annual results, with record operating revenue, operating margin and net income. Operating revenue reached US$46.5 billion, while operating profit measured by EBIT (earnings before interest and taxes) amounted to US$21.7 billion. The company's operating margin, measured as operating profit as a proportion of net operating revenue, was 47.9%. The year's net profit came to US$17.3 billion. Vale also allocated more resources than any other mining company to fund the construction of new platforms for growth and value creation. The company invested US$12.7 billion in new growth opportunities and the maintenance of existing assets. Another US$6.7 billion financed acquisitions, mainly of fertilizer assets in Brazil.99

Less than a year after facing the biggest crisis in its history, Vale overcomes its problems and had enough power to continue growing. Due to strong demand and economic recovery across the world, the company's gross revenue from iron ore sales rose by 105.6% in 2010. This growth in revenue was mainly caused by an 84.9% increase in average sales prices, as well as an 11.2% rise in the volume sold.100 Making greater use of its production capacity, the company's gross revenue from pellets rose even more in 2010, by 373.5%, thanks to a 118.5% rise in sales volumes and an increase of 118.7% in average sales prices, also caused by strong demand.101

In 2010, China purchased 42.9% of the company's shipments of iron ore and pellets, while Asia as a whole bought 60.7%. Europe's share was 20.7%, followed by Brazil, with 13.7%.102

99 - See Vale's 2010 Sustainability Report - Investors' Summary.
100 - See Vale's 2010 Form 20-F Report.
101 - Idem.
102 - Idem.

In terms of diversification, Vale also enjoyed results that consolidated its position following its major resumption of investment. Gross manganese revenue grew by 77.9%, due to a 56.5% rise in the average price and a 13.3% increase in sales volumes. Ferroalloy revenues expanded by 78.5%, due to a 60.7% increase in volumes and a 10.9% rise in average sales price.103 In the coal sector, revenues increased by 52.1%, mainly due to the consolidation of Vale's sales in Colombia. The average selling price also rose in line with better market conditions.104 Nickel production, which had been weak since the workers’ strike in Canada beginning in July 2009, also started to grow again. In July 2010, a new five-year collective agreement was signed by representatives of production and maintenance employees at the striking mines, bringing an end to the dispute.105 Gross nickel revenue rose by 19.4% during the year. Gross revenues from copper increased by 37%, caused by a 40.5% increase in the average sales price. Gross revenues from sales of aluminum and related products rose by 24.6%. On the other hand, potash revenues fell by 52.2%, caused by a 21.2% fall in average sales prices and a 13.9% decline in the volume sold in 2010.106

103 - Idem.
104 - Idem.
105 - Idem.
106 - Idem.
Energy in 2010

In 2010, Vale produced 85.3% of the electric power consumed in its operations in the Brazilian Southeast System and 63.3% of the power used in the South System. Through stakes in hydroelectric plants – currently Igarapava, Porto Estrela, Funil, Candongua, Eliseu Batista, Amador Aguiar I, Amador Aguiar II, Estreito, Machadinho, Glória, Ituerê, Mello and Nova Maurício, the latter four small hydroplants – the company had implemented its plan to produce and use a cheaper and cleaner energy form. As in previous years, all of the electric power consumed by the North System was obtained at market prices from regional electricity companies. In all, hydroelectric power plants supplied 23% of the electricity demand of Vale’s Brazilian operations.

Over the course of 2010, the company’s total electric power usage was 22 TWh. 108 Its activities in Brazil accounted for 73.3% of this total,109 corresponding to 3.9% of the electricity consumed in the country.110 This is more than the amount used by the city of Rio de Janeiro in the same year.111 In Canada, Vale’s power plants in Sudbury met 9% of local operations’ electricity needs, while in Indonesia, self-generation supplied 90% of the company’s demand.112

The remainder of Vale’s electricity demand in Sudbury was met through purchases from utility companies in the province of Ontario,113 while the Thompson operations bought low-cost power from the local hydroelectric power plant.114 Finally, the company’s operations in Voisey’s Bay were completely supplied using diesel generators.115 In Brazil, Vale’s main electricity suppliers are Eletronorte, Centrais Elétricas de Minas Gerais (Cemig) and Espírito Santo Centrais Elétricas (Escala). Together, these companies supplied 36% of Vale’s electricity purchases in 2010.116

In April of the same year, Vale Energia Limpa S.A. was established to operate in the field of clean synthetic fuels, which emit less greenhouse gas emissions.117 In December, Vale received an operating license for the Estreito Hydroelectric Plant in Maranhão, the company’s first hydro project in Brazil’s North region. This plant began generating power in March 2011.

Vale and the capital markets

A major step forward was taken in terms of Vale’s position in the global markets when the company listed its shares on the Hong Kong Stock Exchange.118 By listing on one of the most important stock exchanges in Asia, investors across the world were now able to trade in the company nearly 24 hours a day, in the Americas, Europe and Asia, strengthening Vale’s position as a global company.119

Between 2000 and 2010, Vale produced US$154.5 billion of value for its shareholders and distributed US$17.4 billion in dividends. Total shareholder returns were 38.2% per year between 2001 and 2010 – the highest rate among the largest mining companies.120 In 2010 alone, Vale returned US$6 billion of capital to shareholders, through the distribution of US$3 billion in dividends, equivalent to US$0.57 per share, and a US$2 billion share buyback. Consequently, Vale had resumed its long-term upward trend in the prices of its shares, which began at the start of 2000 and accelerated significantly over the past ten years.121

107 - Idem.
108 - Idem.
109 - According to the UFE’s Energy Bulletin, for the fourth quarter of 2010, total electricity consumption in Brazil was 8,841 TWh. For details, visit the website of UFE at: <http://www.ufe.org.br/press/imagens/20110603_1.pdf>.
110 - Vale no 107.
112 - Idem.
113 - Idem.
114 - Idem.
115 - Idem.
116 - See Vale’s 2010 CVM Reference Form.
117 - Idem.
118 - See Vale’s 2010 Form 20-F Report.
119 - Idem.
120 - Idem.
121 - Idem.
Vale in the fertilizer market

In nature, fertilizers are distributed into three groups of nutrients: nitrogen (used by plants in photosynthesis, contributing to fast plant growth), phosphorus (which helps the development of roots) and potassium (fundamental to the quality of fruits and the internal circulation of liquids in plants).

In the late 2000s, after a period of retraction arising from the crisis of 2008, Vale’s investment strategy in the fertilizer sector represented a new stage in the diversification of the company, which now served the food production market.

Vale’s investment in fertilizers was based on the belief that Brazilians’ growing per capita income and demand for biofuels would raise fertilizer demand in the country. Brazil would play an important role in this market because of its position as a leading agricultural producer and its growth potential, especially due to its access to water and arable land. The country is currently the world’s fifth largest importer of fertilizers.

The Rio Colorado fertilizer production project, located in the Argentinean province of Mendoza, originally belonged to the Anglo-Australian company Rio Tinto, which sold it to Vale. The project entails developing a mine with an initial nominal potash production capacity of 2.4 million metric tons per year and the potential to expand output to as much as 4.35 million metric tons per year. A 350-kilometer railroad, port facilities and a power plant will also be built. Elsewhere in Argentina, the Neuquén Project, designed to produce 1 million metric tons of potash per year, entered the final study phase in 2012.

Together with Rio Colorado, Vale also acquired 100% of the Regina Project in the province of Saskatchewan, Canada. The project, now called Kronau, could potentially yield around 2.8 million metric tons of potash per year. In 2009, infrastructure was already in place to transport the output to Vancouver, facilitating access to Asian markets.

In 2010, Vale acquired the phosphate operations of Fosfertil and Bunge Participações e Investimentos for US$5.82 billion. Subsequently, on February 1, 2011, Vale Fosfatados merged with Vale Fertilizantes.

In Brazil, Vale now has fertilizer operations in five states. In the state of São Paulo, in Cajati the company produces phosphate rock and dicalcium phosphate, used to make animal food; in Guarapuava it produces phosphate fertilizers, used to enrich the soil for farming; in Cubatão it produces phosphate and nitrogen fertilizers; and in Santos it operates a maritime terminal that handles ammonium, sulfur and bulk fertilizers, with the capacity to process 2.5 million metric tons per year. In Minas Gerais, the company’s facilities in Tapira, Uberaba, Patos de Minas and Araxá produce phosphate rock and phosphate fertilizers. Also in Minas Gerais, the company is implementing the Talitare Project, which consists of developing a mine capable of producing an estimated 2.7 million metric tons of phosphate concentrates per year. In the state of Goiás, the Catalao unit was created to produce phosphate rock and phosphate fertilizers. In Paraná, the company produces nitrogen fertilizers in Araucária, while in Sergipe, the Carnalita potash project in the municipality of Rosário do Catete has been inaugurated.

Outside Brazil, besides Argentina and Canada, the company also operates in Peru and is developing a project in Mozambique. In Peru, in 2010 operations began at Bayovar Mine, which sits on one of the largest phosphate rock deposits in South America and is capable of producing 3.9 million metric tons per year. In Mozambique, the Ewane Project is designed to produce phosphate rock in the province of Nampula.

10.6 Vale in the fertilizer market

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10.7 Logistics

The crisis of 2008, when Vale's goods arrived at ports but there were not enough ships for them, led to a radical change in the company's shipping strategy. To become free from supply restrictions and to meet rising market volatility, Vale decided to buy and build its own vessels. In August of the same year Vale signed a contract with Daewoo Shipbuilding and Heavy Industries in India to construct three large ore carriers. Vale's total investment in this was US$1.6 billion.132 The era of the Valemax had begun.

Seven VLOCs were also ordered from South Korean shipyard Daewoo Shipbuilding & Marine Engineering Co. Vale received the first one in May 2013 and christened the world's biggest ore carrier Vale Brasil. Vale's total investment in this seven South Korean ships was US$1.6 billion.133 Measuring 362 meters in length, 65 meters in width, and able to carry up to 400,000 metric tons, Vale Brasil was more efficient than smaller ships at transporting ore from Brazil to Asia and had 35% lower carbon emissions per ton transported.134

In September and October 2013, two more Valemaxes were delivered: Vale Rio de Janeiro and Vale Itália.135 The design of these vessels received a Nor-Shipping Clean Ship Award, for significantly reducing carbon emissions per ton of ore transported.136 The purpose of this new operation was to create and utilize a new corridor for transporting general freight produced in the Center-North region, in particular stimulating exports of soybeans, rice, and corn. Costing approximately US$47 billion, the sub-concession strengthened Vale's portfolio of logistics services.137 The new operation was in line with the company's strategy of participating effectively in general freight transportation in Brazil.138 The figures show the success of the strategy of using the North-South Railroad to carry general freight. In 2008, Vale operated a fleet of six locomotives and 370 cars on the FNS, transporting 2.9 billion metric ton-kilometers of freight for its customers; in the following year, using the same fleet, the company transported 1.16 billion metric ton-kilometers for its customers.139

The company had long-term shipping contracts with the Valemaxes. In October 2007 Vale won a bid for a sub-concession to operate a 750-kilometer stretch of the North-South Railroad (FNS) between Carajás and Maranhão, in the state of Maranhão, for 30 years. Vale sought to develop initiatives to permit economies of scale to reduce freight transport costs for its customers. Log-in, in which Vale has a 31.3% stake, is a logistics company established in order to provide multimodal services based on integrated door-to-door solutions for port, shipping and rail freight transportation, complemented by short-distance road freight transportation and the storage of containers at land freight terminals.140

Part of the general cargo transportation industry, multimodal logistics specializes in the transport, handling and storage of goods stored in containers. Log-in does not transport ore, but general cargo. Its activities are not therefore part of Vale's main logistics businesses, which involve the transport, handling and storage of its products, especially iron ore, and bulk goods for third parties.141

Between 2009 and 2010, Vale's gross logistics service revenues grew by 32.7%. Railroad revenues expanded by 32.1% (due to higher volumes of agricultural goods, steel products and iron ore products), and revenues from port operations increased by 33.7%.142
In 2010, the EFVM transported 78.9 billion metric ton-kilometers of iron ore and other freight—16.8 billion metric ton-kilometers (21.3%), including iron ore, exclusively for Brazilian third parties. The EFVM, whose fleet consisted of 331 locomotives and 18,967 cars, also carried 1 million passengers in 2010. The EFC transported 90.4 billion metric ton-kilometers of iron ore and other goods, of which 3 billion metric ton-kilometers were for external customers. The EFC also transported 341,583 passengers in 2010, using its fleet of 220 locomotives and 10,701 cars.

The FNS carried 1.52 billion metric ton-kilometers of goods for third parties, using its fleet of six locomotives and 440 cars, while the Centro-Atlântica Railroad (Ferrovia Centro-Atlântica, or FCA) transported 11.4 billion metric ton-kilometers of freight for customers, using its fleet of 500 locomotives and 12,000 cars. The FCA, an important logistics corridor for general freight, extending for 8,023 kilometers, passes through 316 municipalities in seven Brazilian states (Minas Gerais, Espírito Santo, Rio de Janeiro, Sergipe, Goiás, Bahia and São Paulo) and the Federal District.

Finally, MRS carried a total of 144.9 million metric ton-kilometers of goods, including 60.8 million metric ton-kilometers of iron ore and other Vale products.

Ports and terminals

Over the course of 2010, 100.4 million metric tons of iron ore and pellets were exported from the iron ore terminal at Tubarão Complex. Elsewhere at the Complex, Praia Mole Terminal handled a total of 10.7 million metric tons that year. The Dry Products Terminal handled 6.6 million metric tons of grains and fertilizers, while the Bulk Liquid Terminal shipped out 1 million metric tons of bulk liquids. Intense port activity was one indication of a very successful year for Vale. What happened at Tubarão Complex was repeated in other parts of Brazil.

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What happened at Tubarão Complex was repeated in other parts of Brazil. Ponta da Madeira Maritime Terminal in Maranhão handled 34.2 million metric tons of iron ore for Vale and 5.8 million metric tons of goods for third parties. At the Sepetiba Bay Port Company Terminal in Angra, Rio de Janeiro, operated by subsidiary CPFL, 23.6 million metric tons of iron ore were shipped out.

Quaí Island Terminal in Rio de Janeiro exported 37.9 million metric tons of iron ore in 2010. Meanwhile, at Itanhaém Barra Maritime Terminal in Itanhaém, belonging to Petrobras and operated by Vale, 600,000 metric tons of fuels, agricultural products and steel were handled. To the south, Santos Maritime Terminal on the coast of São Paulo State, operated by subsidiary Vale Fertilizantes, handled 2.1 million metric tons of bulk solids, up 10.2% from 2009, reflecting Vale’s growing investments in fertilizers.

The good results achieved in 2010 spurred on even more investment the following year. In 2011, the company announced more than US$5 billion of investments in logistics, with the aim of reaching 522 million metric tons of products shipped in 2015.
Our History

Vale
to the creation of the company’s first research and development separators, Vale could process the itabirite. This innovative process containing iron, but in another form and in lower concentrations, use of magnetic separators.
also processing low-grade itabirite. Vale opted for the pioneering the extraction and usage of high-grade ore, at a lost cost, while less feasible. It was then necessary to create a technology to enable reserves were to be found at ever deeper levels, making operations planning and disposal, and mine closure.
technology to be employed, transportation of output, waste profiles, mineral quality and concentration, the type of mining rooms and laboratories, information is processed about mine planning.

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opened its Mineral Development Center (Centro de Desenvolvimento Mineral, or CDM) in 1965 in order to try to make better use of the ore extracted from Cauê Mine in Itabira, Minas Gerais.

CDM was created with the mission to design mine development plans, ranging from the feasibility study phase to best practices for harnessing reserves. In the center’s study rooms and laboratories, information is processed about mine profiles, mineral quality and concentration, the type of mining technology to be employed, transportation of output, waste planning and disposal, and mine closure.

When CDM was established, Cauê Mine’s remaining hematite reserves were to be found at ever deeper levels, making operations less feasible. It was then necessary to create a technology to enable the extraction and usage of high-grade ore, at a lost cost, while also processing low-grade ores. Vale opted for the pioneering use of magnetic separators.

“The hematite was thinning out and the ore then available, containing iron, but in another form and in lower concentrations, was infeasible. By implementing the use of high-intensity magnetic separators, Vale could process the infeasible. This innovative process is considered to be the first major technological advance that led to the creation of the company’s first research and development center, in the municipality of Santa Luísa, halfway between Itabira and Belo Horizonte. At that time, the need to use more technology was already clear. The success of the process encouraged other subsequent initiatives.

An important company research center was opened in October 2008. The new Ferrous Metals Technology Center (Centro de Tecnologia de Ferrosos, or CTF), built in São Paulo in the state of São Paulo, after the success of Bento Horizonte, Minas Gerais, was dedicated to iron ore-related technologies. The aim was to improve and expand production by running simulations in world-class laboratories of the entire mining and steelmaking process. CTF was equipped with advanced apparatus such as a softening and melting furnace enabling metallurgical tests at temperatures of up to 1,700 degrees Celsius. Using this furnace, it is possible to simulate different conditions for using iron ore in blast furnaces. Another useful piece of equipment at CTF is a Mössbauer spectrometer, which investigates the chemical and physical characteristics of iron compounds using nuclear resonance. This cutting-edge technology is also used in space exploration missions: a Mössbauer spectrometer was sent to Mars by the U.S. National Aeronautics and Space Administration (NASA) to study the planet’s soil.

CTF has a multidisciplinary team composed of metallurgical engineers, chemists, geologists and physicists, among other professionals. The Center has entered into strategic partnerships with universities and research centers in Brazil and other countries, including the United States, Germany, China and Japan. 10 Another characteristic of CTF is its use of advanced mathematical models to simulate steelmaking processes for its customers. These models are capable of predicting the behavior of the variation of iron ore available on the market. This enables Vale to calculate the best formula for its steel, and to help develop integrated furnaces feed solutions for its customers.10

Vale Institute of Technology (ITV)

The most ambitious project developed by Vale in recent years in the research field is the Vale Institute of Technology (Instituto Tecnológico Vale, or ITV). The Institute’s activities began in 2009. Its goal is to coordinate Vale’s science and technology actions, emphasizing long-term research projects conducted in partnership with the national and international scientific community. Through this initiative, Vale aims to expand scientific research output and technology-based economic development in Brazil, as well as generating and sharing knowledge to spur socioeconomic, environmental and mining industry-related development.

Since it was established, the Institute has entered into 97 research and development agreements, provided more than 50 research scholarships, and created partnerships with 16 Brazilian and international institutions, including Brazil’s agricultural research institute, Embrapa, the National Council for Scientific and Technological Development (CNPq), the Massachusetts Institute of Technology (MIT) and the École Polytechnique Fédérale de Lausanne (EPFL), in Switzerland. In addition to its research partnerships, ITV is building a series of facilities across Brazil to be staffed by world-class researchers. Initially, the Institute will invest BRL50 million in two research centers in Duque de Caxias (Minas Gerais) and Belém (Pará).

João Furtado, economist, in a speech given at Vale’s auditorium in September 2011.

Idem.


Idem.

Idem.

Idem.

Idem.
Both centers will focus on a specific theme: the mining of the future in Minas Gerais and sustainable development in Pará. They will each accommodate an average of 300 professionals, including professors and students. The ITV research centers will be landmarks in terms of their cutting-edge architectural design, offering an inclusive, stimulating and safe workplace. Both centers will feature efficient energy generation and usage systems, reduced water use, rainwater collection, and materials with a low environmental impact.

From the very start, ITV has had an international mindset, arranging for researchers in Brazil and other countries to work together as part of a network of international research institutes. The idea is to involve a broad range of actors, bringing benefits for society since local development will be promoted, and for Vale, given that value will be added to its business as it develops its network of relationships with the domestic and international scientific communities.

The ITV centers will also offer postgraduate courses and invest in the creation of technology-based enterprises, focusing on the development of entrepreneurs and the creation of business incubators. This will enable the technologies and research developed at the Institute to be transformed into businesses with high potential for growth and innovation.¹⁶⁴

Energy solutions

When Vale and Brazil’s national development bank, BNDES, announced the establishment of Vale Soluções em Energia S.A. (VSE) in 2007, the company already owned stakes in seven active hydroelectric plants in the country all dedicated to meeting its operations’ power needs. VSE’s goal was to develop sustainable processes for generating energy from renewable sources.¹⁶⁵

Under the terms of the deal, Vale owned 51% of VSE’s equity, while BNDESpar, the arm of BNDES that administers the bank’s equity stakes, owned 44%. Sygma Tecnologia, Engenharia, Indústria e Comércio Ltda. held the remaining 5% stake.

VSE’s planned investment program would feature “research in the areas of thermal coal and biomass gasification, and the production of gas-powered turbines and heavy multi-fuel motors.”¹⁶⁶ The company would also enter into “cooperation agreements with universities and research institutions such as the University of São Paulo (USP) and the Aeronautical Technology Institute (Instituto Tecnológico da Aeronáutica, or ITA), as well as hiring its own team of scientists and researchers.”¹⁶⁶

VSE’s head office is in Rio de Janeiro and it has subsidiaries in the United Kingdom and United States, as well as a Product Development Center (Centro de Desenvolvimento de Produtos, or CDP) in São Paulo. CDP, located on a site covering more than 100,000 square meters at the São José dos Campos Technology Park, has state-of-the-art laboratories to support research activities, from the development of prototypes and products to their manufacture.¹⁶⁷

¹⁶⁶ - Idem.

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10.9 Environment

During its 70-year history, one of Vale’s biggest challenges has been to find solutions to minimize the impact of its activities. ITVs, sustainable development center in Belém, Para – one of the company’s boldest investments – is committed to this. Vale has long supported projects designed to generate prosperity while protecting the environment. The Vale Florestar Project, launched in 2007, is one such initiative. In May 2010, through a partnership with BNDES and the employee pension funds of Caixa Econômica Federal (FUNCEF) and Petros, the project evolved into a company, Vale Florestar S.A. 

Vale Florestar S.A.’s purpose is to restore and regenerate degraded or deforested areas of native Amazon Rainforest while also establishing commercial plantations; however, the company’s activities are not restricted to the environment. Vale Florestar also seeks to stimulate the sustainable socioeconomic development of eastern Para, in municipalities situated in the Arc of Deforestation, and to contribute to ordered regional land use.168

Vale, BNDES, FUNCEF and Petros are all members of a Reforestation Fund with assets of R$605 million. Initial resources were invested in Vale Florestar S.A., which is focused on developing forestry businesses in Brazil.169 The goal is to cover a total area of 450,000 hectares by 2022 – 150,000 hectares for commercial plantations and 300,000 hectares for protecting and restoring native forest. 

The idea is for projects to also spread a tradition of sustainable silviculture, helping to reduce pressure on native forest. Vale Florestar is active in the municipalities of Dom Elias, Guanajoló, Paragominas, Rondon do Pará, Abel Figueiredo and Bom Jesus do Tocantins, which according to an ecological and economic mapping study (Macrozoneamento Ecológico-Econômico, or MZEE) of the state of Para, are located in a zone featuring consolidation and expansion of productive activities in territory that is already deforested.170

By means of its direct actions – reforestation, replanting and regeneration of degraded areas – Vale Florestar promotes carbon dioxide sequestration through the natural photosynthesis of trees. 

It is used most intensively in the following areas: in water table-lowering activities, to enable mining in saturated areas; in plants, where it is used in ore processing and cooling; in the sprinkling of access roads and stockyards of raw materials and products. Water is also consumed in pelletizing processes, in ore transportation and in the washing of equipment and components.171

Accordingly, in 2010 Vale intensified its research to make its water use and reuse more efficient. By using the resource more rationally, the company’s water recirculation and reuse rate reached an impressive 79% that year. This means that of the 1.2 billion liters of water required by Vale’s operations in 2010, 269 million liters were removed an impressive 79% that year. This means that of the 1.2 billion liters of water required by Vale’s operations in 2010, 269 million liters were removed 

Rational use of water

In 2010, Vale’s investments in environmental control and protection amounted to US$757 million, up 37% from the previous year. Of this total, US$579 million was spent in Brazil. Some of these resources were spent on water usage and availability management, preventing water waste, saving energy and securing supplies of water for future projects.172

This initiative is particularly important given that a large share of Brazilian emissions of greenhouse gases arise from deforestation, forest burning and other land use changes.173

Vale Fund

Established by Vale in 2009, the Vale Fund for Sustainable Development works in partnership with public and third sector organizations to pursue a shared goal: to leave a positive, strategic legacy for future generations by promoting sustainable development. 

A nonprofit institution, the Vale Fund participates in wide-ranging, transformational projects, balancing conservation and the sustainable use of natural resources with improvements in regional socioeconomic conditions. 

Its projects are carried out by organizations with proven experience in the field, providing effective responses to the key issues of macro-sustainability.

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Water is an essential input for mining activities, demanding human intervention in surface and underground water resources. It is used most intensively in the following areas: in water table-lowering activities, to enable mining in saturated areas; in plants, where it is used in ore processing and cooling; in the sprinkling of access roads and stockyards of raw materials and products. Water is also consumed in pelletizing processes, in ore transportation and in the washing of equipment and components.171

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One of the most innovative projects in global mining, S11D will allow 90 million metric tons of iron ore to be extracted per year just three years after it starts operating. To put this into perspective, the world’s largest open-pit iron ore mine, in Serra do Carajas, only reached this output level three decades after it began functioning.183 S11D has been designed to set the benchmark for intelligent mining, with lower costs, lower water consumption and less pollution.

“Pursuit” systems reduce operating costs and produce lower carbon emissions. If the S11D mine were completely operated using off-highway trucks, there would be more than 100 vehicles circulating, consuming 65 million liters of diesel per year. Using conveyor belts, diesel consumption will be 15 million liters per year, a saving of 77%. Finally, the need to replace more than 100 very large truck tires (each one over three meters high) every year will be eliminated.184

In Canaã dos Carajás, a total of 37 kilometers of conveyor belts will be installed within the mining area, including branches that will connect to a main 9.5-kilometer truck line to the processing plant. Between the area where the ore will be extracted and the site where the processing plant will be built, there is a difference of altitude of 450 meters. This is another advantage of the truckless system, as conveyor belts can more easily cope with such slopes than trucks.

The technological innovation being applied at S11D is in line with the sustainable model adopted by Vale, which calls for significant reductions in emissions (through processing using natural ore moisture), the elimination of tailings ponds and lower carbon emissions. The project’s industrial facilities will be located on pasture land outside Carajas National Forest. The outcome of five years of environmental and engineering studies, the S11D Project bears witness to Vale’s take on mine sustainability, as outlined in Vale’s 2010 Sustainability Report.181

At the start of 2010, Vale ran a unique experiment at its Carajás operations, testing a technology for screening ore using only its natural moisture in order to reduce water use in the region.176

In the operations where it has been implemented, this new process technique has cut water use by the same amount consumed by a city of 450,000 inhabitants. It has also reduced electricity consumption by 10,000 MW per year and eliminated the need to build new tailings ponds.174

Wind fences
The first time that Vale put into practice the idea of building artificial wind barriers, called wind fences, was in 2009, at Tubarão Complex in Espírito Santo. Wind fences are designed to stop the wind from blowing dust particles into the air and are therefore an important instrument in controlling atmospheric pollution. They are ingeniously structured, made of a metal frame and polypropylene sheets, and can contain winds of up to 120 kilometers per hour.175

Wind fences have been installed around Vale’s stockyards at Tubarão to permit greater control over atmospheric emissions of iron ore, pellet and coal particles. In all, 9 kilometers of the fences have been erected. The fences are one and a half times the height of the pile of products they shield, resulting in an average height of 24 meters.176

In 2009, Vale began research at the Federal University of Rio Grande do Sul (UFRGS) to develop its wind fences. In 2007, the company hired the Midwest Research Institute (MRI), an American organization specializing in environmental control solutions, which calculated the barriers’ ideal dimensions and layout, in line with the type of stockyard.177

After that, the plans were made and work began at Tubarão Complex. During the construction work, four 23-meter-high towers were built around the stockyards, to which instruments were attached to continuously monitoring particulate matter levels and the wind direction and speed. After four months of monitoring, the results showed that the wind fences had reduced dust emissions by 77%.178

In addition to wind fences, Vale has invested in a number of other improvements to cut particulate emissions. One of the most significant was the shielding of iron ore and pellet conveyor belt transfer houses in 57 places, in order to prevent dust from dispersing at points where the material is transferred from one belt to another.179

Another way of capturing dust is by using electrostatic precipitators. These tools are now employed at 21 pelletizing facilities. In addition to wind fences, Vale has invested in a number of other improvements to cut particulate emissions. One of the most significant was the shielding of iron ore and pellet conveyor belt transfer houses in 57 places, in order to prevent dust from dispersing at points where the material is transferred from one belt to another.179

One of the most disturbing issues in the sustainable development process in Brazil is the imbalance between the living conditions of the inhabitants of its different regions, argues professor Paulo Haddad in the document A importância do Projeto Ferro Carajás S11D para o processo de desenvolvimento nacional do Região Norte do Brasil (“The importance of the Carajas S11D Iron Project for the national development process in Brazil’s North region”). When one observes the geographical distribution of new investment projects in the country’s mining sector, at the implementation or technical design phase, initially estimated at US$14 billion, it is notable that the overwhelming majority are located in the traditional tragedy or dynamic periphery, helping to attenuate Brazil’s regional development imbalances. This is the case with the S11D Iron Project, located in a region of the country that needs to make economic and social progress,” says Haddad.

Another consequence of the S11D Project is that the Carajas Railroad, used to take iron ore on the coast, will be extended for 100 kilometers, to Canaã dos Carajás. At the same time, Ponta da Madeira Maritime Terminal, where the ore is loaded onto ships for export, will gain an extra berth. By 2015, the terminal’s loading capacity will have increased to 270 million metric tons per year, almost twice its present capacity.185

Vale |
Vale | Our History
Aerial view of passenger train on the Vitória-Minas Railroad (EFVM), 2009.
More preservation actions

At the largest open-pit iron ore mine in the world, Vale is reusing the ultrafine ore particles deposited in tailings ponds after processing. This system for recovering fines was pioneered in 2010. At an oil palm plantation, producing palm oil used to make biodiesel, in 2010.

Another environmental advantage of this process is that it does not generate any waste, and it basically only requires the use of dredgers with pipes, compartments and a rescreening plant. At Azul Mine, for example, more than 8 million metric tons of fines were recovered in 2011 alone, in the first year that the system was implemented. As a result, Vale was awarded an international certification by consultancy Finnch & Prunge, formally designating the tailings pond at Azul as a mineral reserve. In the same year, using the same process, 8 million metric tons of iron ore were recovered at Geladinho Mine in Carajás.

Biodiesel

In yet another step associating diversified investments with environmental actions, on February 1, 2011, Vale announced its purchase of Biopalma da Amazônia S.A., a palm oil producing company in Pará. Vale’s plan is to use most of the palm oil produced by Biopalma to manufacture “B20,” a blend of 20% biodiesel and 80% regular diesel, to power its fleet of locomotives on the Carajás Railroad and large machinery and equipment in its Brazilian operations.

Vale’s investments in biodiesel production are part of its strategic priority to be a global sustainability agent, making ever greater use of renewable fuels in its energy supply. Biopalma has six production clusters under development in the Vale do Acará and Baixo Tocantins areas of Pará. By 2013, it will have planted 60,000 hectares with oil palm trees and allocated 75,000 hectares for the restoration and regeneration of native forest. By 2011, it had already planted 18,400 hectares of palm oil trees.

All areas used to grow palm trees must first be mapped and demarcated by the federal government as degraded areas. As part of Vale’s strategy, Biopalma will contribute to preserving green areas and restoring degraded areas. In addition, a family farming program has been designed to cover 2,000 families in the Vale do Acará and Baixo Tocantins regions, who will produce palm oil on their land. The company will monitor the farmers’ agricultural practices and has guaranteed to purchase their output.

In a different field, Vale renewed its efforts to gradually start using natural gas and biodiesel as replacements for diesel and fuel oil in its operations. In February 2011, the company launched the Green Train project, which involves using a blend of natural gas and diesel to power its locomotives. The project is conducting trials on the Vitória-Minas Railroad (EFVM). It is estimated that using natural gas on the EFVM will cut emissions of CO2 equivalent by 73,000 metric tons per year.

São Paulo Stock Exchange Corporate Sustainability Index

As part of the process of continuously improving its sustainability management, Vale made a number of advances in 2010. It was the first mining company to join the São Paulo Stock Exchange’s Corporate Sustainability Index (Índice de Sustentabilidade Empresarial, or ISE), and it further developed its Sustainability Action Plan (Plano de Ação em Sustentabilidade, or PAS), whose targets were adopted as one of the criteria for employees’
In 2009, out of all major mining companies, Vale had the lowest intensity of greenhouse gas emissions per unit of revenue, according to a survey conducted by the Carbon Disclosure Project. The company was also rated among the top five in a multi-sector ranking in Goldman Sachs’ GS-Sustain Report – Focus List.

A nonprofit institution based in London, the Carbon Disclosure Project produces an annual report on climate change-related activities undertaken by major global companies. The organization presently represents more than 3,000 investors, who together control US$57 trillion in assets.206 The company has a major presence.

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The GS-Sustain Report produced sector rankings based on three dimensions: Quality of Management and Sustainability (environmental, social and corporate governance); Industry Position (access to profitable growth, and low-cost operations); and Return on Capital (cash return on capital invested and return on equity).208 Vale’s position in a ranking that combined sustainability, quality and dividends made it clear that the company had excellent prospects at the end of 2010.

In 2008, Vale’s greenhouse gas emissions amounted to 16.4 million metric tons of CO₂ equivalent – up 10% from 2007. This increase was mainly due to the incorporation of operations in Australia and refinements to the emission calculation methodology used. Since 2006, when it published its Corporate Guidelines on Climate Change and Carbon, the company has taken measures in many areas, year after year, to cut its CO₂ emissions and minimize the environmental impact of its operations. In 2010, Vale emitted 0.45 metric tons of carbon dioxide per dollar of sales, similar to the 2009 figure. This result also reflects the company’s efforts to improve its data collections in relation to the previous year.

The Vale Carbon Program encompassed an agreement with the National Space Research Institute (Instituto Nacional de Pesquisas Espaciais, or INPE) signed in April 2009. This agreement provided for the publication of three reports about climate change and its impacts on vegetation, agriculture, biodiversity and energy generation capacity in the states of Pará and Maranhão, where the company has a major presence.

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10.10 One of the best mining companies in the world

In May 2011, Vale gained a new CEO, Murilo Ferreira. Before being appointed, Ferreira had already developed a successful career at Vale. He was made a director of Vale do Rio Doce Alumínio (Alvale) in 1988, and later worked as Vale’s Executive Director of Nickel and Base Metals Sales, before being appointed CEO of Vale Inco (now Vale Canada), where he remained until 2006. In his first speech as Vale’s CEO, Murilo Ferreira stressed that employees were the company’s most important asset: “I strongly believe in the people working with me. I strongly believe we achieve better results by working as an integrated team, capable of overcoming any difficulties caused by global economic instability.”

Vale had ended the previous year with new records in all sectors, with a profit of US$30.1 billion, up 42.6% on its previous record, set in 2008. The final results for 2011 were even better. The year ended with three new annual production records: 322.6 million metric tons of iron ore, 51.8 million metric tons of pellets, and 7.3 million metric tons of coal.

The company’s results were in line with the good overall performance of Brazil, which that year had risen to seventh in the ranking of the world’s largest economies. In 2011, Vale was more international, diversified and focused on social and environmental initiatives. The company had reached a point where it was no longer sufficient to be the biggest; it also aimed to be the best. To achieve this, Vale would have to know how to conclude the past and the future.

International logistics

Vale’s investment in Valemax vessels was accompanied by strategies to better distribute iron ore exports to Asia. An example of this is the use of the Strait of Malacca, to the west of Malaysia, in order to optimize international logistics arrangements. The idea was to use the 800 kilometer channel as an export platform, shortening distances and competing on the Chinese market on an equal footing with its Australian rivals. To this end, Vale will benefit from a new port terminal and distribution center capable of hosting 30 million metric tons of iron ore in Teluk Rubiah, in the Malaysian state of Perak.

In March 2011, expanding its foreign presence – especially in Asia – Vale began constructing its first pelletizing plant at the Sihan Industrial Complex in the Sultanate of Oman. The company has invested a total of US$1.35 billion there in two pelletizing plants and a distribution center, which will act as a hub to meet growing demand for iron ore products in the Middle East, North Africa and India.

In the same way that it saw Asia as a market to be prioritized, the company also invested heavily in Africa. On May 9, 2011, mining operations began at Moatize Coal Mine in Tete Province, Mozambique. Shortly afterward, in July, the mine’s processing plant was activated. This project is Vale’s biggest investment in the coal sector. In the mine’s first year of operations, it produced 275,000 metric tons of metallurgical coal and 212,000 metric tons of thermal coal.

In March 2011, Vale began producing nickel in Onça Puma, Pará, Brazil. The mine and processing plant have a nominal production capacity of 53,000 metric tons per year of nickel contained in...
ferronikel. Onça Puma lies over a deposit of laterite/saprolite nickel, and the operation’s output in 2011 was 7,000 metric tons.210

Upgrade in Vale’s Standard & Poor rating to A-

Vale’s investments, diversification, good results and social and environmental commitments – as well as its proven ability to tackle crises – were acknowledged by the international ratings agencies. On November 23, 2011, Standard & Poor’s Ratings Services raised the global scale ratings of Vale S.A. (“Vale”) and its subsidiary Vale Canada Ltd. from BBB+ to A-, and confirmed the company’s brAAA rating on the Brazilian national scale.211

Standard & Poor’s analyzes the performance of companies listed on international stock markets, giving them risk scores that range from AAA (the best) to D (the worst). According to the agency, Vale’s rating was due to its “demonstrated commitment to financial prudence and a level of flexibility that enables it to adapt to the harshest global conditions.”212

Long life in Itabira

Nearly 70 years after Companhia Vale do Rio Doce was established there, the city of Itabira in Minas Gerais played host to one of the company’s most innovative projects. New technology would be used to expand the mining horizon there. In June 2011, Vale announced a R$3.8 billion investment (to be spent by 2014) to implement the Conceição-Itabiritos project, launched in March of the previous year.213

The project entailed constructing an ore treatment facility capable of producing 12 million metric tons per year of pellet feed. Through this initiative, Vale was beginning a pioneering industrial-scale project at its iron mines in Brazil, which could extend the lifespan of reserves and reduce environmental impacts.214

The aim of the project is to reuse ultrafine iron and manganese particles left over from previous mining activities and deposited in mining areas, while tailings ponds store waste produced during ore processing in processing plants.215

Conceição-Itabiritos is an innovative project based on technologies developed by Vale, which will make it possible to transform waste materials, until recently considered economically worthless, into valuable market products. Accordingly, Vale expects to perfect technology for processing low-grade itabirite ore (with iron content of around 40%) that can be applied at other mines.

Seventy years have now passed since Companhia Vale do Rio Doce was established in 1942 by a decree signed by the President of the Republic, Getúlio Vargas. By 2010, Itabira, which 70 years before had been a quiet town exclusively dependent on mining, was now a modern city and the fourth highest ranking municipality in Minas Gerais in terms of quality of life, and it continued to be a major focus of Vale’s activities.216

In 70 years, currencies changed names, wars started and ended, new technologies appeared and disappeared, countries were created and left the map, and the world became globalized – and meanwhile, the former CVRD moved to the private sector and is now called just Vale. Over the course of its history the company has learned to tackle the challenges in its path. Its mission is to transform natural resources into prosperity and sustainable development, using a mixture of knowledge, innovation and talent, and in this way it will continue to evolve.
Restoration of Christ the Redeemer Statue

The statue of Christ the Redeemer, perched on top of Corcovado Mountain in Rio de Janeiro, is a Brazilian icon, ranking alongside the black and white Portuguese stones along the beach promenade in Copacabana, Pelé’s goals, the Brazilian soccer team’s yellow jersey, Carmen Miranda’s fruit hat, the samba rhythm and the Girl from Ipanema. The statue is a symbol of Rio and was elected one of the seven wonders of the modern world in a poll conducted in 2007.1 Inaugurated in October 1931, its initial design was created by engineer Heitor da Silva Costa and it was produced by artist Carlos Oswald and French sculptor Paul Landowski.2 The statue now has more than 80 years of history, and since 2010 Vale has been participating in one of its most important chapters.

Working with the Archdiocese of Rio de Janeiro, Vale was responsible for one of the most thorough restorations of the monument since its inauguration. As part of a five-year agreement signed in January 2010, Vale undertook to replace approximately 3 million soapstone mosaics covering the statue and to do maintenance work on the entire belvedere surrounding the statue, which receives around 1.4 million visitors per year. In all, Vale invested R$7 million in this work.3

From head to toe, the statue is 30 meters high and it stands on an eight-meter-high pedestal. Added to the height of the mountain, the monument reaches an altitude of 748 meters – the highest art déco work in the world.4 During the restoration work, in order to maintain the same appearance, soapstone was mined from the same region of Carandai in Minas Gerais that provided the material when the statue was built. More than 100 professionals worked directly on the restoration, which lasted five months. The restored statue was unveiled to the people of Rio and tourists on June 30, 2010.

To celebrate the occasion, Vale ran a contest to pick the 80 best responses to the question “Why would you like to have a permanent reminder of the Christ the Redeemer monument?” The company website received more than 100,000 visitors from 84 countries, and 9,000 people took part in the contest. Each winner received a soapstone mosaic identical to those used to restore the statue, engraved with their name. Since June 2010, 80 people have been able to say, with pride, that they have a piece of one of the wonders of the modern world in their home.

1 - The poll, which took place on the internet, was based on a list of 100 options produced by the Hillman Wonders of the World website (http://www.hillmanwonders.com), featuring the ancient city of Machu Picchu and the Great Wall of China, among other sites.
Banded iron formations (BIF) | Finely stratified sedimentary, chemical meta-sedimentary or igneous rock, precipitated from aqueous solutions of iron oxides, carbonates or silicates alternating with quartz, amphibole or quartz-chlorite layers. Banded iron-bearing layers may develop economically extractable iron deposits, as occur in Brazil in the Itabirite deposits of Minas Gerais, for example.

Blast furnace | A cast metal product with a banded iron ore or other forged products.

Billet | Example.

Car dumper | An automatic system operated by the stockyard control center that rotates railroad cars 180 degrees to dump their ore.

Car go around Cape Horn and the Cape of Good Hope, hence their name.

Car carrier | A ship’s deadweight tonnage (DWT) | A ship’s deadweight tonnage, calculated in metric tons, is the weight excluding the train's weight, multiplied by the kilometers for which the goods were carried.

Coke | Coal processed in a coke oven, used as a reducing agent in blast furnaces and smelters to transform iron ore into pig iron.

Coke blast furnaces | Reactors that use coke as a fuel.

Communion | Fragmentation, grinding, reduction in size of mineral particles.

Concentration | Physical, chemical or biological process to increase metal or mineral content.

Containerization | Term used to express the utilization of cargos in containers. It is a dispatch method in which products are placed in containers and, after initial loading, are not moved during the dispatch operation until unloading at the destination.

Conveyor belt | Device consisting of a continuous flexible belt, assembled in a structure, pulled by rollers, and used to transport bulk goods.

Copper cathode | Copper plate of at least 99.9% purity, produced using an electrolytic process.

Cored wire | The process of injecting alloys with cored wire is used in metallurgical applications in which strict control of chemical elements in steels is essential.

Crushing | The first mechanical stage in ore comminution. Crushing reduces blocks or particles of mined ore to sizes suitable for milling operations.

Deadweight tonnage (dwt) | A ship's capacity to store and transport cargo, fuel oil, water, supplies and crew members, measured in tons.

Direct reduction | Processes of obtaining metallic iron by reducing its oxides without changing its state (solid).

Docks | Port area, jetty where ships dock for repairs or to load or unload cargo.

Dredging | A service involving excavating channels at ports to maintain or increase their depth.

Drilling rig | A machine equipped with a structure, pulled by rollers, and used to transport bulk goods.

Exhaustion | Final phase in a mine’s life cycle, when there are no more reserves left that can be mined economically.

Firebrick | A region in the Brazilian state of Minas Gerais that is rich in various minerals, especially iron, gold and manganese. It is one of the most important mineral provinces on the planet.

Fluxing | Reactors that use a fluxing agent as a feed.

FOB (Free on board) | Arrangement whereby the purchaser pays for the shipment, the insurance and all costs associated with the transportation of the goods until the destination.

Gangue | Economically useless mineral material.

Geology | Science that studies the Earth — its origin, structure, composition and evolution, as well as the causes and processes that gave rise to its current state.

Grade | Mass of an element or pure substance in relation to the total mass of the material in question. Usually expressed as a percentage.

Gravel | Rocky outcrop on river beds or in diamond mining areas.

Greenstone belt | Precambrian belt characterized as containing metamorphic rocks of one or more igneous and sedimentary sequences of economic interest, such as rocks that presumably originated from volcanic metallic deposits.

Hematite fines | Iron ore product used in small charcoal-fed blast furnaces. In Brazil, they are mainly used by companies in the pig iron industry. Their grain size ranges between 6 mm and 19 mm.

Heap | Metal or solid alloy in the shape of the mold into which it was poured.

Heap attractive force | The weight of goods transported, in metric tons, excluding the train’s weight, multiplied by the kilometers for which the goods were carried.

Iron ore fines (sinter feed) | Iron ore particles that vary from 0.15 mm to 6.35 mm in diameter. Used in sintering.

Iron ore lump iron | Fine particles of iron ore smaller than 0.15 mm generated by mining and milling. This material is turned into pellets through an agglomeration process.

Iron Quadrangle | A region in the Brazilian state of Minas Gerais that is rich in various minerals, especially iron, gold and manganese. It is one of the most important mineral provinces on the planet.

Itabirite | A banded rock with hematite layers measuring between millimeters and centimeters in thickness (with or without magnetite), containing silica, generally quartz. It is a metamorphosed banded iron formation (see entry).

It is normally contains low iron concentrations.

Jetty | A coastal hydraulic engineering structure similar to a pontoon, built at sea to protect them from rough waters.

Lump crushing | Crushing of ore into lumps.

Lump ore | Iron ore or manganese ore in lump format, whose highest particles vary from 6.35 mm to 50 mm in diameter, with small variations between different mines and ores.

Metric ton-kilometers | The weight of goods transported, in metric tons, excluding the train’s weight, multiplied by the kilometers for which the goods were carried.

Mine | Deposit in the process of being extracted, whose output is mainly characterized by chemical or mineralogical properties.

Mineral | Natural, solid inorganic compound, with a defined chemical composition and characteristic physical properties (such as crystalline color, hardness, fracture, luster, appearance, cleavage pattern, etc.).

Mineral reserve | Portion of a given researched area that has an ore body with grades and volumes calculated based on geological studies, with varying degrees of uncertainty.

Mineralogy | Branch of geology that studies minerals, their genesis and evolution.

Mining | Method of operations required for the industrial extraction of mineral or fossil substances in a deposit, economic activity related to the harnessing of mineral deposits.

Mining Code | Set of laws governing the discovery, geological research and mining of minerals in Brazil.

Mining concession | Authorization granted by the National Mineral Production Department (DNPM) for a company to mine a given mineral good.
Ships | Million tons per annum.
Multipurpose ships | Ships built to transport various types of cargo. Vale |
Nanomax ships | A Nanomax ship has the maximum acceptable dimensions to pass through the Panama Canal.
Particle size | The dimensions of sets of particles of different sizes, based on conventional scales of openings through which such particles can pass.
Pelletizing | Iron ore pelletizing is a process to agglomerate ultrafines produced in iron ore mining and in concentration stages. There are three basic stages in the process: (i) preparation of ore (to obtain the suitable degree of fineness); (ii) blending of in additive and formation of spheres; and (iii) firing (to obtain industrial material, from the extraction of useful mineral substances to their processing.
Ore exploration | Phase of prospecting for and researching natural resources.
Ore reduction | Opposite reaction to oxidation. Chemical process in which an element goes from a more oxidized condition to a less or non-oxidized condition (for example, iron's transition from oxide to metal).
Ore/oil carrier ships | Combination bulk carriers, designed to transport solid and liquid bulk goods. In addition to conventional bulk carrier facilities, they have a pumping system and respective cleaning and degasifying tanks. The same as combined carriers.
Panamax ships | A Panamax ship has the maximum acceptable dimensions to pass through the Panama Canal.
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Sintering | Process of agglomerating particles by heating and fusing them together.
Small-scale prospecting | Activity of exploiting minute mineral substances, executed in areas established for this purpose, under a small-scale mining permit regime.
Smelting | Metallurgical process that involves the transformation of pig iron into steel.
Spot market | The term spot is used in the financial markets to refer to deals executed with cash payments and immediate delivery of goods. In this case, delivery does not mean physical delivery, but rather the delivery of a given quantity of money corresponding to the quantity of goods traded.
Storage silo | Hangar or large modern granary used to store grains and cereals.
Tailing | Waste product of concentration operations, generally containing valuable metals in an ore (gangue).
Tertiary crushing | Fragmentation obtained in a third crushing stage.
Timelapse | Sheet steel with low carbon content, coated on both sides with a layer of tin.
Vein | Portion of sought-after mineral in rock, generally found between valuable rock layers.
Very large ore carriers (VLOCs) | The biggest bulk carriers in the world, each one capable of transporting 400,000 metric tons (dwt) of cargo.
Waste rock | Soil or rock with no mineral content, or less mineral content than is economically feasible to extract.

Pallets (pellet feed) | Agglomerated balls of iron ore ultrafines, of a size and quality appropriate for specific steelmaking processes. Vale’s pallets vary from 8 mm to 18 mm in size.
Pinch | Sticky black resin obtained by distilling tar or tar pitch.
Plant | Industrial establishment equipped with machines, in which raw materials are transformed into final or semi-finished products.
Precious metals | Metals that, due to rarity and rarity, have a high economic value, not only for practical use in industry, but also as an investment. The most traded are gold, silver, platinum and palladium.
Probable mineral reserves | Reserves whose quantity, grade and quality can be estimated using similar information to that used for proven reserves. However, their inspection, sampling and measuring locations are more remote or spatially arranged in a less appropriate manner. Although the level of certainty is lower than for proven (measured) reserves, it is sufficiently high to assume that there is continuity between the observation points.
Processing | A variety of processes through which ore extracted from mines is reduced to particles that can be separated into minerals and waste, with the minerals either suitable for further processing or direct use.
Proven (measured) reserves | Reserves whose quantity is computed using the dimensions revealed in outcrops, trenches, galleries, underground workings and drilling. Grade and quality are determined from detailed sampling results, and the inspection, sampling and measuring points are closely spaced. The geological character of the reserves is so well defined that the mineral substance’s dimensions, shape and grade can be determined perfectly.
Railroad ties | Pieces of wood or metal that, spaced out side by side, cross a railroad bed, and onto which the tracks are fixed.
Refining | Process of purifying metals and alloys. In steelmaking, it is the stage involving the transformation of pig iron into steel.
Rigipar | Set of blocks made of stone (or another material such as cement) piled up on top of one another in the water to serve as a barrier for the foundations of hydraulic works that stick out of the water or are very extensive, such as breakwaters or barriers against wave erosion.
Rolling mills | Series of rollers for large-scale steel plate production. Each mill produces a different reduction in thickness.
Run of mine (ROM) | Raw (unprocessed) ore obtained directly from a mine, without going through any kind of processing.
Sample | Cylindrical piece of rock or soil obtained from a drilling operation, described and analyzed in a laboratory.
Screening | Separation based on particle size.
Secondary refining | Process of purifying metals and alloys outside a main reactor. In steelmaking, secondary refining encompasses various operations conducted after refining in an oxygen converter or electric furnace.
Ship loader | Tower or funnel used to load bulk goods directly from terminals into ship holds.
Siliceous ore | An economically important mineral occurring in nature such as quartz, fiant, opal, etc.
Sinter | Aggregate produced in the sintering process.
Sintering | Process of agglomerating particles by heating and fusing them together.
Small-scale prospecting | Activity of exploiting minute mineral substances, executed in areas established for this purpose, under a small-scale mining permit regime.
Smelting | Metallurgical process that consists of obtaining a solid product from metal in liquid state, by solidifying it in a mold.
Spot market | The term spot is used in the financial markets to refer to deals executed with cash payments and immediate delivery of goods. In this case, delivery does not mean physical delivery, but rather the delivery of a given quantity of money corresponding to the quantity of goods traded.
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Vale | Our History
Vale | Our History

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Our History

The Vale Group is a multinational corporation with operations in South America, Asia, Europe and the United States.

Our roots

Vale is a result of the merger of two mining companies: Companhia Siderúrgica Nacional (CSN) and Mineração Vale SA (MVC). The two companies were initially established in the 1950s and 1960s, respectively, to exploit the mineral resources of Brazil's Iron Ore Basin (BvB).

The merger of CSN and MVC in 1997 created Vale, one of the largest integrated mining companies in the world. The merger was approved by the Brazilian government as a means of consolidating the country's mining industry and increasing its competitiveness.

Vale has operations in several countries, including Brazil, Chile, China, France, Germany, India, Japan, and the United States. The company is listed on the New York Stock Exchange under the ticker symbol “VALE.”

Vale's mission

Vale's mission is to be the leader in sustainable development. The company aims to do this by integrating social, environmental, and economic responsibilities into its business operations. Vale is committed to contributing to the economic and social development of the communities in which it operates.

Vale's vision

Vale's vision is to be the world's leading company in the mining industry. The company aims to do this by being a responsible and transparent company, one that is committed to respecting human rights, the environment, and the local communities in which it operates.

Vale's values

Vale's values are transparency, innovation, collaboration, responsibility, and sustainability. The company is committed to conducting its business in a sustainable manner, with a focus on environmental protection and social responsibility.

Vale's sustainability

Vale is committed to sustainability, and has implemented a number of initiatives to reduce its environmental impact. The company has set targets for reducing greenhouse gas emissions, water usage, and waste generation. It has also implemented measures to improve the livelihoods of local communities and to promote gender equality.

Vale's sustainability report

Vale publishes an annual sustainability report that provides detailed information on the company's performance in areas such as environmental, social, and governance (ESG) metrics. The report is available on the company's website and can be accessed by clicking on the links below:


Vale's sustainability initiatives

Vale has implemented a number of sustainability initiatives, including:

- The Vale Carbon Program, which aims to reduce greenhouse gas emissions from the company's operations.
- The Vale Inco Ltd. program, which focuses on energy efficiency and reducing waste.
- The Vale Sustentabilidade (PAS) program, which is committed to improving the livelihoods of local communities.
- The Vale Network, which is a program that aims to engage local communities in the company's operations.
- The Vale Institute of Technology (VIT), which is committed to training and developing local talent.
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Vale's partnerships

Vale has partnerships with various organizations, including government agencies, NGOs, universities, and community organizations. The company works with these partners to implement sustainability initiatives and to promote transparency and accountability.

Vale's website

Vale's website is available in multiple languages and provides a wealth of information about the company, its operations, and its sustainability initiatives. The website is available at the following link:

[Vale's Website](https://www.vale.com)

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