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Sustainability Report

12



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< Sustainability Report >

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.....  
**Foldout**

This foldout is part of Vale's  
Sustainability Report 2012.

**This foldout is detachable.**  
.....



Strategic vision

## Sustainability: one of Vale's strategic pillars

In 2012, Vale made progress in deploying the sustainability agenda in all phases of its operation, from strategy to business practice.

# US\$ 1.342bi

In 2012 Vale invested US\$1.342 billion in social and environmental actions, US\$1.025 billion (76%) in environmental expenditures and US\$317.2 million (24%) in social actions (71% on a voluntary basis and 29% mandatory).

[Read more on pages 14 and 15](#)

### ISE BM&FBOVESPA

Mining company listed in 2013 in the Corporate Sustainability Index (ISE) of São Paulo Stock Exchange (Bovespa) for the third consecutive year.

[Read more on page 14](#)



# 160

### Research projects

Since its creation (2009), Vale's Technological Institute supported about 160 research projects, involving the participation of more than 800 scholarship students.

[Read more on page 20](#)

# 97%

### Targets and challenges

97% of the targets of the Action Plan on Sustainability (PAS) were achieved in 2012. Of these, 82% were "Challenges achieved" (above level 3) and 15% "Targets achieved" (level 3).

[Read more on pages 17-19](#)

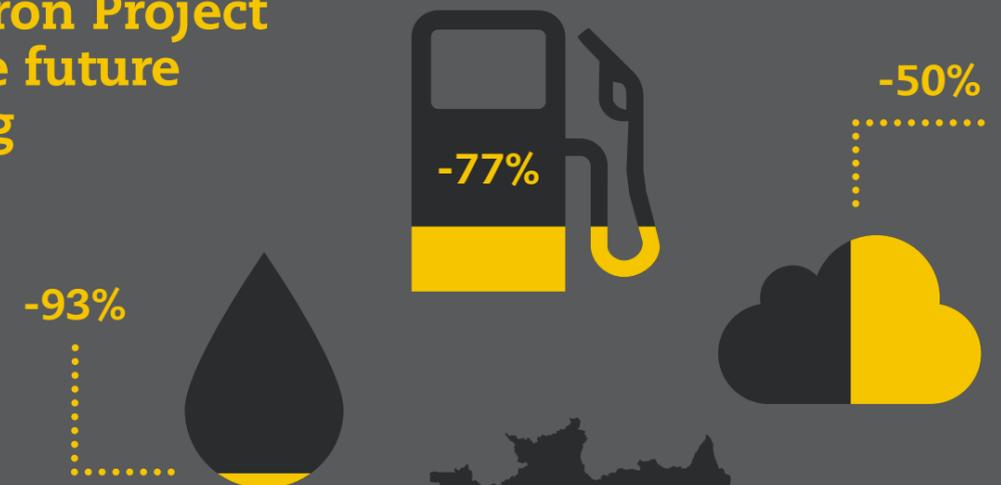


### Acknowledgement

Vale has been acknowledged as one of the 100 most sustainable companies in the world, integrating the Global 100 ranking, organized by the Canadian institution **Corporate Knights**, in the categories of energy use, CO<sub>2</sub> emissions, innovation and health and safety.

[Read more on page 24 and 25](#)

## Carajás Iron Project S11D: the future of mining



### Carajás S11D

When implemented the project will save 93% of water consumption, 77% of fuel usage and reduce by 50% the emission of greenhouse gas, compared to conventional methods.

[Read more on page 17](#)



People

## Commitment to "Life matters most"

Vale advanced in topics such as commitment to zero harm, eradication of educational deficit and building high-quality relationship based on trust with employees and the community.



# +17%

Women's workforce increased by 17% in 2012. With this, the number of women employed by the company grew to 13%.

[Read more on page 38](#)



# 195.6 thousand

this is the number of Vale's employees at the end of 2012, including its own employees (with an open-ended employment contract) and contractors (service providers in permanent activities and projects).

[Read more on page 29](#)

# 49%



### SGSS (in Portuguese)

In 2012, the deployment of the Health and Safety Global Management System (SGSS) has become the goal of all Vale employees, with an impact on variable pay. That year, the percentage of 49% implementation of SGSS in business was achieved. It was higher than the target of 39.2%.

[Read more on page 32](#)

# 160 thousand

### Day to Reflect

Approximately 160,000 employees and service providers around the world participated in the Day to Reflect on Health and Safety, held for the second consecutive year.

[Read more on page 34](#)



# 86%

of action plans for improvement in people management have already been implemented. Another 11% are in development and 3% will be started.

### Action Plans

Throughout 2012, over five thousand action plans were prepared to improve people management in different areas of Vale.

[Read more on page 28](#)



### Training in Health and Safety

Vale promoted 41 courses in health and safety.

[Read more on page 35](#)



### Participants

# 100,000

approximately 100,000 participants in 7,000 classes, totaling over 520,000 hour/class.





**1,337**

**Trainees**  
In 2012, Vale's Vocational Training Programme for young people aged 18-28, had 1,337 trainees.

[Read more on page 35](#)

**76%**

Of the 394 participants in the Vocational Training Programme, eligible for hiring, 76% were employed.



**1.6 million**

**Vale Museum**

This is the number of visitors that went to Vale Museum, located in Vila Velha (ES), over 15 years of activities, completed in 2013, in 38 national and international exhibitions.

[Read more on page 50](#)

**-14%**

**Education**

In 2012, Vale could reduce by 14% the educational deficit between its own employees in Brazil.

[Read more on page 35](#)

**745**

**thousand people**

this is the number of direct or indirect beneficiaries from the actions of Vale Foundation.

[Read more on page 50](#)

**1,596**

Professionals from Vale Brazil and Mozambique were trained to collaborate in the relationship with traditional communities and indigenous peoples, in a total of 457 hour training.

[Read more on page 52 and 53](#)

**40 thousand**

In 2012, about 40 thousand people around the world have benefited directly or indirectly, by Vale's agreements with indigenous peoples and traditional communities.

[Read more on page 52 and 53](#)

**82.1%**

**In Mozambique,** the percentage of local hiring reached 82.1%.

[Read more on page 50](#)

**11**

**Dialogue**

11 is the number of channels available for dialogue between Vale and the community.

[Read more on page 48](#)



**5**

**In Brazil**

Vale has developed social action multi-year plans of five years duration to five Brazilian states.

[Read more on page 49](#)

**Mozambique**



Planet

## Using natural resources sustainably

In 2012, Vale improved integrated management of territories with the goal of leaving a positive legacy in the regions where it operates.



76%

**Recycling**  
this was the rate of waste recycling of Vale in 2012, exceeding the target of 73%.

[Read more on page 68](#)

99

**Research**

this is the total number of research projects under development in Vale Nature Reserve, all in partnership with 61 institutions - 48 domestic and 13 international - which involve more than 300 researchers and collaborators.

[Read more on page 58](#)

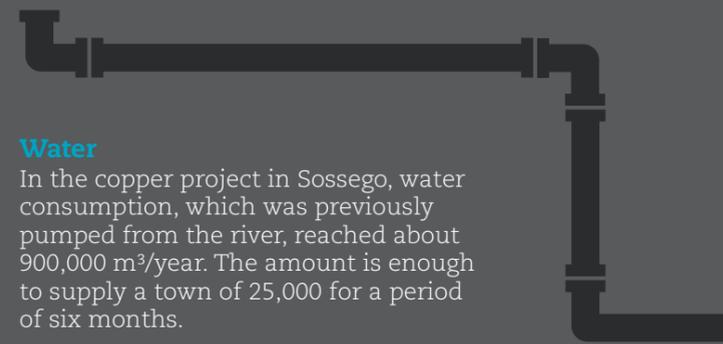


25

Projects on energy efficiency were implemented in 2012 and Vale Technology Institute (ITV) is conducting other 15 related to climate change and energy.

[Read more on page 76](#)

900 thousand m<sup>3</sup>



**Water**

In the copper project in Sossego, water consumption, which was previously pumped from the river, reached about 900,000 m<sup>3</sup>/year. The amount is enough to supply a town of 25,000 for a period of six months.

99%

**Reuse**

In 2012, water reused in the production processes of project Sossego reached 99%.

[Read more on page 89](#)

**Vale Fund**

Since its creation in 2009, Vale Fund has invested about US\$36 million in 28 projects and in 20 partner organizations, aiming at the sustainable development in the Amazon.

[Read more on page 63 and 64](#)

12.8 million

CO<sub>2</sub>

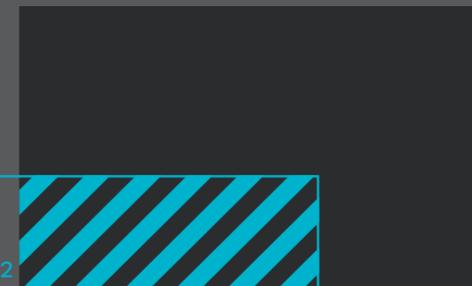
**Reserves**

Approximately 12.8 million tons is the amount of CO<sub>2</sub> stored in Vale's reserves in Minas Gerais and Espírito Santo.

[Read more on page 78](#)

13.7 thousand km<sup>2</sup>

4.7 thousand km<sup>2</sup>



**Conservation**

Vale protects or helps to protect 13.7 thousand km<sup>2</sup> of protected environment, an area about nine times larger than the city of São Paulo. Protected areas are almost three times larger than the total operating units of the company (4.7 thousand km<sup>2</sup>).

[Read more on page 58](#)



Creating value

## Promoting the sustainability agenda in the value chain

Vale remained committed to the commitments of promoting the sustainability agenda along its value chain and developing suppliers in the regions where it operates.

# 80%

### Sustainability Bonus

In 2012 Vale maintained sustainability bonus for pig-iron companies that use more than 80% of the coal from owned forests.

[Read more on page 96](#)



### Investment

In 2012, investments in the implementation of projects, R&D and sustaining existing operations totaled US\$17.7 billion.

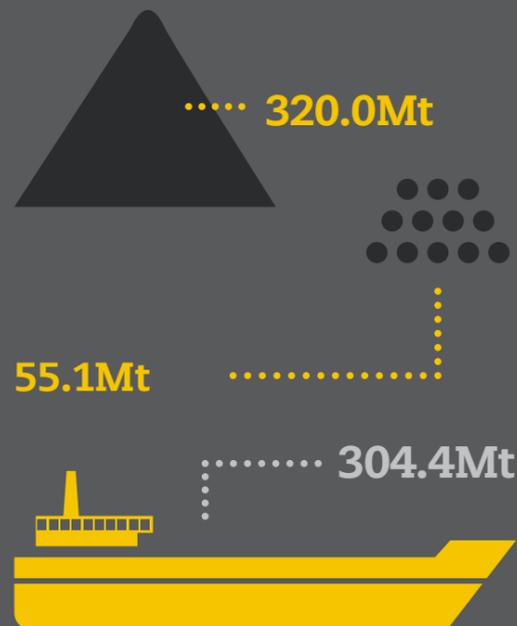
[Read more on page 106](#)

## Records

In 2012 there was a record iron ore and pellets shipments: 303.4 million tons.

The production of 320.0 million tons of iron ore and 55.1 million tons of pellets were also the largest in Vale's history.

[Read more on page 104](#)



# +200

# 12

## Zero Harm

The Supplier Zero Harm Project involved 60 companies operating in current and capital projects. 12 initiatives that could collaborate to achieving zero harm were selected out of more than 200 different suggestions.

[Read more on page 97](#)



# 34%

### China

China was the main destination of Vale's production, with 34% share in total sales.

[Read more on page 105](#)

# 170

### Suppliers

have already been trained in how to make their emission inventories.

[Read more on page 97](#)



### IDF (in Portuguese)

The Supplier Performance Index (IDF) covers 100% of suppliers in Brazil and, since 2011, it also monitors the performance of companies in Mozambique, Peru, Argentina, Paraguay and Malaysia.

[Read more on page 100](#)



## **Mission**

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To transform natural resources into prosperity and sustainable development

## **Vision**

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To be the number one global natural resources company in creating long term value, through excellence and passion for people and the planet

## **Values**

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- ▶ Life matters most
- ▶ Value our people
- ▶ Prize our planet
- ▶ Do what is right
- ▶ Improve together
- ▶ Make it happen



# 2012 Sustainability Report



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**Strategic vision**



**People**

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Communities 45



**Planet**

Land use 57  
Climate change  
and energy 76  
Water 87



**Creating value**

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Value added 104



# Vale acknowledges the importance of understanding the demands of society by means of dialogue and trust

In 2012, Vale continued investing in innovative and sustainable solutions to underpin its business: the company made efforts in health and safety in order to reach the zero harm target and developed relevant projects in search of energy efficiency and management of water use

.....

Furthermore, the company continued influencing its value chain in promoting human rights, in order to strengthen the relationship with communities, understanding their needs and cultural diversity, among other aspects.

Our focus is in line with the company's commitment to leave a positive legacy to society and to make efforts to obtain and maintain its social license to operate. This is achieved by constantly seeking best practices in social and environmental management, contemplating governance, ethics and relationship with stakeholders.

The recent period of global economic downturn, challenging by itself, made us focus more on capital allocation. Nevertheless, Vale continued its course and began the operation of two major new production projects (Solobo, Brazil, and Lubambe, Zambia). Over 200 environmental licenses were obtained in Brazil, among them the Preliminary License for Carajás S11D project, which will enable the supply of higher quality iron ore at lower costs.

Investments, excluding acquisitions, totaled US\$17.7 billion, in line with the amount in 2011 but lower than the US\$21.4 billion (-17%) expected. For 2013, the budgeted amount for investments is US\$16.3 billion. In 2012, iron ore and pellets shipments reached a historical record of 303.4 million tons. Social and environmental expenditures totaled US\$1.3 billion (US\$1 billion in the environmental area and US\$317.2 million in the social area). These values show the company's commitment to investing in the development of the territories in which it operates.

Honoring its commitment to shareholders, even in the most adverse scenario, Vale, returned the amount of US\$6 billion in 2012, in dividends and interest on own capital.

For the seventh consecutive year, Vale obtained the internal controls certification required by Sarbanes-Oxley Act, as required for public companies listed on the New York Stock Exchange with American Depositary Receipts (ADRs). And in 2013, for the third consecutive year, Vale is listed in the Corporate Sustainability Index (ISE) of BM&FBovespa (São Paulo Stock Exchange) in Brazil.





Picture: Leonardo Aversa

In this report, we present the evolution of our sustainability indicators, aligned with the Principles for Responsible Investment (PRI). We also reaffirm commitments and positions taken in the previous report, highlighting actions and results in the most relevant topics.

Vale, with the support of the Board of Directors, reaffirms its commitment to the UN Global Compact and reports in this document the progress in the implementation of its principles, as well as those established by the International Council on Mining and Metals (ICMM).

On behalf of Vale's Board of Directors and shareholders, I thank the Board, employees and business partners for achieving the results informed in this report and invite each reader to get to know more details about our path towards a more sustainable development.

**Dan Conrado**  
Chairman of the Board  
of Directors



Our focus is in line with the company's commitment to leave a positive legacy to society and to make efforts to obtain and maintain its social license to operate



# Commitment to people, life and the planet

The global economic context is now much more challenging than in the last ten years. It is expected that the global economy will grow at a slower pace in the new period we are living in. This requires greater effort and austerity in the management of a large company like Vale.

.....

This is why we face the present difficulties and establish priorities, with transparency as a major element in our management approach.

The focus of our investments is the development of world-class assets with long life, low cost, high quality production, with advanced technology, and expansion capacity. In 2012, we presented the third major result of our history.

I highlight the importance of taking into account value generation in close coordination to the commitments we have with life, with people in different locations where we operate, and with the planet as a whole.

Our pursuit of operational excellence is based on the preservation of the integrity of each one of us at Vale. Aligned to the pursuit of zero harm to people and the environment, we created "Golden Rules" and initiated the implementation of the Health and Safety Global Management System (SGSS, in Portuguese). Despite our efforts in 2012, unfortunately 15 fatalities among employees and contractors were recorded, which reinforces the importance of our commitment and the hard work that remains to be done on that front.

To "Value our people", we are concerned with the training and skills of our employees. We have no doubt that qualifying our professionals maximizes business results and contributes, at the same time, to raise the educational level of the population in areas where Vale operates.

In 2012, 97% of the Action Plan on Sustainability (PAS, in Portuguese) targets aimed at continuous improvement were achieved, with indicators related to energy and water, among others. The PAS enforcement, as well as the performance in Health and Safety, influence the variable remuneration of our employees, and thus demonstrate the importance that everyone should give to these indicators in our company.

Such results contribute to advance with the goal of delivering on our "Mission, Vision and Values" reflecting these principles in the behavior of each one of us. It also helps to strengthen the pillars of our strategy, which are: Care for people; Incorporate sustainability into business; Manage the portfolio with rigor and discipline; Focus on iron ore; Grow through world-class assets.

The integration and deployment of the sustainability agenda in the strategy and practice of Vale's business is a challenge. In this year, 2013, we are establishing long-term objectives for the topics identified as priorities. For us, there is only sustainability when we work with society, sharing the value generated with all stakeholders. For this, we open and maintain an ongoing dialogue with our stakeholders because we believe that only together we will be able to establish a positive trend and contribute effectively to the achievement of our social license to operate in the long term.





Picture: Leonardo Aversa

For us, sustainable development is also capturing the numerous growth opportunities, taking into account the physical limits of the planet. Therefore, we focus on education and research in the use of technologies and the efficient use of natural resources for the responsible practice of sustainable mining.

We can mention water reuse initiatives - already 77% in our operations -, 25 energy efficiency projects implemented in 2012 and the management of greenhouse gas emissions.

We are also committed to continuous advances in the integrated management of the territories to leave a positive legacy in the regions in which we operate. We encourage our value chain on topics such as the management of carbon emissions and the respect for human rights. We advanced in environmental issues with licenses for projects that are vital for the company, such as those related to the S11D Carajás Iron Project - the largest in Vale's history and the iron ore industry in the world. This represents a step ahead when it comes to conciliating mining and sustainability.

Vale is part of a select group of companies in the United Nations Global Compact Lead and is committed to promoting its principles on issues related to human rights, labor rights, fighting corruption and protecting the environment. We also participated in the International Council on Mining and Metals (ICMM), an important exchange for continuous improvement in sustainability in our industry. This

report reaffirms our alignment with the principles established by the Board.

Based on matters that are important to us and our stakeholders, we have invested resources and made efforts to advance in matters that concern our strategy, the people, the planet and the value we create and we wish to share with society.

I thank our employees and partners in general that, in carrying out their daily activities with recognized commitment, contributed to the results we seek to reflect in this report.

I invite you, the reader, to become familiar with these initiatives and maintain a constructive dialogue with us about the topics presented here, reinforcing our commitment to advance further in the mission "To transform natural resources into prosperity and sustainable development".

I wish you all an excellent reading!

**Murilo Ferreira**  
Chief Executive Officer

# A Brazilian company with global presence

Vale S.A. is a publicly listed company that is headquartered in Rio de Janeiro and has a global presence. Its shares are traded on the stock markets of São Paulo, New York, Hong Kong, Paris and Madrid.

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The company is the world's largest producer of iron ore and pellets and the second largest producer of nickel. Vale also produces manganese ore, ferroalloys, platinum group metals (PGMs), gold, silver, cobalt, potash, phosphates and other fertilizers. It also has activities in the logistics, steelmaking and energy sectors.

Vale's products are used, for example, in the steelmaking industry, in manufacturing airplanes and cars, in construction materials and in the production of food, among other elements present in people's daily lives, helping to improve their quality of life.

### Movie and book for Vale's 70 years anniversary

Vale produced a book and the documentary "Our History" for external audiences to get to know Vale better, and to engage its employees with the history they help build daily.

The 420 page publication was distributed to more than five thousand public libraries in Brazil, and its content was shared internally in the company. In the medium-length film employees from ten countries tell Vale's history since its foundation in June 1st 1942. It was screened publicly during internal commemorative events. The documentary was awarded in Cannes and it can be seen in Vale's YouTube channel — it has over 30,000 views.

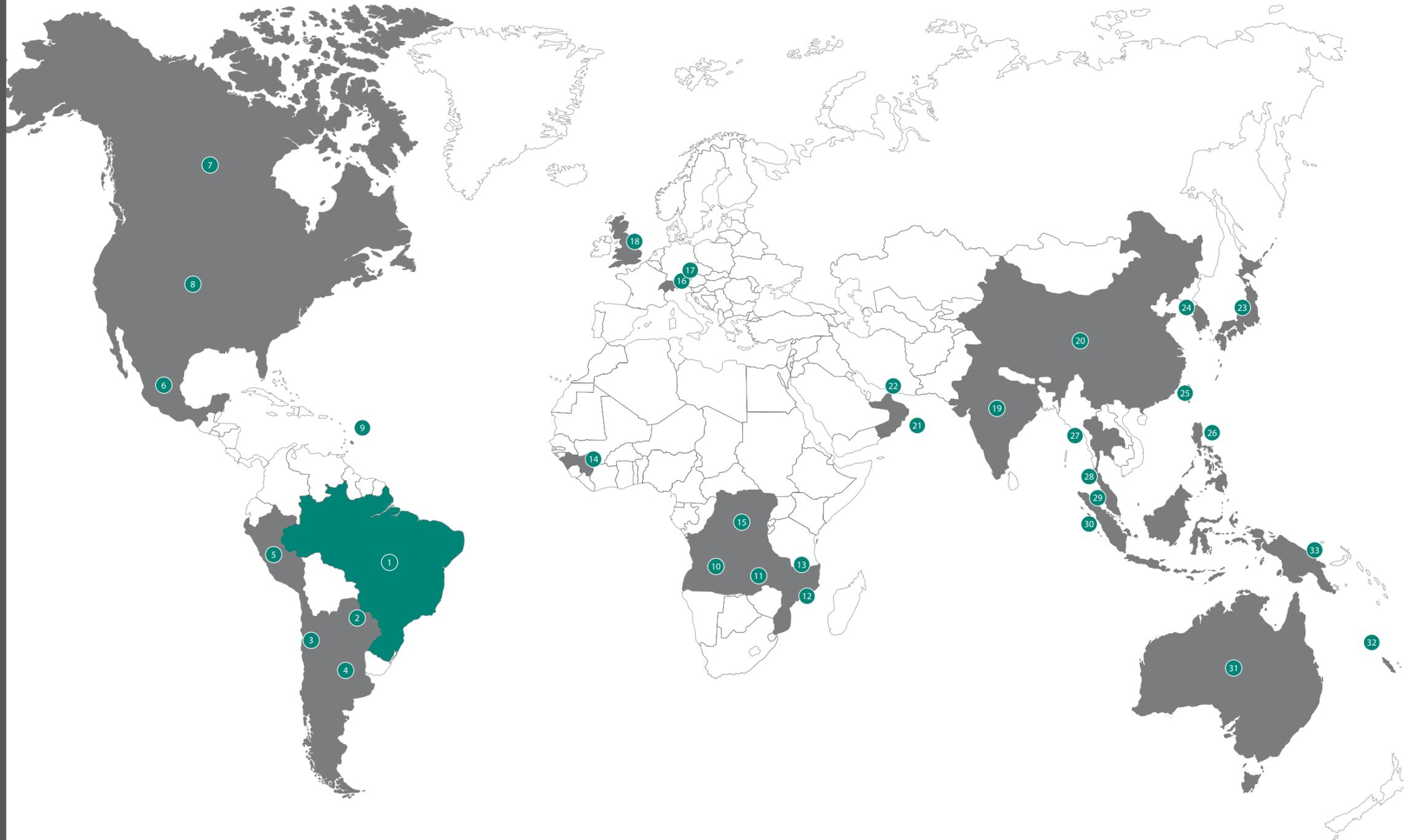


With a Smartphone download a QR Code reader and use the code on the side to watch the "Our History" video on [www.youtube.com/vale](http://www.youtube.com/vale).



# Vale's operations around the world

-  Operations
-  Offices
-  Joint ventures
-  Exploration/  
Projects under development



## Americas

- 1 Brazil** *Vale's worldwide headquarters* 
- 2 Paraguay** 
- 3 Chile** 
- 4 Argentina** 
- 5 Peru** 
- 6 Mexico** 
- 7 Canada** 
- 8 United States** 
- 9 Barbados** 

## Africa

- 10 Angola** 
- 11 Zambia** 
- 12 Mozambique** 
- 13 Malawi** 
- 14 Guinea** 
- 15 Democratic Republic of Congo** 

## Europe

- 16 Switzerland** 
- 17 Austria** 
- 18 United Kingdom** 

## Asia and Oceania

- 19 India** 
- 20 China** 
- 21 Oman** 
- 22 United Arab Emirates** 
- 23 Japan** 
- 24 South Korea** 
- 25 Taiwan** 
- 26 Philippines** 
- 27 Thailand** 
- 28 Malaysia** 
- 29 Singapore** 
- 30 Indonesia** 
- 31 Australia** 
- 32 New Caledonia** 
- 33 Papua New Guinea** 

Position as of April 2013

# Executive Officers



Picture: Leonardo Aversa

Standing (from left to right)

**Vania Somavilla**

Executive Director,  
Human Resources,  
Health and Safety,  
Sustainability  
and Energy

**Galib Chaim**

Executive Director,  
Capital Projects

**Luciano Siani**

Chief Financial Officer,  
Finance and Investors  
Relations

**José Carlos Martins**

Executive Director,  
Ferrous and Strategy

**Peter Poppinga**

Executive Director,  
Base Metals and  
Information Technology

Sitting (from left to right)

**Roger Downey**

Executive Director,  
Fertilizers and Coal

**Murilo Ferreira**

President and Chief  
Executive Officer

**Humberto Freitas**

Executive Director,  
Logistics and Mineral  
Exploration

**Changes in Vale's Executive Officers – 2012/2013**

**Exit**

Tito Martins

Executive Director, Finance and Investors Relations

july/12



How to read this report

# Sustainability report based on the most relevant topics

Vale's 2012 Sustainability Report is based on issues identified in the company's materiality matrix. These issues were organized by relevance and thematic affinity in chapters that offer a broad and complete overview of the most relevant issues for Vale and its stakeholders.

.....

In 2011, Vale reviewed its strategic business approach reflected in its Mission, Vision and Values, aligned with its sustainable development program. As part of this program, Vale identifies the most relevant social, environmental and economic issues, and continually seeks to improve its management.

For the 2011 Sustainability Report, Vale undertook a robust process of identifying materiality issues with the participation of senior management and external stakeholders, who were represented by specialists<sup>1</sup> in key topics such as climate change, forests, communities, human resources and education. The materiality process relied on the guidance of the Brazilian Foundation for Sustainable Development (FBDS) and has been revised to reflect contemporary demands and trends to improve how Vale approaches the subject. As a result of this process, the company identified strategic issues and consequently established long-term commitments based on prioritization of issues.

In 2012, Vale opted not to change the priority of issues listed from the previous year, with the understanding that such an approach would be consistent with the deployment of its strategic direction for the foreseeable future. In addition, there was no significant change in the context within which the company operates that could lead to the prioritization of new material issues. Therefore, in this report, the company presents the develop-

ment of priority material issues, highlighting its management progress over the course of 2012.

## Guidelines

For the sixth consecutive year, Vale is publishing its sustainability report according to the guidelines of the Global Reporting Initiative (GRI), G3 version, including the Mining and Metals Sector Supplement. This edition refers to 2012 and, when applicable, covers the progress made over the period from 2010 to 2012.

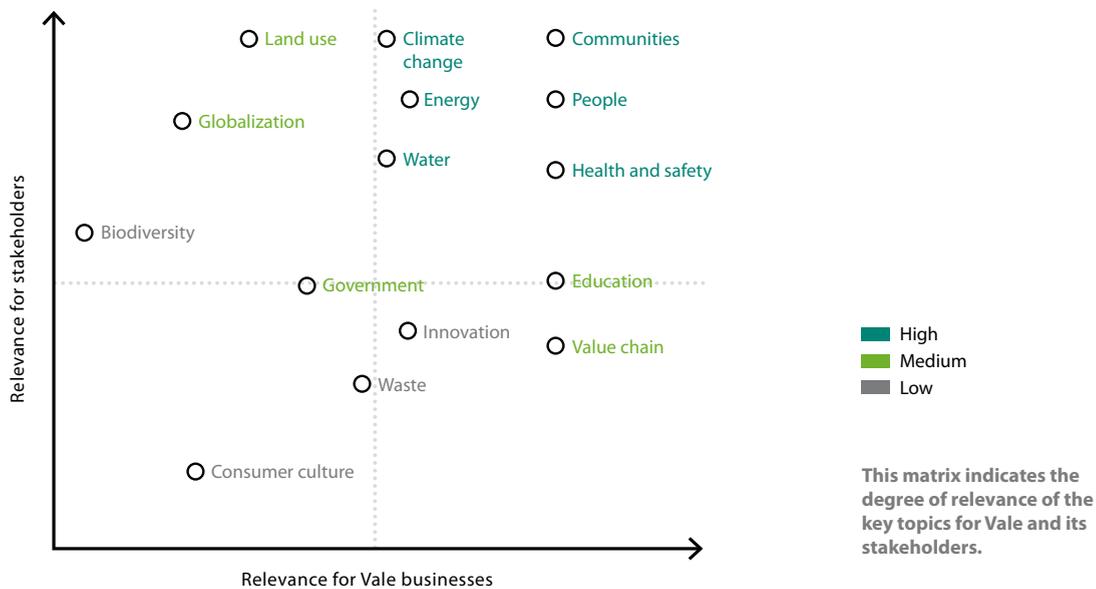
The report also fulfills the principles of the International Council on Mining and Metals (ICMM) and the United Nations Global Compact, two international initiatives to which Vale is a signatory. The report serves as Vale's Communication on Progress (COP) for the Global Compact. The correlation index allows readers to find information on how the company meets these commitments.

The 2012 report maintains the GRI application level A+, which covers all GRI profile items, management approach information, essential performance indicators and indicators from the Mining and Metals Sector Supplement, in accordance with the GRI's approach to the materiality principle.

The text was produced to show the company's positioning and its results with regard to the demands of its main stakeholders on commitments taken in the 2011 report, aligned with the topics highlighted in the materiality matrix. Complementary content can be found indicated throughout the report by the

<sup>1</sup> BSR conducted interviews with international experts.

## Materiality matrix



symbol  [1.01], To Access it download the interactive digital file at [www.vale.com/rs2012](http://www.vale.com/rs2012).

This report has been structured so that the readers gain an understanding of Vale's commitments and results as they align with the company vision's three main sections: People, Planet and Value Creation. A chapter explaining the company's strategic vision, based on its mission, vision and values and its Sustainable Development Policy, is included at the beginning of the document.

The methodology used to define boundaries was consistent with that applied in the sustainability reports of previous years. It corresponds to the implementation of the guidelines of the GRI Boundary Protocol, which considers the criteria of degree of influence (ownership or operational control) and potential impacts on sustainability.

With regard to scope, for the 2012 report, the Manganèse France and Vale Manganese Norway assets in Europe were sold, together with kaolin and coal assets – Cadam S.A. and Vale Colombia CI, respectively. No acquisitions were made during 2012. However, an increase in the performance indicators reported<sup>2</sup> for operations/projects occurred.

<sup>2</sup> Any differences in the total data and percentages in charts and tables are because these figures were rounded off for better visualization of information. In this report the amounts in reais were converted to U.S. dollars at the rate of 1.955.

### External assurance

The information in the 2012 Sustainability Report was verified by the independent audit firm KPMG, as declared in the digital file. The assurance scope included compliance with the GRI methodology, assurance of information on management approach and performance, and the application level statement. In addition, KPMG checked Vale's adherence to ICMM principles, as stated in the digital file.

In total, Vale has reported 86 indicators, of which 48 are core, 27 are additional and 11 are from the Mining and Metals Sector Supplement. Some of these indicators - marked with their respective classifications, with profile items preceded by the letters PI - were included in the print version. Others are reported in the digital file, available on Vale's website.

In terms of management approach, Vale is continuing to globalize its corporate procedures and documents in order to reconcile local culture and the dynamics of each business.

### Assessment and contact

For more information about sustainability, visit the company website [www.vale.com](http://www.vale.com) or [contact us through the Talk to Us channel, selecting the Sustainability category](#);  [1.01]



# 10%

is the share of Sustainability Action Plan and health and safety, each, in the variable remuneration of employees.

## Sustainable development

Sustainable development for the Vale is to seize growth opportunities, acknowledging the physical limits of the planet.



Luciana Rocha de Oliveira e Silva, engineer at Ilha de Guaíba Terminal (TIG) in Mangaratiba (Rio de Janeiro), Brazil  
(Picture: Márcio Dantas Valença)



Strategic vision

# Sustainability: one of Vale's strategic pillars



# Sustainable development

Sustainability is one of Vale's strategic pillars, based on the concept that there can only be sustainable development when the company and society work together, sharing the value created with its stakeholders.

In the 2011 Sustainability Report, Vale made commitments to its stakeholders as an outcome of the materiality process, in particular:

**People** To develop people, guaranteeing education, health and safety, building high-quality relationship based on trust;

**Communities** To promote local development with education, health and safety, leaving a positive legacy in the regions where Vale operates;

**Value chain** To promote the sustainability agenda among its suppliers and customers, striving to guarantee that human rights are not violated within the value chain and to support the development of suppliers in regions where the company operates;

**Government** To act on promoting sustainable development in partnership with governments, based on the company's participation in public policy and economic value created and distributed.

## Pillars of Vale's strategy

- Care for people.
- Incorporate sustainability into business.
- Manage the portfolio with rigor and discipline.
- Focus on iron ore.
- Grow through world-class assets.

Throughout this report, Vale presents the strategies and actions adopted in 2012 to act on these commitments, supported by its strategic pillars. Vale made progress integrating and deploying the sustainability agenda in its business strategy and practice. In 2013, long-term goals are being established for a number of priority topics, with the contribution of each business area, besides fully including the sustainability agenda in Vale's strategy.

## Social and environmental expenditures [PI4.8, EC8, EN30]

In 2012, Vale invested US\$1.342 billion in social and environmental actions, US\$1.025 billion (76%) in environmental expenditures and US\$317.2 million (24%) in social actions.

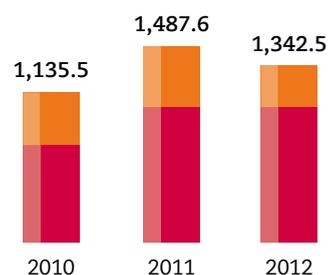
Of total environmental expenditures (75% related to legal requirements and 25% voluntary), 66% (US\$677 million) was spent in Brazil and 34% (US\$348 million) in other locations where Vale operates.

Social area resources (71% on a voluntary basis and 29% mandatory) contributed to stakeholder engagement and the building of partnerships that value the know-how and capacity of governments, companies and civil society of coming up with solutions around a shared vision.

For 2013, Vale anticipates investing US\$1.580 billion in social and environmental initiatives, of which

## Social and environmental expenditures [EC8, EN30]

In US\$ million



	2010	2011	2012
<b>Social</b>	398.5	457.2	317.2
<b>Environmental</b>	737.0	1,030.4	1,025.3
<b>Total</b>	<b>1,135.5</b>	<b>1,487.6</b>	<b>1,342.5</b>

### Social expenditures

(2012)

Areas of action	Value (US\$ million)	%
Human and economic development	73.6	23%
Impact management	67.1	21%
Infrastructure	62.3	20%
Sponsorship	60.7	19%
Donation to the Vale Foundation	42.9	14%
Corporate institutional relations	7.1	2%
Socioeconomic diagnosis/PGIS	2.7	1%
Public sector management	0.8	0%
<b>Total</b>	<b>317.2</b>	<b>100%</b>

### Environmental expenditures

(2012)

Type of expenditure	Value (US\$ million)	%
Tailings dams, dikes and waste rock piles	281.5	27%
Air emissions	192.2	19%
Water resources	125.9	12%
Environmental management	110.9	11%
Other	110.5	11%
Degraded areas and protected areas	69.3	7%
Waste	57.2	6%
Environmental studies and environmental licensing processes	28.4	3%
Contaminated areas	26.8	3%
New environmental technologies	22.6	2%
<b>Total</b>	<b>1,025.3</b>	<b>100%</b>

US\$1.265 billion (80%) will be dedicated to environmental control and protection, and US\$315 million (20%) to social programs.

#### Dialogue mechanisms [PI4.14, PI4.15, PI4.16]

In order to guarantee that it implements its governance system, fulfils its commitments and obtains its licence to operate, Vale engages its stakeholders and develops dialogue mechanisms, addressing issues that are sensitive to society.

It is through dialogue and trust that Vale expects to gain sufficient information to understand and meet society's demands. [See the company's communication channels.](#) [2.01]

#### Governance [PI4.1, PI4.4, PI4.5, PI4.6, PI4.8, PI4.9]

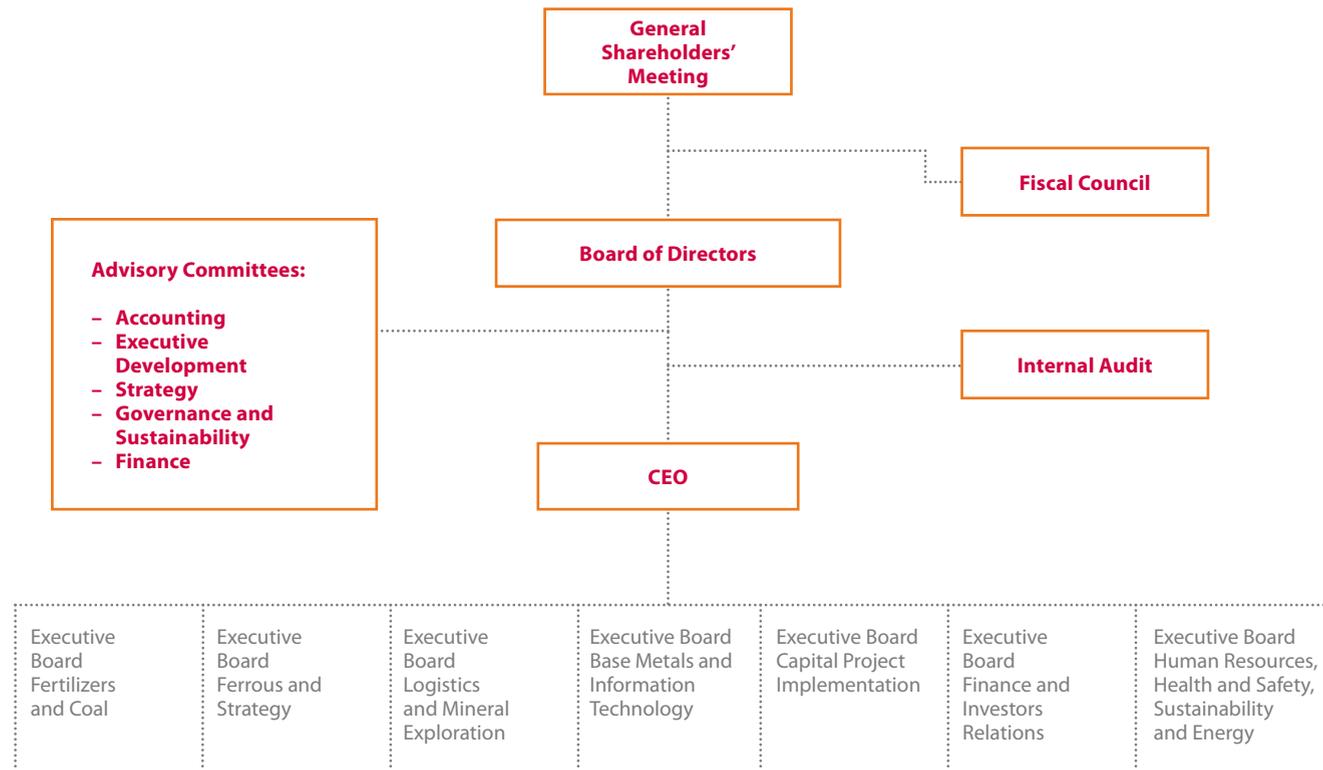
Vale's corporate governance model is based on the principles of clarity of roles, transparency and stability, as needed to position the company on its path of growth and value creation.

Vale has a Sustainable Development Policy<sup>1</sup>, created in 2009, which guides the company based on three pillars: Sustainable Operator, Local Sustainable Development Catalyst and Global Sustainability Agent. Along with this policy, Vale has established other global policies related to sustainability, such as the Climate Change Mitigation and Adaptation Global Policy, Human Rights Policy, Accountabilities Norm for Health, Safety and Environment and Health and Safety Policy, among others.

Vale's Board of Directors has an advisory committee dedicated to governance and sustainability issues. The Executive Board of Human Resources, Health and Safety, Sustainability and Energy is responsible for sustainability issues and is supported by dedicated corporate bodies.

<sup>1</sup> Some of Vale's Policies are available on [www.vale.com](http://www.vale.com).

## Governance Structure



Because of the complexity of its businesses and the many regions and cultures where it operates, Vale seeks to have a management structure that is able to translate the company's strategic vision for its thousands of employees and stakeholders. The challenge comprises the development and implementation of policies and procedures that are common to the entire organization. This requires an ongoing effort from Vale, that still has to face challenges in this area. [2.02]

In order to reaffirm its commitment to progress in results and advancement of sustainability management in 2012, the company's performance in health and safety accounted for 10% of the variable remuneration of its employees, to strengthen a preventive and conscious attitude. Additionally, the targets of the Action Plan on Sustainability are also directly linked to the payment of variable remuneration, with 10% participation for employees in 2012.

### Action Plan on Sustainability (PAS)

The PAS is one of the tools to boost the implementation of Vale's new strategic vision in operational practices and tangible benefits applicable to the company's operations in the different locations where it operates.

Indicators that comprise the PAS are linked to themes that seek continuous improvement in the company's assets, such as energy, water, waste, emissions and recovery of degraded areas (RAD in Portuguese). For these indicators, absolute or relative targets were set contributing directly or indirectly to enhance Vale's performance, as detailed in the specific chapters where these topics are covered.

Performance indicators are monitored carefully and are part of Vale's management. The table in pages 18 and 19 presents the results related to variable remuneration in 2012 and the challenges set for variable remuneration in 2013.

Some 2012 objectives, proposed and referenced in the 2011 Sustainability Report, were adjusted and revised due to changes in the production plan, governance and new budgetary guidelines.

In Vale's classification, "Target achieved" corresponds to a level 3 target (scale 0-5), and "Challenge achieved" represents overcoming a level 3 target.

Out of the results in 2012 - 33 in total -, 27 (82%) represent "Challenge achieved", five (15%) represent "Target achieved", and only one represents "Target



## Target

**To strengthen bonds of trust** with stakeholders through mechanisms and channels of engagement



## Result

**Structuring a governance model,** enabling planning and more effective treatment of social issues

### Case

## The path to sustainable mining

The Carajás S11D project, located in the state of Pará, Brazil, is a pioneering initiative because it addresses sustainability from the concept stage onwards. The project is currently in the process of obtaining a construction license and is expected to begin operations in 2016. Carajás S11D will ensure Vale's leasing position in the supply of iron ore, with a production of 90 million metric tons per year.

Solutions such as replacing off-highway trucks with conveyor belts, ore processing using natural moisture and the use of already degraded areas for the processing plant and stockyard are some of its innovative features. Vale is also attentive to environmental aspects associated with areas where iron ore is found, such as cavities (read more in chapter Planet/Territory, page 60 to 62).

When in operation, the mine and plant will reduce water consumption by 93%, fuel usage by 77% and greenhouse gas emissions by 50%, compared to conventional methods. With investments in the social area, the region will experience a new cycle of growth. Actions aimed at developing the local workforce and suppliers and strengthening the community will be implemented through Vale and Vale Foundation programs.

Investment in the project will be US\$19.5 billion, US\$8.04 billion in the mine and plant, and the remainder in logistics.

not achieved". The EN4 indicator target for the North Atlantic Nickel area was not achieved due to processes and weather events in the region. Further work is required to better understand the factors that influence energy demand in the region.

All indicators, with targets and challenges whether or not achieved in 2012, have improvement plans within the PAS, which are developed from technical visits, diagnoses and meetings with those responsible for the aforementioned topics.



## PAS Target Table 2012

Indicators	Metric	2012 Target (average variation 2011)	Results in 2012	2013 Target (average variation 2012)
<b>Iron ore and pellets</b>				
EN3	kcal/t	New metric <sup>d</sup>	▲	1% reduction in one unit
EN4	MWh/t produced	No target in 2012	—	1% reduction in two units
EN8	m <sup>3</sup> /t produced	54% reduction in one unit <sup>h</sup>	●	24% increase in one unit <sup>h</sup>
EN10	%	7% increase in three units <sup>h</sup>	●	Maintenance of the target in three units
EN22 Generation	t/Mt handled	15% reduction in three units <sup>h</sup>	●	20% reduction in three units
MM10	%	All units must adapt to complete the Conceptual Plan for Mine Closure by the end of 2013	●	Ferrous business units will continue this plan in 2013 in a centralized way. No target in 2013.
RAD	%	New indicator	●	Maintenance of the target (100% achievement of the RAD Plan)
<b>Copper<sup>e</sup></b>				
EN3	litres/t handled	26% increase in one unit	●	3% reduction in one unit
EN4	kWh/t powered	Maintenance of the target in one unit	▲	Maintenance of the target in one unit
EN8	m <sup>3</sup> /t produced	2% reduction in one unit	●	25% reduction in one unit
EN22 Generation	t/Mt handled	No target in 2012	—	5% reduction in one unit
<b>Manganese</b>				
EN8	m <sup>3</sup> /t produced	1% reduction in three units	●	2% reduction in three unit
<b>Nickel – North Atlantic<sup>iv</sup></b>				
EN3	litres/t produced	Maintenance of 2011 result <sup>v</sup>	▲	No target in 2013
EN4	MWh/total metal base	Maintenance of 2011 result <sup>v,vi</sup>	✘	No target in 2013
EN8	m <sup>3</sup> /production	Maintenance of 2011 result <sup>v</sup>	▲	Maintenance of 2012 result in one unit
EN20	SO <sub>2</sub> t/t Ni produced	Maintenance of 2011 result <sup>v</sup>	●	No target in 2013
EN22 Generation	%	No target in 2012 <sup>h</sup>	—	25% increase in recycled material in one unit (Sudbury) <sup>vi</sup>
<b>Nickel – Asia-Pacific<sup>v</sup></b>				
EN3	GJ/t Ni produced	Maintenance of 2011 result	●	20% reduction in one unit
EN8	m <sup>3</sup> /t produced	No target in 2012 <sup>h</sup>	—	New metric
EN20	t SO <sub>2</sub> /t Ni produced	Maintenance of 2011 result	●	2% reduction in one unit
EN22 Generation	t	No target in 2012 <sup>h</sup>	—	Maintenance of 2012 result in one unit
<b>Coal</b>				
EN3	litres/t handled	Average consumption of 0.83 litres of diesel/ ton handled	●	12% reduction in three units
EN4	MWh/t handled	Average consumption of 0.004 MWh/ton handled	●	2% reduction in three units
EN8	m <sup>3</sup> /t produced	Average consumption of 0.079 m <sup>3</sup> /ton produced	●	No target in 2013
<b>Fertilizers<sup>viii</sup></b>				
EN3	several	6% increase in 11 units <sup>h</sup>	●	10% reduction in ten units
EN4	kWh/t produced	1% reduction in ten units <sup>h</sup>	●	4% increase in nine units <sup>h</sup>
EN8	m <sup>3</sup> /t produced	4% reduction in five units	●	2% reduction in four units
EN22 Generation	t/Mt disassembled	Maintenance of 2011 result	●	2% reduction in one unit



Indicators	Metric	2012 Target (average variation 2011)	Results in 2012	2013 Target (average variation 2012)
<b>Logistics – General cargo<sup>V</sup></b>				
EN8	m <sup>3</sup>	Target maintenance <sup>II</sup>	●	44% reduction in three units
<b>Logistics – Tugboats<sup>IV</sup></b>				
EN22 Generation	t/vessel	3% reduction <sup>II</sup>	●	No target in 2013
EN3	litres/hours worked	No target in 2012	—	New indicator <sup>X</sup>
<b>Logistics – Railways<sup>V</sup></b>				
EN8	m <sup>3</sup> /MTKB	Target maintenance <sup>II</sup>	●	20% reduction in two units
EN10	%	107% increase <sup>II</sup>	●	276% increase in two units <sup>X</sup>
EN22 Generation	kg/MTKB	72% increase <sup>II</sup>	●	36% reduction in two units
<b>Logistics – Ports<sup>V</sup></b>				
EN8	m <sup>3</sup> /Mt handled	Target maintenance	●	40% reduction in one unit
EN10	%	1% increase in one unit <sup>II</sup>	●	58% increase in one unit
EN22 Generation	t/Mt handled	Target maintenance <sup>II</sup>	●	25% increase in four units <sup>XI</sup>
<b>Logistics – Ships<sup>IV</sup></b>				
Management of ballast water	%	No target in 2012	—	New indicator <sup>XII</sup>
<b>Logistics – Africa<sup>IV</sup></b>				
Qualitative Plan	—	No target in 2012	—	First year of implementation of PAS
<b>General Services</b>				
EN22 Disposal	%	Maintenance of 2011 result	●	10% reduction in one unit <sup>XIII</sup>
EC6	%	Maintenance of 2011 result	▲	No target in 2013 <sup>XIV</sup>

- I** Copper targets in 2012 were standardized as a percentage, but remain equivalent to those presented in the 2011 Sustainability Report.
- II** Target in 2012 different from the proposal in the 2011 Sustainability Report. See details on page 16 and 17.
- III** Changes in the productive plan generated negative or positive impact on the 2013 target, depending on the business area.
- IV** To better understand some targets, details were added in the table regarding Logistics and Nickel activities, respecting the specific characteristics of each operating unit.
- V** Action plans were implemented and the target was established to maintain the 2011 results.
- VI** Target not achieved in 2012. See details on page 16 and 17.
- VII** 4% rejection of recyclable bins (Thompson) and 49% increase in recycled plastic in one unit (Port Colborne).
- VIII** The Potassium unit was incorporated into Fertilizantes in 2012.

- IX** For tugboats (Logistics), the EN3 indicator is replacing the indicator EN22 on the 2013 target.
- X** Implementation of new systems of reuse and revision of water balance generated positive impact on the 2013 target.
- XI** Review of the criteria for calculating the indicator had a negative impact on the 2012 target.
- XII** Specific indicator for ships.
- XIII** Restructuring the plan for the allocation of waste generated negative impact on the 2013 target.
- XIV** Due to the procurement process restructuring, a target to the local purchases indicator (EC6) was not established in 2013.

Reference	Quantity	Percentage
● Challenge achieved	27	82%
▲ Target achieved	5	15%
✘ Target not achieved	1	3%
<b>Total</b>	<b>33</b>	





Graphical representation of the first ITV location, which is under construction in Belém (Pará), Brazil

Picture: Agência Vale

### Research and innovation

In order to develop its activities, Vale is constantly seeking the best technology to provide mineral resources that are essential to modern life with responsibility and respect for the environment. Along with this guideline, the Vale Technology Committee (VTC) was created together with the Vale Technology Institute (ITV).

VTC is a committee composed of Vale directors who are directly linked to the company's technology initiatives. It is responsible for strategic coordination of Vale's technology, activities and investments in research and development.

The ITV is a non-profit institution that aims to pinpoint trends, anticipating potential opportunities or problems in science and technology that may affect Vale's business, preparing the company for new challenges.

It operates through the integration of three functional areas, the first of which is its core objective:

**Research** promote, disseminate and carry out research, technology and innovation related to mining and sustainable development;

**Education** develop and qualify technical and scientific knowledge through postgraduate courses, doctorate courses and academic and professional MA courses, as well as extension activities and undergraduate science activities;

**Entrepreneurship** foster the formation of a researcher-entrepreneur culture, preparing people to lead technology-based companies or technology transfer processes that may result from the research.

Vale's research is conducted through ITV and its collaborative work takes place with universities – especially in the case of postgraduate, MA and doctorate courses – as well as institutions that encourage and promote this initiative. Since 2009, together with universities it has coordinated or supported 160 research projects, involving the participation of more than 800 scholars. Of the total projects, approximately 150 are being developed in partnership with Brazilian groups and the rest with international partners.

Among the main projects there is the use of coconut fibre for ore pelletizing process, the development of techniques for tailings disposal in mineral processing as an alternative to ponds, the use of natural gas instead of diesel for locomotives with reduced greenhouse gas emissions (GHG), production of fluorite from fluosilicic acid and the development of AgroSiCa, a product rich in silicon and calcium to be used as an agricultural additive, focusing on the disposal of fluosilicic acid. Examples of some initiatives can be found throughout the report. More information on Vale research. [\[2.03\]](#)

### Integrated risk management [P11.2]

Vale believes that risk management is essential to support its growth plan, strategic planning and financial flexibility, in addition to understanding the risk profile it is exposed to.



## Challenge

**To implement the main policies** at the same pace at which the company is growing, while respecting local characteristics



## Result

**16 new or revised global regulatory mechanisms approved, two policies, and 14 instructions.** This requires an ongoing effort from Vale, that still has to face challenges in this area

Sustainable development and social and environmental responsibility are core to Vale's risk management guidelines because they address the company's business objectives. Risks related to sustainability are detected when there is a potential deviation from one of these objectives of the business.

This analysis takes into account six factors: health and safety, environment, reputation, social, financial and compliance with legislation. [2.04]

### Legal compliance [508]

Vale complies with legal requirements in its processes, but due to the complexity and interfaces of its actions, in some situations there have been legal demands. In 2012, Vale recorded 293 relevant cases<sup>2</sup>, 147 judicial and 146 administrative. The judicial cases include 69 related to civil actions concerned with the legality of Vale's privatization and 52 tax cases in which Vale is contesting undue demands for Mineral Exploration Financial Compensation (CFEM). This latter issue also represents the majority of the administrative cases (135).

<sup>2</sup> Legal proceedings are considered significant based on at least one of the following criteria: a) their value, including compensation claims and fines (legal proceedings – more than 10% of the assets and labor administrative processes – more than US\$400,000); b) whether they involve a subject of interest to the company or affect the general public, regardless of value; c) those resulting from non-monetary sanctions.

During this period, no non-monetary sanctions were imposed and significant<sup>3</sup> fines were paid, totalling US\$35 million related to the Mineral Resource Inspection Charge (TFRM), the Value Added Tax on Goods and Services (ICMS) and CFEM. [2.05]

### Ethics [PI4.8, SO2, SO3, SO4]

The strategic vision defined by Vale in 2011 was implemented following the guidelines of important tools, which reinforce behaviours in line with the company's values, such as the Code of Ethical Conduct, also available in specific versions for suppliers and the financial market, Sarbanes-Oxley Certification (SOX certification, obtained by the company since 2006), and the Reporting Channel.

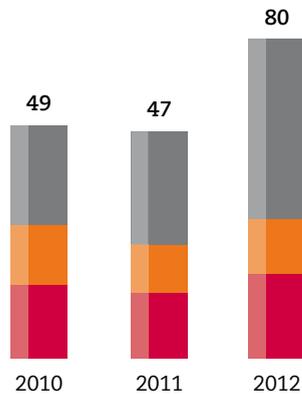
Vale follows best market practices, preventing losses and investigating cases that are associated with fraud, embezzlement and unlawful acts. It is also a signatory to the Business Pact for Integrity and Against Corruption, created by the Ethos Institute, through an agreement with the Office of the Comptroller General (CGU), in Brazil, and the United Nations Office on Drugs and Crime (UNODOC).

Through ICMM, Vale also contributes to the Extractive Industry Transparency Initiative (Eiti), an important initiative that aims to ensure transparency in

<sup>3</sup> In this report, Vale continues to disclose existing cases to which the significance criterion applies. However, the company now discloses only those values acknowledged as owed or already paid by Vale, to best meet the scope of the SO8 GRI indicator and to avoid any distortion of reality concerning judicial and administrative proceedings that, as they are awaiting the final decision, cannot normally be accounted for precisely. Vale's Form 20-F contains an estimated provision according to accounting criteria.



## Fraud cases



	2010	2011	2012
Cases involving other measures <sup>I</sup>	24	29	53
Cases of non-renewed contracts	10	6	8
Cases with dismissal or punishment <sup>II</sup>	15	12	19
<b>Total</b>	<b>49</b>	<b>47</b>	<b>80</b>

<sup>I</sup> All events were presented to company administrators and those responsible for the affected areas, leading to mitigation of risks of fraud, such as notifications and fines with the support of the Legal Department.

<sup>II</sup> In cases of fraud, the number of employees dismissed/punished was 23 in 2010, 20 in 2011, and 35 in 2012. In the last year, the main causes for dismissal were forgery (43%), conflict of interest and influence peddling (29%) and misuse of corporate media (11%).

financial flows between companies in the extractive industries and the countries where they operate.

Potential accounting irregularities or improprieties, as well as on any other accounting issue, auditing matters and those related to internal controls, ethics, human rights and the environment, can be informed through the Reporting Channel.

The disclosure of the Reporting Channel and the company's efforts to make this tool more accessible to employees, including through an Internet portal, helped increase the number of records. In 2012, there were 80 fraud cases, as the chart shows. All confirmed cases were presented to managers and directors of the areas involved and action plans were established.

The reported cases refer to measures taken specifically with respect to fraud against the company. There is no case of irregularities or improprieties in the accounting records of the company or its internal controls. Moreover, no case of corruption (active or passive) of civil servants or government representatives by employees was recorded in the period.

Cases identified must be duly grounded and handled rigorously in proportion to the damage incurred or avoided. People demonstrably involved are held accountable and punished with dismissal and prosecution. Companies with proven involvement in unlawful acts have their contracts terminated, are excluded from Vale's registry and the disclosure are fined in proportion to the damage or injury.

Vale conducts risk assessment of corruption, particularly in the supply chain, execution of contracts in operational areas, analysis of claims by suppliers and loss prevention in capital and betterment investment projects. As part of the company's effort to advance its management of risk analysis and implementation routines to prevent losses caused by fraud in capital projects, in 2012 leaders of these projects were trained and contracts were reviewed in 18% of Vale's operations<sup>4</sup>. This percentage is three times higher than that achieved in 2011 (6%). All analyzes are performed based on the Loss Prevention Guide of the Corporate Security Department and the Capital Projects Department. [Find out which business units underwent a risk assessment in 2012.](#) **[2.06]**

The company also seeks to act preemptively on this issue providing training, such as the Loss Prevention in Capital Projects, which introduces the main points to prevent fraud and promotes the improvement and recycling of contract management concepts. The online course on Business Ethics is available in Valer - Vale Education - website. Near 1% of employees took this training in 2012, whether in person or online. In 2013, Vale will maintain the commitment to disseminate this topic internally.

<sup>4</sup> The business unit's criterion adopted for the indicator considers the business unit's set of projects, mines, plants, railways, ports and port terminals, among others. Because of the diversity of Vale's activities, there is no standard definition of a business unit.



Picture: Hebert Fernandes

Vale's ship at Sohar Port in Oman

### Human rights <sup>[HR3]</sup>

Vale contributes for the respect and promotion of human rights in its projects and operations throughout the life cycle of activities in its production chain and in the regions where it operates.

Since 2009, Vale's Human Rights Policy has established principles and guidelines to be followed. Vale acts in accordance with the Universal Declaration of Human Rights and the United Nations (UN) "Protect, Respect and Remedy" Framework for Business and Human Rights.

Vale follows local labour laws and is a signatory to the International Council on Mining and Metals (ICMM) and the UN Global Compact. It also partners with other institutions that have adopted respect for human rights as a principle, such as the Global Business Initiative (GBI), the BSR and Ethos Institute.

In addition to the Human Rights Policy, Vale also has a Human Rights Guide that establishes the company's positioning on human rights issues. In 2011, Vale revised the guide and published a second edition that aims to support not only its employees, but also other stakeholders, in understanding and respecting human rights. The guide addresses issues such as: respect for diversity, awareness on moral and sexual harassment, and relations with employees, customers, partners,

suppliers, communities, governments and society. It also addresses critical issues in mining, such as child labour and forced labour, artisanal mining, and others.

Over the course of 2012, Vale conducted several initiatives to increase awareness of human rights through awareness raising and training for different internal audiences. With a focus on operational management, Vale conducted in-person training on the subject (in Maranhão, Pará, Belo Horizonte and Rio de Janeiro) and training<sup>5</sup> on the Human Rights Policy for regional focal points of the Human Resources area, attended by 200 participants. This year there was also the national and international release of the second edition of the Human Rights Guide for employees, the launch of an online course on Human Rights and Companies, and support for the production of a series of educational videos on the topic "Que direito é esse," in partnership with television channel Futura.

In addition, Vale has established ways to prevent, mitigate and remedy cases of human rights violations. For this purpose, Vale has developed tools for monitoring Human Rights issues, such as the Global Human Rights Risk Map, for a global assessment of risks of human rights violation, and the application of the second edition of the [Social Aspects of Sustainability Management Tool](#). [12.071](#)

<sup>5</sup> A total of 32 training hours in 2012.

For 2013, in addition to the proposed revision of the Human Rights Policy and tools, the company established goals on risk assessment and management, and the integration and increase of employee awareness through the development of a strategic education plan for special training, according to the target audience.

**Institutional partnerships** [PI4.12]

The company has established a range of partnerships, such as with the International Council on Mining and Metals (ICMM), the United Nations Global Compact, with Vale's participation in the Global Compact Lead platform, the World Economic Forum, the World Business Council for Sustainable Development (WBCSD), and the BSR that help exchange experiences and discuss global best practice in sustainable development, as well as accompanying trends.

In line with these principles, Vale also participates in forums and institutions. As an example, in 2012, the company participated in the project that implemented the tool "Mining: Partnerships for Development" (MPD) of the ICMM, in southeast Pará. ICMM and the Brazilian Mining Institute (IBRAM), through specialized consultancy Oxford Policy Management,

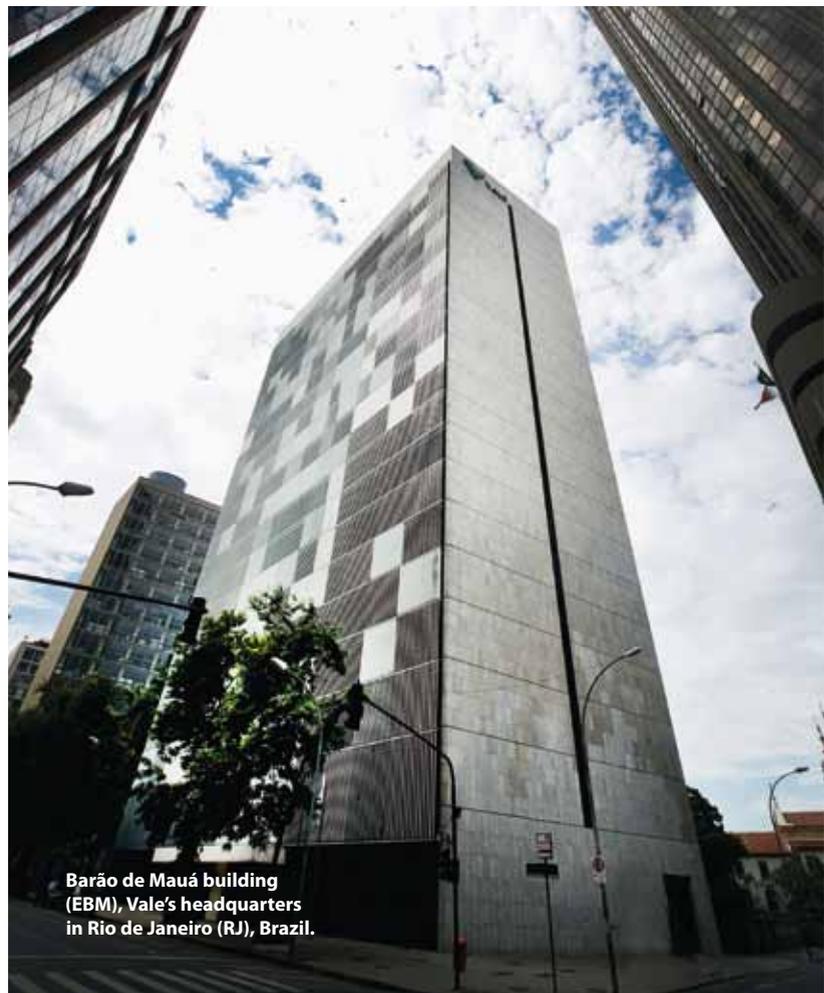
implemented the methodology in Brazil. The tool is a result of the "Resource Endowment" program, initiated in 2004, in partnership with the United Nations Conference on Trade and Development (Unctad) and the World Bank.

The study, scheduled for release in 2013, analyzed the economic and social contribution of Brazilian mining for Brazil, as well as the specific contribution of Vale's mines, based on projects in southeast Pará. In addition, the analysis shows the contribution of these mines at the local, regional and national levels, and highlights the mining industry's initiatives with the public sector and civil society to strengthen governance and improve mining production outcomes.

The findings of the Brazil Country Case Study will be used to contribute to the promotion of engagement between the mining industry and its governmental and non-governmental investors, to promote discussions and related activities and optimize the impact of mining in development.

Vale also participates in the Business and Industry Advisory Committee (Biac) of the Organization for Economic Cooperation and Development (OECD), the

The Human Rights Guide is available in the website [www.vale.com](http://www.vale.com)



Barão de Mauá building (EBM), Vale's headquarters in Rio de Janeiro (RJ), Brazil.

Picture: Antonio Scorza



Employees in Vale's building, in Shanghai, China

Picture: Marcelo Coelho



Earth Moving Equipment Safety Round Table (EMESRT) of the Green Building Council (GBC), the Brazilian Mining Institute (Ibram), the Brazilian Business Council for Sustainable Development (CEBDS) and the Ethos Institute for Business and Social Responsibility, among others, so that it can contribute to global discussions on issues such as the green economy, climate change and health and safety, for example. [2.08]

**Public policies** [505, 506]

Mining is an economic activity of great importance to national development. The mining sector is responsible for the largest private investments in the country, reinforcing the importance of adopting public policies that guarantee the sustainability of the businesses involved in its activities. Vale maintains constant dialogue with government authorities in the countries where it operates, seeking proactive participation in the formulation of public policies and in understanding their points of view, especially in relation to investments.

In 2012, two workshops were held, with full attendance among professionals invited from the corporate and business areas. The goal of the two-day course was to enable participants to better perform their institutional duties. These initiatives are focused on the analysis and discussion of the functioning of government structures in the formulation of public policies.

Vale seeks to maintain strict impartiality with regard to political activities, and acts in compliance with the laws of each country where it operates. Employees, as individuals and citizens, are free to participate in such activities, provided that any public statements they make are clearly personal views rather than the company's position.

Vale S.A. does not make donations to electoral campaigns, but other companies in the group are not prevented from doing so. Donations made by these companies can be found in the public records of the official institutions that are responsible for elections in the countries and regions where Vale operates.



# 63.7

**Million dollars**

This was how much Vale invested in education in Brazil in 2012



# 4,000



**Claims**

Were received through the claim management tool



Celso dos Santos, mechanical technician at Companhia Portuária Baía de Sepetiba terminal (CPBS), in Rio de Janeiro (RJ), Brazil (Photo: Márcio Dantas Valença)



People

# Commitment to “Life matters most”



## People

# Person

In 2012, Vale made significant efforts to make progress in achieving zero harm, eliminating the educational deficit and creating high-quality relationships and trust with its employees.

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The implementation of the Global Health and Safety Management System, associated with the creation of principles called “Golden Rules” and ongoing training and sharing of best practices, contributed to spreading Vale’s “Life Matters Most” value.

There was a significant improvement in employee education. In order to meet this goal, partnerships were expanded. As a result of the feedback provided in the [Global Employee Survey, 10 structuring actions were established with the company’s senior management and more than 5,000 action plans were mapped.](#) [3.01] Of these, 86% have already been implemented, 11% are under development and 3% are yet to be started.

### **Commitment to people** [PI4.17]

Vale is committed to investing in people and building high-quality relationships based on trust, creating a work environment that values everyone’s talents, allowing them to contribute to the company’s goals in a meaningful manner.

The first Global Employee Survey, conducted in 2011, indicated that 84% of participants felt a sense of engagement and contributed to Vale’s progress in practices and projects. The topics covered reflect-

ed aspects of engagement, organizational culture, health and safety and internal communication.

Throughout 2012, nearly 1,000 managers from different management levels developed over 5,000 action plans to improve their areas. These activities continued in 2013 with the implementation of the second cycle of the Global Employee Survey is expected. The new edition of employee engagement survey anticipates the inclusion of issues such as sustainability, as well as issues relating to health and safety, diversity, and specific questions related to the context of two businesses (basic metals and fertilizers) and a specific version of Portuguese for Mozambique.

The Global Employee Survey is essential to advance in the challenge of understanding, respecting and earning the trust of employees from all locations in which it operates. The company is open to listening. This is the only way to delve into the differences arising in a culturally and socially diverse company, and to promote the engagement and appreciation that reflect in people themselves, business and the society. Vale sees this as fundamental and is committed to acting on issues that offer the greatest opportunity to become an even better place to work: meritocracy, collaboration and continuous improvement, and appreciation of employees.





## Commitment

To invest in people and build high-quality relationships based on trust

To help people grow, as they contribute to the company's growth



## Results

Global Employee Survey revealed engagement of 84% and brought supplies for practices and projects

Promotion of issues such as meritocracy, collaboration, continuous improvement and appreciation of employees

### Vale's people – key figures [PI2.8, PI4.17, LA1]

At the end of 2012, Vale had 195,600 workers, including its own employees (with an open-ended employment contract) and contractors (service providers in long-term activities and projects)<sup>1</sup>. The growth trend was maintained, but in a more moderate way, if compared to the previous year. This is mainly due to the sale of certain assets, such as Colombian coal and European manganese operations, and the prioritization of projects.

Of total employees and contractors, 78% work in Brazil. The company also has 1,300 permanent employees on fixed-length contracts. [3.02]

<sup>1</sup> Contractors generally work on retrofitting, expansion and new projects, and as part of maintenance, cleaning and property security contracts, among other services provided.



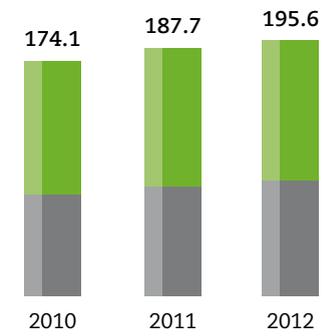
**In my daily routine, I coordinate the blasting work at the mine. This is a high risk activity, this is why safety and physical integrity requirements for my colleagues is paramount. I raise everybody's awareness on the importance of having a responsible attitude during the performance of activities.**

Luís Moura, production supervisor at Araxá Complex (Minas Gerais), Brazil



## Workforce [LA1]

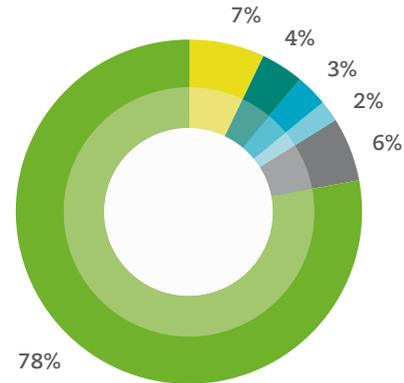
in thousands



	2010	2011	2012
<b>Contractors</b>	103.3	108.1	110.3
<b>Employees</b>	70.8	79.6	85.3
<b>Total</b>	<b>174.1</b>	<b>187.7</b>	<b>195.6</b>

## Own and outsourced employees by region<sup>1</sup>

(2012)

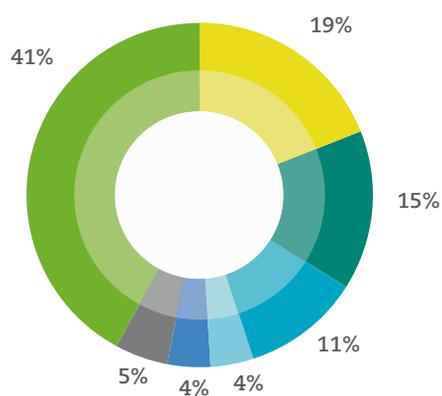


Countries	%
<b>Brazil</b>	78%
<b>Canada</b>	7%
<b>Indonesia</b>	4%
<b>Mozambique</b>	3%
<b>New Caledonia</b>	2%
<b>Others</b>	6%

<sup>1</sup> Employees and contractors shown in the chart account for 100% of reported employees (LA1).

## Own and outsourced employees by Brazilian state<sup>1</sup>

(2012)



States	%
<b>Minas Gerais</b>	41%
<b>Pará</b>	19%
<b>Maranhão</b>	15%
<b>Espírito Santo</b>	11%
<b>São Paulo</b>	4%
<b>Rio de Janeiro</b>	4%
<b>Others</b>	5%

<sup>1</sup> Employees and contractors shown in the chart account for 100% of reported employees (LA1).



Vale maintains its belief that life is more important than production and it is committed to making all efforts necessary to achieve the zero harm target, established in 2011.

It is a major long-term challenge, but the company is convinced that it is achievable. Records from various units that have managed to stay for months on end without any significant incidents<sup>2</sup> are proof that Vale is on the right track.

In 2012, Vale continued its efforts to prevent illnesses and severe injuries. An example was the implementation of the Health and Safety Management System (SGSS in Portuguese), to build a strong foundation of risk management at the company.

The most notable actions carried out include the following:

- Creation of a fatality prevention groups across operations and projects in Brazil and Africa. This program is based on the identification of potential hazards, classifying their risk severity and implementing corrective actions to eliminate the potential for fatalities.
- Incorporation of health and safety as a specific competence in the performance evaluation of all employees, reinforcing the company's commitment to zero harm and everyone's skills and efforts made by each one to develop and to achieve this goal.

- Zero Harm workshops held in all global business units to identify, share and implement best practices.
- Creation and implementation of "golden rules" to establish and easily communicate requirements during critical activities.
- Establishment of a malaria control program to address in a systemic way this risk in endemic areas.
- Approximately 15,000 inspections conducted by the Open Eyes program in Brazil, Colombia, Mozambique, Peru, Argentina, Indonesia and Paraguay. The goal of this initiative is to identify risky situations.

Despite Vale's efforts, in 2012 there were 15 fatalities, involving employees or contractors performing their activities for the company in operations and projects, caused by the following incidents:

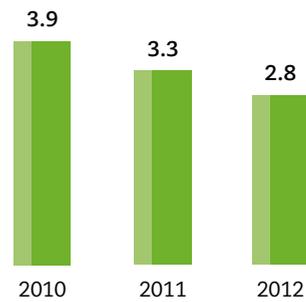
- Lightning (one contractor in Argentina);
- Fall of material in underground mine (one employee in Canada);
- Discharge in high-voltage power grid (one employee and one contractor, both in Brazil);
- Drilling equipment accident (one contractor in Brazil);
- Conveyor belt accident (one employee in Brazil);
- Crane collapse (two employees in Colombia);
- Cargo handling using a crane (one contractor in Malaysia);
- Mobile equipment (one employee in Brazil);
- Drowning in river (one contractor in Brazil);
- Cargo handling involving a crane (one employee in Brazil);
- Tree falling (one contractor in Brazil);

<sup>2</sup> Event related to work that resulted or that could have resulted in a loss.



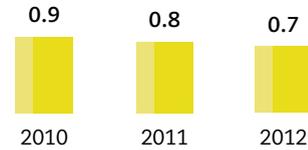
## Total injury rate<sup>I</sup> [LA7]

Number of total injuries <sup>II</sup> / per 1,000,000 hours worked<sup>III</sup>



## Lost-time injury frequency rate<sup>I</sup> [LA7]

Number of lost-time injuries <sup>II</sup> / per 1,000,000 hours worked<sup>III</sup>



- I The data in the charts include employees and contractors.
- II The rate does not include occupational illness. The data in the charts do not include first aid treatment.
- III HHT = person-hours worked / 1 MM = 1 million.

- Moving a load with a bulldozer while descending a slope (one contractor in Indonesia);
- Person hit by a truck (one employee in Brazil).

In all instances, Vale provided support to the families and conducted investigations, in line with company standards, including root cause analysis. In general, accidents have multiple causes, including immediate and organizational ones.

Recommendations designed to address basic causes were determined as a result of the investigation process, to prevent reoccurrence of similar incidents in the future. The solutions are deployed in action plans that are monitored through to completion. To ensure continuous improvement in the prevention of fatalities, analyses are periodically reviewed, besides being shared with health and safety areas and managers.

Workplace fatalities, injuries and accidents are unacceptable to Vale. The graphs above show the total rate of injuries and lost time injury rates in the last three years.

### Health and safety management system

From 2007 to 2011, Vale focused its efforts on the implementation of Critical Activities Requirements (RACs in Portuguese<sup>3</sup> to help eliminate fatalities. In 2012, the company identified an opportunity to enhance all requirements by deploying a global Health and Safety Management System (SGSS). The pilot project for this initiative took place in 2011, in 17 depart-

<sup>3</sup> Critical activities are those that involve working at heights, electricity, automotive vehicles, mobile machinery, equipment lockout and tagout, cargo handling, confined spaces, machinery protection, slope stabilization, explosives and blasting, and chemical products.

ments, 13 in Brazil, with positive results. Consequently, in 2012, the implementation of the Health and Safety Management System became a target with an impact on the variable pay of all Vale employees. The average implementation rate of the Vale Health and Safety Management System for 2012 was 49% implemented in this first year - above the target of 39.2%

The evolution of the Health and Safety Management System continues to be a collective employee goal in 2013. Vale believes that the progress of the system will contribute to growing maturity in health and safety within the company, working towards a continual reduction in the number of accidents.

The Health and Safety Management System consists of 13 systemic requirements aimed at improving the company's risk management processes to eliminate the potential for fatalities, injuries and illnesses. [\[3.03\]](#)

Throughout 2012, the system quality was continually improved. Changes in inspection protocols contributed to proactive management of health and safety risks. Another unique approach that was applied included the provision of a Mobile System to enable inspection data to be registered online.

In 2012, the company developed a global roadmap to enhance its information technology systems for Health and Safety, with prioritization being given to the implementation of a global Incident Management System, starting in Brazil and in Canada in 2013.

### Integrated Health Strategy [PI4.17, LA8]

Vale continues to develop an Integrated Health Strategy, launched in 2011 and based on three pillars: Occupational Health, Personal Health, and Community Health.



Employees in the mining library during the Day to Reflect in Carajás mine in Parauapebas (Pará), Brazil

Photo: Salviano Machado

Occupational Health regulatory documents were created in order to standardize the process of monitoring workers' health and achieve greater integration between health and safety at work.

In the Personal Health pillar, a Global Health and Wellbeing Promotion Strategy was structured. Its goal is to guide and align the Health Promotion activities that Vale performs in different areas, while respecting local needs, resource availability and standards. As part of this strategy, a Global Internal Health Week was held, an event dedicated to health issues in 60 locations in 19 countries (53% of the total) where Vale operates.

Regarding Community Health, a global strategy for malaria control was developed in order to reduce the number of cases and eliminate serious events and fatalities caused by the disease. Moreover, mechanisms to train and plan health and safety teams were implemented so these teams can act in integrated interventions to fight malaria in endemic areas where the company operates. On another front, joint work by the Health and Safety and Community Relations teams seeks to align health initiatives developed in the communities with the company's strategy. [See a list of programs aimed at the community, Vale employees and their family members.](#) [3.04]

**Wellbeing at work**

The need to promote a balance between work and personal life is reflected in one of the people management structuring actions at Vale, directly related to the topic, based on the overall results of the 2011 Global Employee Survey. The promotion of equilibrium between work and personal life is the result of the development and implementation of internal awareness-raising campaigns.

In 2012, the company also defined a Global Health and Wellbeing Promotion Strategy, led by the Health and Safety Department. The objective is to establish guidelines and actions to encourage people to change their behaviour regarding their health, helping to create a culture of wellbeing within the company.

Through these measures, the company expects the topic to evolve internally, leading to new policies and practices. Vale believes that in this way, it will be effectively contributing to the health of employees and their families, with the added benefit of maintaining a productive work environment through increased engagement.

“ ”

**No one should be hurt in a workplace. We're all working to support our families and society. It's our responsibility to make sure controls are in place so that hazards and risk are managed as much as possible. Safety should be everyone's first priority.”**

.....  
 Jim Mathiasen, security supervisor,  
 Sudbury, Canada





## Target

Achieve **zero harm**



## Results

**Implementation** of the Global Health and Safety Management System

**Creation** of “Golden Rules”

**Workshops on Zero Harm** and near 15,000 inspections conducted by the Open Eyes program

**Day to Reflect on Health and Safety** For the second consecutive year, Vale mobilized globally for a Day to Reflect on Health and Safety, held on November 13. This day is about honouring and remembering those who have lost their lives and also to intensify collective efforts to achieve zero harm. Teams from around the world came together to reflect, to learn and to commit to health and safety. Approximately 160,000 employees and contractors were part of this mobilization.

**Health and safety initiatives receive award** Three of Vale’s initiatives won awards at the 2012 Health and Safety Best Practices awards, organized by the Brazilian Mining Institute (Ibram). In the Occupational Health category, the company won first and second place with the following initiatives: “Chemical Dependency Prevention and Treatment Program in Mining” and “Travelers’ Health: Vale’s Journey.” In the Occupational Hygiene category, Vale won first place for an initiative called “Biohazards in Occupational Health Units.” [3.05]

**Emergency response plan** Vale has a crisis management centre that works seamlessly with operational areas to monitor, manage and control critical situations in a centralized and strategic manner to protect its employees, contractors and assets.

To ensure adequate responses to emergencies, Vale uses management systems, regulations and plans to intervene quickly and effectively in any unforeseen situation. The responsible teams are also trained, in most cases using simulation exercises. [3.06]



# Education

In 2011, Vale took on the challenge of eliminating deficiencies in the basic education of around 4,800 employees<sup>4</sup> in Brazil without a certificate of completion of elementary and/or high school education.

The company recognizes that this is a long-term goal and estimates that this deficit can be eliminated, for this group, in 12 years. In 2012, Vale achieved a 14% reduction in the educational deficit. The main action to obtain this result was the continuity of the Educational Training Program, conducted in partnership with several educational institutions such as the Industrial Social Service (SESI).

Most operations take place in areas far from urban centres, and there is often a lack of skilled labour. Therefore, exclusive hiring of people with elementary education is not always feasible, especially with such an intense growth rate.

### Continuous education and training [PI4.17, LA10, LA11, HR8]

In addition to certification in formal education (Educational Training Program), Vale is concerned with the proper training and qualification of its employees. The company believes that qualifying professionals working in operations will contribute to raising the region's educational level. The association of the subject with variable compensation of area leaders in human resources and operations is an additional stimulus to the achievement of training plans. The education strategy developed by the company includes the training of all its employees from the following educational models: Technical,

Management and Leadership, Development Maps, and Cross-Cutting Competences.

It is the company's goal (operational and corporate) to develop 100% of technical tracks and maps for business development and provide the corresponding content. In the area of Logistics, all the content has been defined and this process is underway for Ferrous Metals, Basic Metals & Fertilizers. Read more about Vale's education programs in the table on the next page.

In 2012, Vale invested US\$63.7 million in education in Brazil. Despite the 7% decrease compared to 2011, average training hours at the company showed growth of 4% (55 hours during the year). The figures for management and leadership and specialist categories also increased by 9%, 12% and 2%, respectively.

Vale has also offered training on Human Rights in the Business Security area since 2008. With the objective of updating company safety professionals, 85% of the total workforce was trained in 2012. [3.07]

<sup>4</sup> Employees in Brazil with a labour contract of an undetermined length.

## Vale Education programs

### Development map

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#### Construction/revision Maps Development

New development maps in the areas of Ferrous Marketing and Sales, Community Relations, Vale Foundation, Human Resources and Betterment Investments, providing training catalogues for specialized groups in 100% of business areas.

#### Postgraduate programs

Professional specialist program focusing on Railway Engineering, Copper Mining (external group), Port Projects, Labour Relations and Human Resources, Railway in Mozambique (internal group). Total of 194 professionals registered. 100% of the employees in the area have been trained in the Labour Relations program.

### Cross-Cutting Competences

.....

#### Health and Safety Training

41 courses conducted with over 100,000 participants in 7,000 thousand classes, totalling over 520,000 hours/class. 90% participants passed the training.

#### Training Program for Educational Agents

470 educators and 700 multiplier agents trained to give internal training.

#### Continuous Improvement

Approximately 6,800 professionals trained in the Vale Production System (VPS), 82% in Brazil and 18% in other countries.

#### Environmental Licensing

Approximately 600 people trained, in classes with four different modules (one of them in Mozambique and Argentina).

#### Educational training program

Creation in 2012 of 30 classes with about 300 students in the states of Minas Gerais, Mato Grosso do Sul and Pará.

#### Environmental Attitudes

950 technical specialists, 260 technical managers and 6,400 technical operators were trained in the "Know" and "Be/Do" modules.

#### Inclusion Program for People with Disabilities

Workshops with managers and HR professionals from all regions to align the Program's guidelines and create awareness among HR professionals in all regions; meetings with professionals with disabilities and business area managers; and alignment of facilities and inclusion of professionals with disabilities in communication actions.

### Management and Leadership

.....

#### Competences Curve

Approximately 680 supervisors and area managers trained, in a total of approximately 13,000 hours/classroom in 2012. More than 2,100 managers have participated in this program since it was launched.

#### Rite of Passage

Approximately 740 supervisors and managers trained in a total of over 29,400 hours/class in 2012. 65% of the target group has participated in this program, a total of 2,000 managers.

#### Routine management

More than 1,750 supervisors (85%) have participated in the program since its launch in 2010.

#### Community Leaders

Approximately 450 leaders participated in a total of approximately 570 collaborations.

#### Program for Accelerated Development (created in 2012)

26 participants in the pilot group, a total of 56 hours/class. The program was defined as an educational action required for the development of successors mapped in the process of career and succession. From 2013, the professionals who have a greater possibility of career advancement should participate in this program.

#### Postgraduate course in Vale Business Management

30 participants, a total of 440 hours/class.

#### Leading People: processes and management practices (created in 2012)

25 participants in the pilot group, a total of 24 hours/class. The program was defined as a mandatory action to develop educational leaders, and from 2013, all Vale supervisors and managers (about 3,600) should participate in the program.

### Technical

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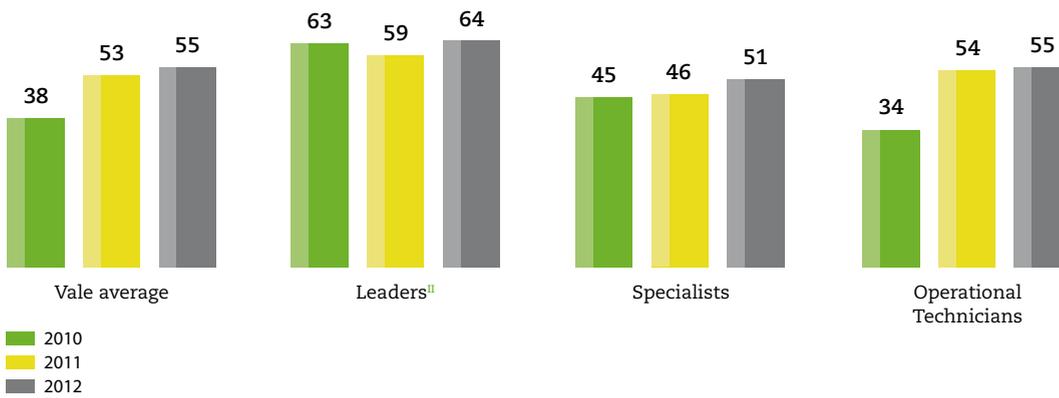
#### Technical training

Construction of Nickel, Ports and Terminals and Fertilizers technical track, covering 100% of Vale businesses, in addition to reviewing the Copper and Pelletizing technical tracks.



## Training hours [LA10]

Annual average<sup>I</sup>



- <sup>I</sup> The average number of hours a year is calculated by dividing the total number of hours of training by the number of employees. Employees covered by this indicator (LA10) correspond to 87% (2010), 98% (2011) and 93% (2012) of total reported employees (LA1).
- <sup>II</sup> The Leader category includes supervisors, general managers, directors and executive directors.

**Encouraging education** Through the Vale Institute of Technology, in 2013 Vale created an MA course on Sustainable Use of Natural Resources in Tropical Regions. The first master's course offered by an institute related to the mining company, the course is acknowledged by the Brazilian Federal Agency to Support and Evaluate Graduate Education (Capes), which reports to the Ministry of Education.

Its objective is to train professionals on the sustainable use of natural resources. It opened with 20 vacancies in courses at the Vale Institute of Technology unit in Belém, Pará, Brazil.

### Respecting differences [PI4.17]

Vale understands that passion for people and the planet, expressed in its vision, needs to be promoted among all employees and contractors, opening paths to develop a culture of diversity and inclusion through dialogue.

The company does not tolerate discrimination, whether based on ethnic background, origin, gender, sexual orientation, religious belief, union affiliation, political and ideological conviction, social class, disability, marital status or age.

Vale's commitment to diversity is already reflected in its Inclusion Programs for People with Disabilities, its Gender Equity Project and its cultural training for employees on international assignments.

## Another major challenge for Vale is to maintain a balance between company growth and employees' basic educational qualification.

To reinforce this position, Vale wants the year 2013 to be a milestone for the issue of "respecting differences." For this purpose, the company has structured a specific area of the Human Resources Department and is consolidating a new global positioning on the subject. The goal is to develop the subject with employees and managers, establish new management models globally and create methodologies to measure the evolution of the topic at the company.

Based on these new global guidelines, diversity strategies can be locally customized according to employee, business and cultural needs in the locations where Vale operates.

### Gender equity

Launched in 2011, the Gender Equity Project developed from the structuring of a committee consisting of representatives of Vale's leadership, responsible for defining the company's position on the subject, multiplying concepts and promoting mobilization actions to understand employees' perceptions.

Throughout 2012, mobilization actions in Brazil (pilot location) involved the participation of more than 1,200 employees in 24 locations in debates, films with subsequent discussion and photo exhibition with pictures of men and women who had the same role in Vale. After planning and consolidating internal and external information, strategic indicators were defined to measure the evolution of the topic at the company, and 20 structuring actions were carried out as a way to recognize and promote the talent and ability of women – without creating a discriminatory environment, yet acknowledging the cultural-historic liability. [3.08]

The actions were based on surveys carried out by Vale's representatives on the topic, with employees participating in the mobilization actions.

During 2012, various training courses and workshops were organized as part of Brazilian operations with the participation of specialists in the subject. In addition, focus groups were organized with the objective of defining a work plan for a structuring action to adjust uniforms and Personal protective equipment (PPE). Through a partnership between Vale's procurement areas and its suppliers, some prototypes have been developed by the project and are in test phase.

In 2013 Local gender equity networks will be established, managed by representatives responsible for identifying priority issues and implementing actions to raise awareness, mobilize and transform.

**Women in the workforce** [LA13, LA14]

The trend of increased female participation in Vale's workforce was maintained in 2012. Growing by 17%, the number of women increased to 13% of total employees.

The largest proportion of women, 49.6%, hold technical positions (operational and administrative), followed by specialists (analysts, engineers, geologists, etc.) with 43.1%. In supervisor positions, the proportion of women remained stable at 3%, while there was a slight increase, from 3% to 3.5%, compared to the percentage in 2011, in management level positions (managers and coordinators - both 3%).

Top management – the Executive Board, Board of Directors and Fiscal Council<sup>5</sup> — consists of 36 people: 35 men and one woman. Eleven of the members are in the 40 to 50 age bracket, while 25 are over 50 years of age.

<sup>5</sup> Position in 2012.

The definition of the globalization strategy for the Gender Equity Project is planned for 2013, when its sphere of operations will be expanded to other countries where Vale operates.



Employee at Ilha Guaíba Terminal (TIG), in Mangaratiba (Rio de Janeiro), Brazil.

Photo: Márcio Dantas Valença





## Target

Guarantee that employees at the operational technician level have the **certificate of completion of elementary and/or high school education**



## Result

**Educational deficit reduction by 14%** with the continuity of Educational Training Program

In accordance with Vale's Remuneration Policy and Code of Ethical Conduct, there is no difference in the base salary between women and men who occupy the same role. Salary variations that may occur are due to employees' different levels of seniority and experience within their functional category.  [3.09]

### Differences that add up [LA13]

Created in 2004 in order to comply with Law 8,213 of July 25, 1991, which requires reserving vacancies for people with disabilities, Vale's Inclusion Program for People with Disabilities in Brazil is coordinated by the Human Resources area. The program has the goal of hiring 140 professionals every year in accordance with Vale's Conduct Adjustment Agreement (TAC in Portuguese) with the Brazilian Public Prosecution Ministry. In 2012, Vale hired 219 people with disabilities, representing an increase of 18% compared to 2011, surpassing the TAC's target by 56%.

To fulfill its commitment to continue advancing in this area, Vale is in the final stage of preparing a set of instructions that will support areas with accessibility measures in order to eliminate physical barriers that impede the mobility of persons with disabilities at the company. Due to the expansion of its scope, the document's publication was postponed to 2013.

In line with the global development of Vale's diversity strategy, the Inclusion Program for People with Disabilities is also being repositioned, allowing other countries to work on the issue in a structured fashion,

seeking to strengthen the culture of inclusion that goes beyond the fulfillment of any legal requirements.

### Fighting discrimination [HR4]

Vale maintains a Reporting Channel to receive reports of discrimination and/or harassment in the workplace, always observing the applicable laws in the locations in which it operates.

In 2012, there were 363 cases, 92% (334) in Brazil and the others at Vale Canada and its subsidiaries (29). In Brazil, 81% (269) were investigated in 2012, and of this total, 50% of these cases were confirmed.

All cases of discrimination at Vale are fully investigated, using interviews with the people involved, their peers and managers to arrive at an understanding of the situation. The Internal Audit area carries out these investigations, supported by Human Resources and Business Security.  [3.10]

### Remuneration and professional assessments [LA12, EC5]

The company's total remuneration philosophy aims to provide its employees with a competitive remuneration package, comprising monetary remuneration, benefits and a working experience that attracts and retains the best talents.

Each year, Vale carries out a survey of salaries in the regions where it operates to ensure that its compensation packages remain attractive and competitive



## Turnover by gender<sup>i</sup> [LA2]

Turnover	2010	2011	2012	
	%	%	%	Number of Employees
General turnover	6.0%	4.7%	5.1% (4,304)	84,123
Turnover rate for men	6.0%	4.7%	5.0% (3,674)	73,355
Turnover rate for women	6.3%	5.0%	5.9% (630)	10,768

## Turnover by age bracket<sup>i</sup> [LA2]

Turnover	2010	2011	2012	
	%	%	%	Number of Employees
Under 30	5.4%	4.5%	4.4% (1,059)	24,213
Between 30 and 50	5.2%	4.0%	4.8% (2,521)	52,716
50 and above	13.5%	10.7%	10.1% (724)	7,194

## Turnover by region<sup>i</sup> [LA2]

Turnover	2010	2011	2012	
	%	%	%	Number of Employees
Brazil	5.4%	3.9%	4.7% (3,160)	67,499
Canada	10.8%	7.3%	6.5% (419)	6,436
Indonesia	6.1%	6.8%	5.5% (173)	3,161
Mozambique	6.0%	8.0%	6.7% (128)	1,915
New Caledonia	6.7%	11.9%	2.1% (24)	1,167
Australia <sup>ii</sup>	9.5%	19.1%	26.4% (271)	1,026
Other	6.3%	5.2%	4.4% (129)	2,919

<sup>i</sup> Employees covered by this table correspond to 99% (2010), 98% (2011) and 99% (2012) of all reported employees (LA1). Total number of employee turnover in 2012 is between brackets.

<sup>ii</sup> In Australia, despite a decrease in 2012 in voluntary dismissals compared to the previous year, the turnover rate increased due to the restructuring of some departments.

in the local market. Vale respects the legal minimum wage/salary in each location.

To strengthen the focus on performance and recognition of achievements, Vale has a short- and long-term variable bonus program. The bonus that an employee receives is calculated in accordance with his or her individual performance, that of their team, department and the company.

Vale conducted the performance review of 97% of its employees in 2012 – a 4% increase compared to 2011, mainly due to the incorporation of Vale Fertilizantes.

The Targets Instructions were also reviewed this year – they regulate the Target Management process at the company. Changes are aimed at increasing the autonomy of each executive department and decentralizing control exerted by the Human Resources and Global Controllershship departments.

At Vale, the Career and Succession process aims to assess employees' skills and potential to guide their own development, maximize personal and organizational performance and reinforce behaviours valued by the company. Technical specialist and management personnel are evaluated annually and the results of these assessments guide decisions in managing people and reinforcing meritocracy practices at the company. [\[3.11\]](#)

### Employee turnover [LA2, LA11]

"Value our people" is a Vale value. The company has a talent retention policy based on programs that support the development of local infrastructure (health, education, housing and leisure), continuous education, and performance, career and succession management.

In 2012, Vale's global employee turnover rate<sup>6</sup> was 5.1%, a slight increase compared to 4.7% in 2011. The turnover rate for women was 5.9%, while for men it was 5.0% (tables above).

One of the commitments taken by Vale in 2011 was to revisit the program of preparation for retirement planning and implement a new model by 2013. For this purpose, the company is revising its Global Dismissal and Retirement Standard, expected to be published by the end of 2013 and is developing a pilot group of this program with 70 employees in Vitória, Espírito Santo. The goal is to test the new model and replicate it in 2013 in other regions of Brazil.

### Freedom of association [HR5]

Vale respects the freedom of its employees to form associations and to participate in negotiations. The

<sup>6</sup> The employee turnover rate corresponds to the total number of employees that left the organization, whether voluntarily or not (including retirees), divided by the total number of employees.

company is committed to not interfering in the settlement, functioning or administration of collective agreements or labour organizations.

In accordance with its Code of Ethical Conduct, Vale does not tolerate discrimination based on membership of a union. In addition, Vale guarantees the freedom of association/unionization of its employees and trade union rights through collective agreements.

In 2012, Vale participated in a working group on ways to prevent child labour, conducted by the International Labour Organisation (ILO), and also contributed to an initiative to develop a toolkit with guidelines on how to prevent human rights violations.

Vale has been a signatory to the United Nations Global Compact since 2007, and it respects the laws of the countries where it operates and the eight fundamental conventions of the ILO, as shown in the following table.

## ILO Conventions

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- No. 29** Forced Labour, 1930.
- No. 87** Freedom of Association and Protection of the Right to Organise, 1948.
- No. 98** Right to Organise and Collective Bargaining, 1949.
- No. 100** Equal Remuneration, 1951.
- No. 105** Abolition of Forced Labour, 1957.
- No. 111** Discrimination, Employment and Occupation, 1958.
- No. 138** Minimum Age, 1973.
- No. 182** Worst Forms of Child Labour, 1999.



Employees at Ponta da Madeira terminal (Maranhão), Brazil

Vale seeks to disseminate labour rights through regular meetings with managers and employees at all Vale units

.....

Photo: Francisco das Chagas Silva Souto



### Relations with employees [LA4, LA5, MM4]

In 2012, Vale maintained broad dialogue<sup>7</sup> with unions, federations and union confederations. The company believes that this is the best way to maintain good relations with worker representatives over the course of decades. In this context, union agreements are important instruments – 96% of Vale employees<sup>8</sup> were covered by them in 2012.

The union agreement signed in Brazil in 2011 is valid for two years and is still in effect. Vale understands that it is because of this relationship based on respect that Brazilian operations have had no strikes since 1989, and no recorded notice of strikes or labour disruptions in any operation worldwide during 2012.

There are countries where relations with unions grow stronger year by year, although they are more recent than in Brazil. Areas of divergence such as those that led to labour disruption in Canada have been

<sup>7</sup> Although Vale's position is based on dialogue, the prior notification of major changes is not a standard procedure and is not established in Vale's collective agreements. According to the Global Reporting Initiative, significant changes correspond to changes in the pattern of production, such as restructurings, closures, mergers or acquisitions.

<sup>8</sup> Employees covered by this indicator (LA4) correspond to 96% (2010), 95% (2011) and 95% (2012) of the total reported employees (LA1).

overcome through union agreements, always built in conjunction with worker representatives<sup>9</sup>.

In Brazil, one of the challenges is to further develop the management of new projects, such as in the Fertilizers area, which now reports to areas managing mining activities' labour relations.

Vale's collective work agreement in Brazil (2011-2013) was based on documents such as its Mission, Vision and Values, Code of Ethical Conduct and Human Rights Guide. The text reflects the major recent social progress that has been achieved in Brazilian legislation, such as civil rights for same-sex partners, and it improved the company's reporting channels for complaints from employees.

### Open dialogue with unions [LA9]

In the challenge of achieving zero harm, Vale recognizes the importance that unions have in spreading the culture of health and safety. This is a concern that is present in dialogue with union representatives and the collective work agreements signed by the company.

<sup>9</sup> In 2012, at Vale Canada and its subsidiaries, 79% of employees were covered by collective bargaining and this figure was 67% in Australia.



Photo: Lucas Lencel

Good Day meeting at Maintenance Workshop in Carajás mine, Parauapebas (PA), Brazil



Photo: Lucas Lencí

Employees in a meeting at the administrative complex of Carajás mine, Parauapebas (Pará), Brazil

In addition to respecting local laws and regulations, Vale takes into account the concerns and views of employees' representatives, which determine mechanisms and requirements for preventing incidents and occupational diseases, such as machinery training, the provision of personal protective equipment (PPE), regular inspections and the maintenance of joint health and safety committees.

The right to refuse to work in unsafe conditions is guaranteed and reinforced by Vale's Health, Safety and Environmental Risk Analysis and Management Instructions (INS-37) and the current collective work agreement.

As part of the dialogue agenda in 2012, two meetings were held with unions in Brazil (Carajás and Sergipe), and one in Chile, altogether mobilizing around 150 people, including leaders of all unions represented at Vale. The commitment made in 2011 to expand the number of meetings was reviewed. The decision in 2012 was to maintain the number of events, but with adjustments in their method.

Vale's health and safety indicators and its main actions on this issue (tools, management systems, targets, etc.) were presented at these meetings, which took place at the company's operating units. The discussions stimulated the participation of union representatives, ensuring the exchange of ideas, clarification of questions and feedback. Union

## Despite having long-term stability, union agreements are, in many cases, constantly revised while still in effect

representatives also visited operational areas for greater interaction and understanding of the actions in practice.

### Health and Safety Committees [LA6]

Besides contributing to the prevention of workplace accidents and occupational diseases, Health and Safety Committees play an important role in identifying ways of continuously improving processes and working conditions. In 2012, the percentage of Vale employees represented in these committees (in Brazil, called Internal Accident Prevention Committees – CIPAs, in Portuguese) was 89.5%. [3.12]

**Benefits** [LA3]

One of the principles of Vale's Global Benefits Standard is to ensure that benefits are offered on a consistent basis in all of the different countries where the company is present, in line with the strategic objectives of its business in each location, the human resources philosophy and corporate strategy, the country's legal demands, and local market conditions.

To simplify access and facilitate the understanding and proper use of the benefits offered by the company, in early 2012 Vale published a new set of Benefits Instructions in Brazil (INS-0072), establishing rules,

criteria and guidelines for the allocation and management of benefit packages for employees, young apprentices and interns. These Instructions replaced and consolidated various regulatory documents.

During the year 2012, a new governance model was implemented in the area aligned with the company's strategic objectives. [3.13]

**Pension plans** [EC3]

Vale provides its employees with complementary private pension plans that aim to ensure they have an additional income when they retire, in accordance with the company's Global Benefits Standard. [3.14]

## Vale seeks to provide benefits to ensure more protection to employees and their families

.....



Employees in Itabira (Minas Gerais), Brazil

Photo: Cristiano Xavier



# Communities

Vale seeks to be a leader in social actions. Throughout 2012, Vale undertook efforts to reaffirm its commitment to leave a positive legacy.

At the same time, the company is committed to align its business strategy to the social needs of the territories where it operates, particularly communities in its areas of influence. In addition, Vale created committees to assist in conducting integrated actions.

To obtain a social licence to operate, the company has dedicated efforts to proper management of its impacts, recognizing and working to prevent, minimize, mitigate and/or compensate for adverse social impacts caused by its activities, as well as to enhance the positive impact of its projects.

Open and direct social dialogue is ever more strategic to Vale because it makes it possible to build a relationship of trust and mutual respect between the company and the community.

Vale's guiding principle is to have a closer relationship with stakeholders, understanding their needs and cultural diversity, answering their complaints and demands and seeking to build sustainable solutions together.

### Governance [PI4.17]

In 2012, Vale performed extensive work to structure a governance model that integrates projects and operations, allowing more efficient planning and treatment of social matters related to company ventures located in the same territory or area of influence. This work, called Model Issues and Stakeholders, is being applied initially in Brazil and will be implemented in Mozambique during 2013.

The model is operated through committees – territorial and executive – and considers environmental initiatives to be developed in a particular region, enabling the prioritization of initiatives that generate better returns for the needs expressed by the community, treating negative and positive impacts of company businesses.

The main tools and processes that support this model are social dialogue, socioeconomic studies, management of community feedback and demands, and multi-year social action plans.

Throughout 2012, Vale established guidelines and trained its teams to structure the social dialogue process. It developed and implemented a tool to manage the demands of Brazilian communities and improved the planning process for social actions.

To disseminate these guidelines and guide teams on its social action strategy, in addition to training, Vale published its Guide to Communities Relations. This document brings together the processes and best practices for the development of some of the relevant issues when it comes to relations with the community, such as Human Rights, Indigenous Peoples and Traditional Communities, Involuntary Relocation and others.

This guide has been prepared based on major references in global stakeholder engagement, Vale's strategic pillars, and the experiences gained by the company over the years.



Employee with a group of students at Vale Botany Park, in Vitória (Espírito Santo), Brazil

Photo: Pedro Cattony



**I felt part of the community. One of the most memorable moments was the library's opening day. Is priceless to see the satisfaction of educators making use of it and the joy of children with so many colorful and fun educational resources. We had various recreational activities with children, parents, educators and employees that stimulated reading and promoted a joyful integration.**

Márcia Frederico de Melo, social worker at Cajati complex (São Paulo), Brazil

Another document, published in 2012, which reinforces the importance of social issues for the company, is the Communities Relations for Capital Projects Manual. The goal is to guide project teams with relation to social issues that must be considered and addressed during the stages of project development and implementation. This manual also enables the planning and implementation of integrated actions with other issues pertaining to capital projects.

**Management of community demands** [PI4.17]

In 2012, the company started managing its relationship with communities through the Claim Management Tool. This resource aims to improve processes already adopted, systematizing community information and demands to promote more proactive, integrated and efficient management of these

claims. Another purpose is to capture the community's needs to enable targeting of the company's resources to meet demands.

The tool has a database integrated with Vale's operations in Brazil via an online standardized system that can be customized according to the needs of each locality. The company plans to implement it in Mozambique in 2013.

All demands are classified in line with profile: reports<sup>10</sup>, praise, complaints, suggestions and requests. Since the start of the tool's implementation, almost 4,000 demands have been recorded. They have all gone through the process of reception, analysis, response, execution (or rejection) and conclusion.

By analyzing the data supplied by the tool, it was possible to conclude that almost all of the events related to impacts were related to the proximity of train yards. A good practice in this process was the use of quality tools to analyze the problem carefully, to identify its causes and possible solutions. As a result, Vale established a new process to adapt procedures that generated noise in order to minimize this impact in neighbouring communities.

The challenge is now to ensure that these new processes are maintained even in the face of possible changes in operational strategies. It is also important to involve the Communities Relations area whenever new facts arise in order to take proactive measures.

<sup>10</sup> Vale considers as a complaint any action that generates damage or injury to the operations of the company. Such acts are crimes and those responsible are subject to the penalties provided by law.



Furthermore, the company and community are together periodically monitoring whether the measure adopted has been effective at solving the problem.

**Railway incidents**

Vale operates 10,600 kilometres of railways in Brazil. This amount represents 37% of the country's total railways. The tracks run through ten states, crossing about 400 municipalities and passing through communities that are growing along the railways. Therefore, Vale pays close attention in this area in order to monitor the risk of incidents.

**Safer railway** A project developed by the Vale Institute of Technology (ITV) seeks to provide safety and improve the quality of life of Vale employees working on the company's railways and the communities surrounding them. Data on flows of people, accidents and equipment, among other things, is aggregated using computing systems developed for this purpose. This information serves to develop action plans to improve safety along the railways and other business operations, besides reducing the impact of accidents on them. It is expected that the system will also add innovative ideas to be replicated at the company's other railway operations.

Vale's railways follow the pattern of other railways in the world, with regard to reductions in accidents per million train-kilometres, taking into account occurrences depending on the distance traveled by trains in a particular railway. [3.15]

Vale is committed to reducing the number of incidents occurring on its railways and maintains several initiatives to mitigate impacts. Such initiatives include identification of critical stretches of environmental risk, expanding the number of simulators and training to drive trains, periodic track and rolling stock maintenance, educational and awareness campaigns in communities influenced by railways and modernization and expansion of signalling systems along Vale's railways, in addition to having dedicated teams to manage, monitor, track and implement preventive actions for all incidents.



**Commitment**

**To respect and understand the neighboring communities** of its operations and projects, including their cultural diversity, and to support their development and leave a positive legacy



**Results**

**Structured a governance model** that integrates projects and operations, allowing a more efficient planning and treatment of social matters related to Vale's ventures

**Publication** of Communities Relations Guide and Communities Relations for Capital Projects Manual





The Green Train uses gas and biodiesel as fuel and operates at Vitória-Minas Railway

Photo: Agência Vale

### Social dialogue [PI4.17]

Dialogue with communities permeates all pillars of Vale's Sustainable Development Policy whether being a Sustainable Operator, Local Sustainable Development Catalyst or a Global Sustainability Agent.

To improve the engagement process and respond to community demands, since 2012 Vale has been implementing structured, permanent processes of social dialogue with communities. This practice creates opportunities for inclusive and participatory social interaction. Its purpose is to share information, promote understanding and mutual cooperation, listen and understand the interests and expectations of communities, considering the company's managerial decisions. [3.16]

### Case

## Railway safety

In 2012, Vale conducted a railway safety program "Segurança Ferroviária Não é Brincadeira" ("Railway safety is no joke"). The main objective of this program was to orientate indigenous communities that live near the Vitória-Minas Railway (EFVM) in the Aracruz municipality (Espírito Santo) as to the importance of the topic.

The work was developed in three stages: the first focused on 200 children of the Comboios Indigenous Territory, at the Indian village school, promoting integration between the topic and indigenous games. The second stage took place on a passenger train, involving children and young Indians from the Córrego do Ouro village, also in the Comboios Indigenous Territory. The group left the João Neiva station in Espírito Santo, attended a talk and participated in games about safety. The last stage consisted of activities at the Vale Railway Museum and involved the participation of young people and adults from the Córrego do Ouro village.

The program was developed after the high number of children living in areas near the railway was noted, and due to the fact that the night train stopped at the same time that religious activities in the village end. The train no longer stops at this time.

Since the project was run, no more accidents have been recorded on that stretch and villagers naturally began to strive for safety on the railway. In view of the positive results, an awareness-raising calendar has been prepared for release in 2013, in which a different piece of safety advice is given each month. The action started at school and became a wider educational project. Also in 2013, an event is planned to bring together approximately 600 indigenous people, with talks and other activities on prevention, safety and the environment.



## Resources applied to infrastructure [EC8]

	2010	2011	2012
<b>Type<sup>I</sup></b>			
Support for public services	19%	49%	10%
Implementation of building work	81%	51%	90%
<b>Area</b>			
Commercial engagement <sup>II</sup> (shared infrastructure)	20%	35%	8%
Pro bono services <sup>III</sup>	1%	0%	0%
Services/Materials/Products <sup>IV</sup>	80%	64%	92%
<b>Total</b>			

**I** Support for public services, implemented by paying for services, such as the cost of hiring nurses and teachers, or making paving work and building schools and hospitals.

**II** Activity that generates public benefits, but which primarily provides an economic or investment return to the company.

**III** Pro bono work to benefit the public, such as the allocation of people with specific functions to activities during the time scheduled for the work, using company resources.

**IV** Investment in infrastructure to provide services or to deliver products.

### Socioeconomic studies [SO1]

Knowledge of regions and impacts generated by the company's projects is critical to support planning of social actions, whether voluntary social investment or actions aimed at managing social impacts. These studies also guide social dialogue and cover topics such as demography, education, health, infrastructure and public services.

In addition to environmental studies required as part of environmental licensing processes, in recent years Vale has produced regional integrated socioeconomic diagnoses of different regions and countries in which it operates, such as Minas Gerais, Sergipe, Espírito Santo, southeast Pará, municipalities crossed by the Carajás Railway, Oman, Australia, Malaysia, Indonesia and Mozambique. In 2012, a socioeconomic diagnosis of Mato Grosso do Sul was completed.

[Read about the positive and negative, direct and indirect potential impacts of Vale's actions where the company operates.](#)  [3.17]

### Multi-Year Plan for Social Action

Planning social actions is possible due to local knowledge, which is gained through social dialogue, managing community demands and manifestations, socioeconomic studies, and the knowledge acquired by company teams working and living in these areas.

Since 2012, Vale has managed these actions based on its Multi-Year Plan for Social Action. Plans for five Brazilian states were prepared over the course of this year: Maranhão, Pará, Minas Gerais, Rio de Janeiro and Mato Grosso do Sul.

The Multi-Year Plan for Social Action, which lasts five years, is the main instrument for managing social expenditures. Its governance is the responsibility of the committees that make up the Issues and Stakeholders Model.

### Social spending [EC8]

In 2012 Vale spent US\$317.2 million in social actions. Of this total, 71% was voluntary and 29% mandatory.<sup>11</sup> Read more in the chapter Strategic Vision.

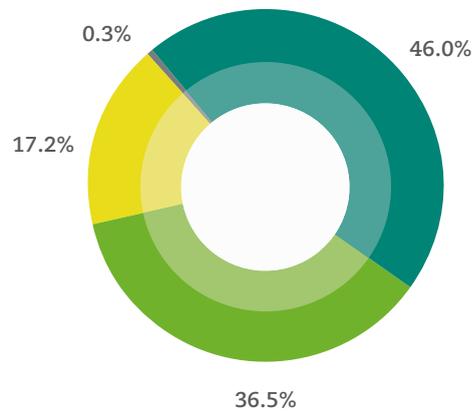
Of this amount, US\$62.3 million was allocated to infrastructure improvement, as illustrated in the chart above. In addition to this, the Vale Foundation also invested US\$2.6 million in infrastructure.

<sup>11</sup> Vale considers Mandatory Social Expenditure to be all of the company's legal obligations (requirements, LOC, TAC etc.), as well as the company's commitments to properly treat impacts on regions where it operates. Taking this criterion into account, in 2011, 72% of social spending was voluntary and 28% was mandatory.



## Areas benefited by Vale Foundation

In thousands of people (2012)



Areas	Direct	Indirect	Total	%
<b>Urban development</b>	0.3	342.8	343.1	46.0%
<b>Culture</b>	226.8	45.0	271.8	36.5%
Vale Museum	100.8	—	100.8	13.5%
Vale Mines Memorial	82.5	—	82.5	11.1%
Vale Music	0.5	54.0	54.5	7.3%
Vale Train	34.0	—	34.0	4.6%
<b>Education</b>	5.0	123.0	128.0	17.2%
<b>Sport</b>	2.5	—	2.5	0.3%
<b>Total</b>	<b>234.6</b>	<b>510.8</b>	<b>745.4</b>	<b>100.0%</b>

### Vale Foundation

The Vale Foundation mission is to contribute to integrated development in the regions where Vale operates, coordinating and leveraging social investments, strengthening communities' human capital and respecting local cultural identities.

In 2012, the Vale Foundation acted on four fronts: Culture, Urban Development, Education and Sport (table above), with the following objectives:

**Culture** Promoting social inclusion through increased access to cultural property and strengthening regional identities, valuing culture, historic regional memory and heritage.

**Urban Development** Contributing to the improvement of municipal capacity, aimed at strengthening public policies for social inclusion, improving planning and land management with the participation of society.

**Education** Contributing to the improvement of basic education.

**Sports** Promoting sports as social inclusion, encouraging human development, citizenship training and the dissemination of sports culture in communities.

At the end of the year, two others were incorporated into its scope: Health and Work, and Income Generation, which were previously under Vale's Community Relations Department.

The Foundation, together with other partners, has developed the concept of Public-Private Social Partnerships, a strategy for building a cross-sector

alliance aimed at promoting sustainable development in regions where large projects are under way. This new kind of partnership takes place by pooling efforts, resources and the knowledge of civil society, governments and companies, based on integrated and long-term strategic planning, focused on a common agenda that includes structuring actions, aligned with public policies aimed at short, medium and long term results. [3.18]

### Local hiring [EC7]

In order to leave a positive legacy in the regions it operates, Vale is aware that investing in training and hiring local labour is of major importance to the social and economic development of communities. The company reinforces its commitment to local realities and needs, and identifies and implements initiatives, always considering regional vocations.

In 2012, Vale's local hiring<sup>12</sup> rate was 61%<sup>13</sup> – 44% of senior management<sup>14</sup> came from local communities, up 10% from 2011. Among the initiatives that helped raise this indicator were reviewing the hiring policy, prioritizing internal recruitment to fill vacancies, using the career and succession process as a tool to support results, and giving preference to local candidates.

<sup>12</sup> Although the indicator calculation considers employees to be local if they were born in the state, the hiring practice adopted, where applicable, prioritizes residents of the state, and not necessarily those merely born there.

<sup>13</sup> Employees covered by this indicator (EC7) correspond to 99% (2011) of total employees reported (LA1).

<sup>14</sup> Vale considers "senior management" to be the hierarchical levels of managers and directors.



## Commitment

**To contribute to populations' living conditions improvement.** To strengthen relationships and communication. To minimize negative impacts. To respect local culture. To perform structuring actions and boost social investment



## Results

Established **committees to conduct integrated actions**

Management **of claims and social dialogue**

**Social and economic studies**

Management based on **Multi-Year Plan for Social Action**

in this country was 82.1%, and where 28.6% of senior management came from the local community. Both of these indicators showed a slight increase compared to 2011: 80.6% and 27.4%, respectively.

### Professional qualification

Regarding professional qualification, Vale develops various actions for external audiences, reinforcing its commitment to train manpower in the communities where it operates. The courses are developed through partnerships with local educational institutions and targeted at different audiences, such as high school students, technical student interns, professional trainees and graduates. In addition to supporting the educational development of regions, these initiatives help qualify employees to work in the company's operations. In 2012, Vocational Training and Youth Apprentice programs, for example, were responsible for the employment of 299 trainees and 991 apprentices at Vale. [3.19]

### Involuntary relocation [MM9]

Involuntary relocation of families is often inevitable in mining and logistics activities. Aware of the disorders these processes may cause, Vale acts proactively for a positive end result, both for the families that will be relocated, as well as for the community that will host the project.

To minimize the disruption and negative impacts in such cases, the company has implemented a Social Management Procedure for Involuntary Relocation. This procedure is based on a document that regulates these activities in Brazil and is used as a reference in other regions where the company operates. The document describes the methodology and establishes the guidelines for the relocation of families in a vulnerable socioeconomic situation, such as roles and responsibilities of Vale's internal areas and guidelines for listening to the community throughout the process. In the second half of 2013, this procedure will be refined.

This topic is also covered in the Communities Relations for Capital Projects Manual, based on the Social Management Procedure for Involuntary Relocation. The purpose of this manual is to advise on social action in capital projects.

Vale also promotes the use of tools and best practices through its Communities Relationships Guide.

In 2012, using this methodology, an involuntary relocation was carried out in Argentina, in the form of resettlement. [3.20]



## Actions in Mozambique

### Infrastructure

- Restructuring work and maintenance of water supply for Cateme.
- Provision of a bus to transport residents between Moatize and Cateme, twice daily, with Vale subsidizing fares for two years. Transport management is the responsibility of the local administration.
- Restructuring work of wetlands in Cateme to prevent water from entering homes.
- Refurbishment of the road and its drainage in Cateme.
- Repairs to the power grid, protecting and improving cables between Tete, Moatize and Cateme, increased distribution network in the streets of Cateme, facilitating the connection between residences and increased lighting.
- 59% of homes in Cateme were repaired, totalling about 400, scheduled for completion in 2014.

### Health

- Construction of a hotline for pregnant women.
- Night health care facility for assistance and counselling for groups vulnerable to sexually transmitted diseases and HIV/AIDS.
- Donation of an ambulance to the health centre in Cateme.
- Implementation of a pharmacy at the public health centre in Cateme, leaving the government with the responsibility to provide the medicines.

### Agriculture

- Corn, nhemba bean, sorghum and pumpkin seeds were acquired for all families in Cateme to support planting in 2012/2013.
- Over 14,000 fruit tree seedlings produced at the Model Farm in Cateme were donated to communities.
- Vale has provided food support, by donating food baskets to 839 families in Cateme to compensate for the loss of the 2011/2012 season harvest, in partnership with the government of the District of Moatize and INGC.

### Employment and income generation

- Funding survey of workforce available in Cateme, in order to identify professional and restore the Moatize Job Centre.
- Development of chicken value chain – 16 chicken coops built, producers trained and technical support made available.
- Savings and credit groups in order to support the rural finance program.
- 108 people trained in professional courses in building, sewing and waitressing.

### Resettlement in Mozambique [MM9]

To improve the quality of life of people relocated in 2010 from mining and industrial areas of the Moatize Coal project, in 2012 Vale Mozambique signed an agreement<sup>15</sup> with the government of the province of Tete and representatives of the communities of the Cateme and 25 de Setembro neighbourhoods. The initiative is a result of a commitment made by the company in 2011 to develop initiatives to support relocated families and meet their demands.

Issues raised by residents include repair of houses, drainage and maintenance of public roads, improvements to water supply system, expansion of the electric power network, construction of sports facility, health investments, investments in agriculture, and the development of public transport solutions.

The agreement signed by Vale includes around 40 commitments aimed at maintaining such infrastructure. Below are the actions already taken by the company in 2012, with investments of approximately US\$40 million.

In 2013, other initiatives will be implemented by Vale, continuing with social and environmental investments aimed at local sustainable development.

### Indigenous peoples and traditional communities [MM5]

Vale recognizes the importance of valuing the culture and preserving the local identities of the traditional communities in territories where it operates. Vale's relations with indigenous communities are based on the concept of ethno-development<sup>16</sup>. The company provided training in order to enhance dialogue and change procedures to monitor impacts as of the development of a project.

Vale is committed to reaching agreements with indigenous peoples and traditional communities to a long-term, integrated vision of the development of the traditional communities near its operations, to help resolve any conflicts and avoid recourse to legal actions.

<sup>16</sup> The notion of ethnic development refers to the practice of social capacity of indigenous peoples and traditional communities to build their future, in line with their historical experiences and the actual and potential resources of their culture, according to projects established according to their own values. It assumes the necessary conditions for the autonomous capacity of a culturally differentiated society to manifest exist, thus, defining and guiding their development.

<sup>15</sup> Memorandum of Understanding signed on July 6, 2012.

In Brazil, there are agreements<sup>17</sup> with 14 communities covering five indigenous territories in the states of Pará, Maranhão and Minas Gerais. In addition, Vale also has an agreement or supports ethno-development projects for other groups at two indigenous territories, located in Pará and Espírito Santo and with 14 quilombola communities in Maranhão. In 2012, this commitment was renewed with nine indigenous groups, and an agreement was signed with the Tupiniquim community in Espírito Santo.

In addition, Vale interfaces with 17 indigenous communities and has agreements with 15 communities in Argentina, Australia, Canada, Chile, the Philippines, Indonesia and New Caledonia.

It is estimated that in 2012, around 40,000 people from indigenous and traditional communities

benefited directly or indirectly from these actions – 20,000 in Brazil. [3.21]

**Monitoring lawsuits** [HR9, EC1, MM6]

Vale maintains wide-ranging, permanent, structured dialogue with indigenous and traditional communities close to its operations and projects, in order to establish a continuous social engagement process for better management of social, cultural, economic and environmental impacts, and to contribute to local sustainable development.

In 2012, Vale recorded three new cases, making a total of 11<sup>18</sup> processes involving the rights of indigenous peoples and traditional communities in currently active areas. [3.22]

<sup>17</sup> None of these agreements included payment for land use.

<sup>18</sup> Two of the cases reported in the 2011 Sustainability Report have been merged.

**Training hours**  
In 2012, each employee spent, on average, **55 hours in training**

**6**  
**Countries**  
Vale has already carried out territorial diagnostics in six countries

**+2**  
**Vale Foundation**  
In 2012, Vale Foundation incorporated two new fronts of work, Health and Generation of Jobs and Income to the four existing ones: Culture, Urban Development, Education and Sports



# 20%

of Vale's energy supply comes from renewable sources

# 3%

In Carajás, Vale operations occupy less than 3% of the area protected by the company



Aerial view of Carajás National Forest in Parauapebas (Pará), Brazil  
(Picture: Pedro Cattony)



Planet

# Using natural resources in a sustainable way



## Land use

In 2012, Vale improved its integrated land use management, including environmental, social and cultural aspects, thereby contributing to the generation of a positive legacy in the regions where it operates. The company has policies and procedures that take account of the specific characteristics of each region.

Vale protects or helps to protect an area equivalent to nearly three times the area occupied by its activities. The company makes use of technologies to aid the effective recovery of degraded areas and to transform them for collective use, contributing to the conservation and sustainable use of natural resources.

From the project design stage to the ending of their activities, the company takes into account social, economic and environmental aspects. It also promotes improvements in environmental performance, by developing studies and projects, based on technological, regulatory and market trends.

For capital projects, the company uses management tools such as the Best Practices Guidelines for Environmental Licensing and Environment and the Licence to Operate methodology. In the implementation and operation phases, Vale has several initiatives to continuously improve its performance. In the closure phase, the company has made progress in designing mine closure plans, in accordance with international standards.

The activities of Biopalma, a company that produces palm oil to make biodiesel, and Vale Florestar, a company that plants eucalyptus are being conducted in areas of the Amazon biome that have already been impacted. They are also contributing to social inclusion and income generation for the families involved in those projects.

Vale also supports the construction of a land use agenda allied with environmental conservation in the Amazon, beyond the company's operations, through the Vale Fund.

### **Biodiversity** [PI4.17, EN12, EN14, MM2]

Depending on the type of activity performed by Vale, its operations entail impacts<sup>1</sup> that can cause changes in biodiversity and ecosystem services<sup>2</sup>. These impacts are mainly related to changes in elements of the physical environment, which support living beings.

The company has been investing in wide-ranging studies of its internal management processes and tools, taking into account the complexity of the subject. The goal is to be a regional catalyst to mitigate impacts and promote biodiversity conservation.

Impacts considered significant for biodiversity are associated with activities that may alter biota, especially those that involve vegetation removal. These activities may be required during the implementation of projects and/or development of operational activities, such as advancement in mining and waste disposal areas.

<sup>1</sup> In 2012, Vale started assessing environmental impacts concepts, including impacts on biodiversity, considering the nature of their activities and different types of businesses.

<sup>2</sup> Functions performed by ecosystems and species, which allow the maintenance of living conditions on the planet, including the provision of resources and support and regulation services.





Soil surveys conducted in Vale Natural Reserve in Linhares (Espírito Santo), Brazil

Picture: Pedro Cattony

In addition to investing in innovation and technology, Vale implements actions and measures to prevent, control and/or compensate for impacts. Such actions are defined for all project life cycle stages and include areas inside, outside and on the boundaries of operational units. Their scope is established considering the ecological attributes existing around operational units. [4.01]

For Vale, biodiversity management must mitigate its negative impacts and enhance positive impacts in territories where the company operates. One of the steps to achieve this is to establish biodiversity

guidelines and requirements. In 2012 it underwent pilot stage verification to check the degree of adherence of procedures and management practices to biodiversity guidelines proposed at three operational units in Brazil.

As a result of this process, the need to incorporate requirements for Biodiversity and Recovery of Degraded Areas in Vale's Environmental Management System was observed. This initiative aims to ensure systematic control of environmental aspects in operations and seeks continuous improvement of operational processes.

Vale deems it necessary to apply each unit's Biodiversity Management Plan actions at all operations that cause negative impacts on biodiversity and ecosystem services. These actions are related to all stages in units' life cycle, from planning (project) to closure, including continuous activities that are associated with specific operational tasks, whether arising from legal obligations or defined by the company itself.

Currently, 32% of Vale's operations require Special Biodiversity Management Plans, and 83% of them have so far been implemented. The other operations are in the process of defining the design scope and details. [4.02]

Vale has been investing in research related to special ecosystems, such as those associated with canga (read more about this topic on page 62), seeking greater knowledge of these environments' ecology



**I believe we all have a duty to protect our planet. To contribute to the preservation of the environment, I take attitudes such as using only the amount of water needed, for example, I close the tap while brushing my teeth, turn off the lights when no one is in a room, and I return egg cartons to the seller. I also recycle trash and reuse printed paper whenever possible. A small isolated act does not get attention, but small acts together can make a difference!**

Sandrine Cassier, Report and Fixed Assets Supervisor  
New Caledonia



Employee analyzing samples in Vale Natural Reserve in Linhares (Espírito Santo), Brazil



Picture: Pedro Cattony

and, with results, implementing actions that seek sustainable use and protection of areas representing its biodiversity. Furthermore, the company has been developing research that seeks the appropriate management of these environments, in particular of those under recovery.

#### Participation and engagement [PI4.17]

Vale participates in forums for strategic discussions on topics that are relevant to the management of its activities, such as the Brazilian Business and Ecosystem Services Partnership (Pese in Portuguese), the workshop to prepare the State Biodiversity Protection Plan in Minas Gerais, organized by the State Forestry Institute, and a work group developed by the UN Global Compact together with the International Union for Conservation of Nature (IUCN).

Through these partnerships, Vale aims to identify the necessary tools to assess its impacts on biodiversity, considering the complexity of the subject, and therefore offer elements that can contribute to evaluating the net positive impact<sup>3</sup> on the regions in which it operates. [4.03]

<sup>3</sup> When the results of actions taken by the company outweigh the negative effects of its operations.

#### Protected and operational areas

[EN11, EN12, EN13, EN15]

Vale protects or helps to protect<sup>4</sup> approximately 13,700 km<sup>2</sup> (including conservation units protected in partnership with local governments), an area around nine times larger than the city of São Paulo in Brazil. The total protected area is nearly three times larger<sup>5</sup> than the total area of the company's operational units (4,700 km<sup>2</sup>), including timber plantations, and 7.5 times larger when these are not considered.

Protected areas help to maintain environmental balance, protect natural resources and help address Climate Change capturing and storing greenhouse gases. Thus, areas protected by Vale contribute to the formation of carbon stocks. In 2012, Vale invested approximately US\$69.3 million in protected areas and the recovery of degraded areas.

These areas also form a region rich in genetic resources, as they are sources of plants with medicinal and pharmacological properties. Other products of economic interest, such as resins, seeds and fibre obtained from sustainable extraction activities, con-

<sup>4</sup> The general approach for protecting, conserving and restoring habitats does not feature environmental compensation.

<sup>5</sup> The ratio was lower than that reported in 2011 (3.5), mainly due to the inclusion in 2012 of the Rio Colorado Potash Project in Argentina and enlargements of Biopalma's and Vale Florestar's areas in Brazil. There were also changes related to the inclusion of Tres Valles in Chile and the divestment of manganese operations in France and Norway and the Cadam unit in Brazil.



## Commitment

**To exercise integrated land management,** seeking to generate positive net impact and value sharing in the regions where Vale operates



## Results

**Management improvement** by merging environmental, social and cultural topics

Partnerships to assess **impacts on biodiversity**

**Development** of Biopalma and Vale Florestar

stitute an important source of income and benefits for the community.

Some of Vale's operational units are located in areas that the company helps protect, such as the Tapirapé-Aquiri National Forest and Carajás National Forest, where the area occupied by operations represents less than 3% of the National Forest's total area. The company also protects areas around its operations, which it either owns or protects through partnerships, such as private reserves of natural heritage (RPPN in Portuguese) and State Conservation Units located in the Iron Quadrangle region of Minas Gerais, as well as the Forêt Nord Nature Reserve in New Caledonia. Read more in the protected area table in the online content. [4.04]

### Regional development in northern Brazil

In line with Vale's commitment to respect and understand the communities in the regions where it has operations, the Urbis Amazônia project, developed by the Vale Technology Institute in northern Brazil, is assessing the dynamics of the development of regions associated with mining, cattle raising or crop growing.

Researchers in the field of urban development and architecture made a comparative analysis to understand the demographic expansion in these regions and the process of urbanization associated with economic growth and physical land occupation. The project, conducted in partnership with other research institutions and using government resources, has contributed to preventing the depletion of natural resources in the communities studied.

In 2012, work began on implementing the Research and Education Center for Biodiversity Conservation (Cepeb) at the Vale Natural Reserve in Espírito Santo.

Vale has 99 research projects under way at the Vale Natural Reserve, in partnership with 61 institutions - 48 Brazilian and 13 from other locations - which involve approximately 300 researchers and collaborators. In 2012, 41 new projects were initiated and 10 studies were completed. The Reserve's team is also currently working on over 100 projects in the areas of forestry, forest ecology and ecological restoration. [4.05]



Areas affected by Vale's operations are associated with the occurrence (natural distribution) of approximately 4,240 plant species and 3,758 animal species, including invertebrates (molluscs and arthropods) and vertebrates (fish, amphibians, reptiles, birds and mammals).<sup>6</sup> Among the species identified in the areas where Vale operates, 200 are classified as inter-

nationally threatened, according to the [Red List of the International Union for Conservation of Nature \(IUCN\)](#), [\[4.06\]](#), where only 25% are assessed as critically endangered, endangered or extinct. 220 species are listed in official national lists of threatened species and approximately 50% as critically endangered, endangered or extinct. [\[4.06\]](#)

<sup>6</sup> These numbers include species registered during studies to analyze the environmental feasibility of projects and monitoring conducted throughout the implementation and operation phases of the units, as well as other environmental studies related to the activities carried out at the units (forest inventories and wildlife rescue reports, for example). With regard to ferrous operations in the Iron Quadrangle region of Minas Gerais, data added to the Biodiversity Database (BDBio) and forming part of the Ferrous System Biodiversity Conservation Plan were taken into account. The purpose of this database is to manage biodiversity knowledge, validating and consolidating historical and recent data generated at operational units.

### Caves

Natural underground caves, also known as caverns or grottoes, represent an important topic for Vale's business. Understanding the importance of the subject, Vale now has a dedicated speleology area, in order to ensure maximum utilization of mineral reserves and comply with legal requirements for conservation of speleological heritage. It also seeks to improve technical knowledge of these natural structures, contributing to the development and dissemination of scientific knowledge about them.

When designing the Carajás S11D Iron Project in Pará, for example, Vale obtained a positive opinion from the Chico Mendes Institute for Biodiversity Conservation (ICMbio), stating that the project was eligible to obtain a preliminary licence from Ibama in terms of protection and preservation of speleology heritage.

All the caves in the project area were studied in terms of their physical, biological, historical and cultural attributes, complying with legal requirements related to licensing in areas with natural caves, and considering their relevance in the local and regional context. Caves with a unique or rare genesis, a unique morphology, notable dimensions in terms of length, area or volume or unique speleothems were

Benefitting from favorable infrastructure and the presence of a large protected forest area, the Vale Natural Reserve has an aptitude for the development of activities related to scientific research, forest management and biodiversity conservation.



Employee at Vale Natural Reserve in Linhares (Espírito Santo), Brazil

Picture: Pedro Cattony



Employees in Vale Natural Reserve herbarium in Linhares (Espírito Santo), Brazil.



Picture: Lucas Lenci

#### Case

## Reserves protection in New Caledonia

The North Kwe Rainforest Project is a voluntary initiative by Vale in New Caledonia. Created in 2005, at the same time as the opening of the Goro Project's first mine in the region, the initiative is aimed at supporting the policy for protecting the region's forest and river reserves, which have shrunk considerably over the last hundred years as a result of intense human occupation.

The aim of this initiative by Vale is to reunite seven forest fragments totalling around 30 hectares, which are currently separated by areas shrubland, which could harm local biodiversity. The initiative involves planting corridors of native trees. To this end, the company has established a partnership with the local communities, which in 2012 began participating in tree planting, and with the New Caledonia Institute of Agronomy, which is providing technical expertise. Vale's nursery of native species is germinating seeds and producing the saplings to be planted. The project will continue until 2014, when it will be revised based on the results obtained.

Another project being conducted in the same area aims at establishing, at the Blue River National Reserve, an ex situ population of one of the rarest palm species in the world, *Saribus jeanneyii*, found only in the North Forest, with only one recorded specimen in the world with the potential to bear fruit. Twenty-two saplings of this palm have so far been grown from seeds by the Institute of Agronomy, and they will be transferred to the Blue River Reserve. The goal is to ensure a population of 100 specimens of this plant species.

classified as being of maximum significance, and they will be fully preserved.

Vale's speleology area identified 16 (8.5%) of the 187 caves in the S11D project's region as being of maximum importance. Of the total number of caves, 152 (81%) will be preserved and 35 (19%) will be destroyed (24 of high significance and 11 of medium significance). As a compensatory measure for destroying these caves of high and medium significance, Vale will provide for the preservation of 70 high-significance caves in the Bocaina Mountains, an area adjacent to where the S11D project is being implemented.

Vale is developing environmental programs and actions specifically aimed at the area's speleological heritage, including a program for the surrounding area and another program to monitor vibrations. The aim of these programs is to enable the maintenance of the caves' physical integrity, determining the vibration thresholds that they can withstand.

The company also has a program designed to minimize physical and biological losses related to the irreversible elimination of caves, prioritizing significant aspects that can add information to the understanding of cave formation processes, the ecology of caves and/or their use as shelter by fauna and people.

The aforementioned programs are currently being deployed at some of Vale's other operational units, notably the Carajás Mining Complex and Vargem Grande Mining Complex. The main results obtained

## Area impacted and area being restored (permanently and temporarily) by Vale in the period 2010-2012 (in km<sup>2</sup>) [EN13]

Year	Impacted area	Area being restored <sup>1</sup>		
		Area undergoing permanent restoration	Area undergoing temporary restoration	Total area undergoing restoration
2010	30.6	8.0	6.5	14.5
2011	17.2	7.3	17.9	25.2
2012	22.9	7.2	5.6	12.8
<b>Total</b>	<b>70.7</b>	<b>22.5</b>	<b>30.0</b>	<b>52.5</b>

<sup>1</sup> The restoration of degraded areas is a gradual process demanding medium and long term action. The term "undergoing restoration" denotes areas in which the activities have been initiated and are in progress (initial restoration of certain ecosystem functions and gradual increase in species, with the aim of returning the vegetation to as close to its original state as possible). "Undergoing permanent restoration" corresponds to areas that will no longer be affected by the company's activities while "undergoing temporary restoration" covers areas that may be used again in operational activities.

at these locations have reinforced Vale's commitment to evaluating and developing actions aligned with key concerns raised by Vale's stakeholders with regard to caves.

### Canga

Canga is a type of rock, originally described in Brazil, but also in various tropical and subtropical regions of the world. It is a product of the weathering of iron-rich rocks. Fields of rocky outcrops are biodiversity-rich ecosystems that commonly occur in canga areas, although they are not restricted to them. As these ecosystems are still little studied, restoration programs for areas impacted by mining activity in these environments still require more consistent information to achieve good results.

Aware of the importance of the issue, Vale has conducted several experiments to rehabilitate these environments in its operational areas, as well as supporting research projects together with a number of Brazilian universities (some via the Vale Institute of Technology).

Vale has been investing in ecological studies of canga environments since 2007, in order to better understand the biology of the species that inhabit this ecosystem, and then implement these results in projects to restore, conserve and preserve these environments. Studies are currently under way in the Iron Quadrangle region, with the same purpose, and also to look for similarities among these environments in different regions. Besides benefiting from the results of these studies in its own activities, Vale

has contributed to the scientific community, sharing the knowledge generated.

### Impacted and restored areas [EN13, MM1]

The company uses technologies designed for the effective reclamation of degraded areas and their transformation for collective use.

Recovery of degraded areas is one of the mining stages at Vale. Activities begin right from the stage of removing existing vegetation. Several recovery techniques are used, depending on local environmental conditions, such as soil type, climate, terrain and biome, among others.

For re-vegetation, different methods can be adopted, such as the traditional planting of saplings previously grown in nurseries, direct seeding (planting seeds directly in the sites to be re-vegetated), promotion of natural regeneration, use of biodegradable mats (used to sustain seeds and plants in re-vegetation of steep slopes), the transplanting of rescued native species, hydro-seeding (the dispersal of seeds in water jets containing sticky products), placement of topsoil (rich in organic matter), transplanting of saplings from areas to be cleared to areas to be restored, or through a combination of several of these techniques.

To ensure the recovery of degraded areas, care is needed for reclaimed sites to reach a degree of maturity and evolve without human interference. Maintenance activities and environmental protection services are conducted to prevent harmful agents from affecting recovery, such as access by

## Opening and closing balance for mineral production or extraction activities carried out by Vale in the period 2010-2012 (in km<sup>2</sup>) [MM1]

Year	Impacted areas (opening balance) <sup>I</sup>	Impacted areas in the reference year	Areas undergoing permanent restoration in the reference year <sup>II</sup>	Impacted areas (closing balance) <sup>III</sup>
2010	719.4	30.4	8.0	741.8
2011	584.7	15.1	7.2	592.6
2012	588.8 <sup>IV</sup>	14.8	7.1	596.5

- I Annual opening balance represents the total amount of land to be restored by the company at the beginning of the reference year.
- II Areas undergoing temporary restoration are not computed. Only areas in the process of permanent restoration are considered.
- III Closing balance represents the total amount of land recovered by the company at the end of the reference year.
- IV The opening balance in 2012 was lower than the final closing balance of the previous year due to the exclusion of the values associated with the Cadam unit's mining operations, disposed of by Vale, removed from Cadam unit assets, which accounted for 3.8 km<sup>2</sup> of areas to be restored by Vale.

people and animals, and especially the occurrence of fires. The objective is to ensure the environmental balance of areas in recovery. [\[4.07\]](#)

Reinforcing their intention for continual improvement of these processes, Vale implemented in 2012, for all ferrous operations, compensation goals associated with recovery of degraded areas included in the Action Plan on Sustainability (PAS). See the table on the chapter Strategic vision.

The goals, also implemented for 2013, create a minimum area - in extension - to be recovered in the year, for each of these areas. Thus, it is expected that there is an increase in the quality of management and execution of activities. In addition, the company expects a gradual evolution of the indicators for the coming years in order to evaluate a larger number of aspects of recovery in the company.

In 2012, activities were started for the recovery of 12.8 km<sup>2</sup>, of which 7.2 km<sup>2</sup> are permanent recovery and 5.6 km<sup>2</sup>, provisional. The total area was 22.9 km<sup>2</sup> (Table on page 62). 7.1 km<sup>2</sup> were destined to permanent recovery and 14.8 km<sup>2</sup> to impacted areas, without considering logistics and operations of industrial forest plantations. This resulted in a closing balance of 596.5 km<sup>2</sup> (Table above). The difference between the total number of the impacted areas and areas undergoing permanent restoration is mainly associated with operational units in process of expansion and projects under implementation, as a result of the company's strategy.

## In 2012, Vale published a regulatory document to identify the synergy between activities of degraded areas recovery, in order to optimize efforts, reduce costs and maximize recovery results.

Partnerships with public and private institutions are helping the company to develop conservation and restoration projects in regions where it operates, for example Espírito Santo, Minas Gerais, Mato Grosso do Sul and New Caledonia. [\[4.08\]](#)

### Vale Fund

With operations in six Brazilian states, a portfolio of 28 projects already supported and 20 partner organizations, the Vale Fund ended 2012 having made significant progress in its mission to contribute to the sustainability of the planet. Since its founding in 2009, the institution has invested around US\$36 million in sustainable development actions in the Amazon.



## Commitment

To contribute to the conservation and sustainable use of biodiversity and ecosystem services promoting engagement with communities, governments and stakeholders



## Results

The company protects or helps to protect an area of 13,700 km<sup>2</sup>

Supporting the construction of a territorial agenda associated with environmental conservation through Vale Fund

For example, the Fund moved forward with its Green Municipalities program<sup>7</sup>. Working in an integrated manner with other local agents – municipal governments, organizations and companies – the Vale Fund pursues sustainable alternatives for municipal socioeconomic development, hand in hand with the conservation of natural resources. The Fund also participates in the Green Municipalities Program's Steering Committee in the state of Pará, collaborating with public policies related to the topic.

In 2012, the Vale Fund formed institutional partnerships to consolidate its operations in the Amazon region, within a territorial perspective. For the Vale Fund, this means going beyond projects and understanding the demands of a given region within a vision of sustainability: who are the key players in each region, what actions are being taken to make progress, and what synergies may there be with the actions proposed by the Fund. From this perspective, one may highlight partnerships with the Avina Foundation and the Amazon Regional Alliance (ARA), which aim to strengthen conservation and environmental governance efforts in the biome, beyond the limits of Brazilian territory.

<sup>7</sup> In this program, Vale Fund operates through integrated projects to consolidate a model of sustainable and efficient management to the municipality, mobilization and engagement of various actors in society and the development of sustainable productive activities, resulting in the improvement of life of the people.

Another important action in 2012 was the Amapá Initiative, a partnership with the state government of Amapá and NGO Conservation International launched during the Rio+20 conference. The objective is to develop a dynamic long-term program aimed at unleashing the state's natural capital and sustainable development, to promote a transition from a conventional economy to a green economy. Actions are organized under four themes: payments for environmental services; protected areas; land use regulation; and social and biodiversity production chains.

For 2013, the Vale Fund has the challenge to consolidate its operations in the Amazon and participate in strengthening collaborative actions between institutions working in the biome to promote sustainability. The Fund also plans to enhance its project management and monitoring model and to create an impact management system.

The Vale Fund is a non-profit institution created by Vale in 2009 as a Civil Society Organization of Public Interest (OSCIP in Portuguese). It functions as a cooperation fund working in partnership with public, private and third sector organizations. For more information, please visit [www.fundovale.org](http://www.fundovale.org).

### Conflicts over land use [MM6, MM7]

Vale understands the importance of having good relations with communities and bases its conduct on this principle, seeking solutions for the common good. In 2012, the company invested in expanding





Reforestation area in the Azul's manganese mine, Carajás region, in Parauapebas (Pará), Brazil

Picture: Salviano Machado

and improving its stakeholder dialogue channels, using specific tools to manage the demands of communities and address these requests properly.

In 2012, Vale was involved in 27 cases considered representative since they were lawsuits (12 cases) or involved shutdowns of projects or obstruction of access to them (15 cases). [4.09]

#### Mine closure [MM10]

From the moment a mining project is planned, work should begin on establishing guidelines for closing it, even if it may operate for decades. For this reason, Vale establishes plans for technical, economic, social and environmental aspects throughout the lifecycle of projects, starting in the research phase and potentially persisting even after the closure of a unit. The company is not yet implementing any mine closure plans, but only demobilizing some structures that have reached their limits.

Some operations have been shut down temporarily and are undergoing institutional, legal, environmental, and geotechnical management to prevent any impacts.

Based on the long-term vision adopted by the company, Vale has advanced in its efforts to achieve the goal of producing closure plans for all its Brazilian units by 2013. At the end of 2012, 56% of its mines had completed such plans, 29% were in the process of producing plans, and 15% had not yet started them.

The plans developed by Vale follow the guidelines of its Mine Closure Guide and Terms of Reference for Preparing Mine Closure Plans – internal regulatory documents that guide operational units to follow best practices in the field.

For operations outside of Brazil, most have mine closure plans and comply with the specific laws of each location. Examples include units of Bayovar in Peru, Moatize in Mozambique, and operations in Canada among others. [4.10]

#### Mining waste [MM3]

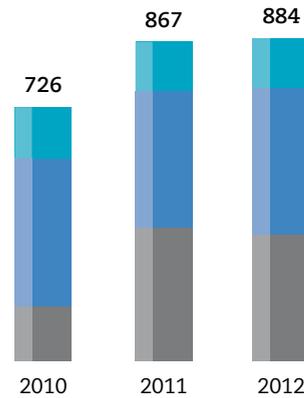
Vale's commitment to environmental and social issues is also reflected in the way the company manages specific kinds of waste in its production process. These materials are disposed of in tailings dams (containing tailings and sediments) and piles (containing waste rock and tailings), and their volume is directly linked to production and geological characteristics at the site.

#### Differences between waste rock and tailings

**Waste Rock** Material overlying the ore body. This waste rock is removed during mining and disposed of in piles or used in earthworks and other structures at the mine itself.

## Total mining and metallurgical waste<sup>1</sup> [MM3]

in million metric tons



	2010	2011	2012
<b>Iron ore - Tailing</b>	75	67	69
<b>Iron ore - Waste rock</b>	461	401	443
<b>Other business areas</b>	190	399	372
<b>Total</b>	<b>726</b>	<b>867</b>	<b>884</b>

<sup>1</sup> Includes waste rock and tailings from nickel, potash, manganese, coal, copper and slag (manganese alloy).

Vale is committed to prepare for the closure of mines in each of the countries where it operates, seeking to standardize and tailor corporate guidelines.

large volumes may be contained in such dams and piles, and so it is essential to ensure that such structures are stable in order to control the risk of impacts. [\[4.11\]](#)

In 2009, Vale established its Management System for Dams and Piles, which permitted advances in waste management, and implemented action plans arising from safety recommendations by independent audits.

This system underwent functional improvements in 2012 to allow interaction with other systems within the company, providing increased robustness for modules. The process of implementing the Dam Safety Plan was also initiated, based on the Brazilian Federal Law 12,334/2010, which establishes the National Dam Safety Policy.

In 2012, there was an increase of approximately 2% in Vale's generation of mining waste, which reached 884 million metric tons. The generation of waste rock and tailings resulting from iron ore production increased by approximately 9%, due to an increase at some major units in the amount of waste rock removed to extract the same amount of ore. This ratio varies in line with the geological characteristics of mines. Some units also began to mine new areas, which contributed to this increase.

Other business units showed an overall decrease in production (such as lower nickel production and the sale of manganese operations), leading to a reduction in the generation of other kinds of tailings, down 6.7% from 2011.

**Tailing** Waste material resulting after processing iron ore. It may be disposed of in piles or tailings dams.

In 2012, Vale invested approximately US\$281.5 million in dams, dikes and waste rock piles, representing the largest share of the company's environmental expenditure (27%). In this area, Vale seeks to optimize waste rock and tailings disposal processes, through various initiatives, such as the following:

- Mining and recovery of iron ore in tailings dams and waste rock piles;
- Recovery and utilization of these materials in other industrial processes, such as the production of cement, ceramics and other aggregates;
- Segregation of waste rock, making separate piles of materials with the highest iron ore content, which may potentially be reused in future in the light of possible new technologies;
- Evaluation of alternative waste disposal methods, without compromising geotechnical safety, reducing the number of conventional dams, since



Picture: Rogério Reis / Tyba

**Iron ore storage yard at Brucutu mine, in São Gonçalo do Rio Abaixo (Minas Gerais), Brazil.**

#### Case

## Waste transformed into products

One of Vale Fertilizantes's main by-products is phosphogypsum – calcium sulphate ( $\text{CaSO}_4$ ). This material is generated in the process of obtaining phosphoric acid, a raw material used in fertilizer production. Each ton of this generates four to five tons of phosphogypsum. The Industrial Complex of Piaçaguera, Uberaba and the Cajati Mining and Chemical Complex together produce approximately 5.7 million metric tons of this material per year.

Since it began this activity, the company has sought to develop internal policies to foster the reuse and sale of phosphogypsum, transforming what was supposed to be waste into a by-product of the process. Vale Fertilizantes supplies phosphogypsum as agricultural gypsum and also as an additive for cement. When used as agricultural gypsum, it is a source of secondary macro-nutrients for plants and a means of soil correction.

The new interest in phosphogypsum has now enabled the consumption of some of the stored material, freeing up areas until now used to store it. Besides phosphogypsum, the Cajati unit is engaged in actions to reuse waste rock as paving material for roads and other uses, and it is conducting projects to reuse calcitic limestone fines present in limestone slurry generated in mining processing – a material that is presently disposed of in tailings dams.

Another by-product that used to exist in Cajati was material resulting from sulphur filtration. A process was developed to transform this material into a product known as Sulphur 70S, sold to animal nutrition companies. The Cajati unit sells all the output resulting from this process, and occasionally some of the volume generated at other operational units, such as Araxá and Cubatão.

**Copper recovery** Vale has entered into two important partnerships in this area. The first, between Vale and Fiocruz in Minas Gerais, seeks to identify different micro-organisms and enzymes with the potential to be used in bio-remediation, bio-leaching and the recovery of metals present in mining environments.

The second partnership, between Vale and the University of São Paulo (USP), with partial funding from Brazilian Development Bank (BNDES in Portuguese), aims to develop a technology to use micro-organisms that feed on copper in tailings dams. The goal is to identify the micro-organisms that best perform this task and, in a second stage, recover the metal to reprocess it and sell it on the market.

The research will be conducted at Sossego Mine in Canaã dos Carajás, Pará, which began operating in 2004. The tailings pond where samples of micro-organisms are being collected contains around 90 million metric tons of waste, with 0.07% copper content. Twenty researchers at the USP's Polytechnic School of Chemical Engineering are participating in the initiative.

#### Non-mineral waste

In line with its commitment to mitigate the impacts generated by its production activities, Vale works to add value to its non-mineral waste. The company seeks to implement the best options for recycling, reusing and properly disposing of this waste. In 2012, Vale implemented its first global instructions on this subject.

This concern for waste management is present in the design of new projects, by planning structures and implementing best management practices. During the operation phase, Vale invests in technological development, transport optimization and the establishment of local partnerships, always respecting the culture and level of development of each region. In 2012, Vale invested US\$57 million in waste management.

All hazardous and non-hazardous waste generated at Vale's units is sent to licensed companies for disposal. The program for evaluating waste recipients conducted 83 audits in 2012 out of a total of 229 registered companies, with the aim of promoting improvements in the environmental performance of Vale's suppliers and partners.

In 2012, all of Vale's business areas, except Fertilizers, which is in the adaptation phase, expanded their targets for recycling and reduction in the generation of hazardous waste. The new consolidated recycling target was 73%, including composting, reuse, re-refining and reprocessing in relation to the total amount disposed. This target was exceeded, reaching a percentage of 76%. [The company's Action Plan on Sustainability](#) also established targets for reducing the generation of hazardous waste, as shown in the table in the Strategic vision chapter. [\[4.12\]](#)

### Initiatives and partnerships [PI4.17]

Seeking to improve environmental performance and technological innovations aimed at inserting residues in sectors of the production chain, Vale promotes opportunities through multidisciplinary studies. For example, technical feasibility studies on using manganese ferroalloy slag in cement production have been conducted in partnership with cement companies, with results that point to a new sustainable alternative use for this waste. In addition to becoming an eco-efficient solution, it enables the recognition of waste as a marketable good through the use of techniques that add market value.

On the Vitória-Minas Railway in Brazil, an innovative project is transforming used railway ties into high-quality charcoal. The initiative, developed by Vale in partnership with a company from Espírito Santo, is generating economic and environmental benefits, transforming waste into inputs for new production processes, creating jobs, income and investment in new recycling technologies.

This project will represent a US\$5.1 million saving for Vale, by cutting the cost of transporting and destroying used ties, and it will also generate revenue of US\$92,000 during the contract period. It is expected that 72,000 metric tons of railway ties will be supplied



Employee at the waste management area in the urban center of Carajás, in Parauapebas (Pará), Brazil.

Picture: Will Etchebehere / Conspiração Filmes





Aerial view of passenger train on a stretch of the Vitória-Minas Railway (EFVM)

Picture: Eugênio Sávio

## Case

# More sustainable railways

An innovative solution can generate sustainable benefits for Vale's railways. In 2012, the company completed testing of three sizes of plastic railway ties. The new technology will replace demand for railway ties made of other materials, since it is fully recyclable and lighter than concrete and steel versions, and its life expectancy is up to five times greater than those made of wood.

Plastic railway ties do not have application restrictions, unlike, for example, concrete or steel ones, which are hard to use on bridges or tunnels. Their lightness and ease of transportation, handling and installation result in better safety for operational teams.

The evaluation of new railroad ties demanded rigorous laboratory tests, conducted at the University of São Paulo (USP). In late 2012, the product was approved for purchase and replacement at the Port of Tubarão's terminal. The next unit to receive the new railway ties is the Ponta da Madeira Port Terminal in Maranhão. Its use is also being evaluated for the Vitória-Minas Railway (EFVM) and Centro-Atlântica Railway (FCA). The approval process varies in line with the operating characteristics of each unit.

for 53 months to the partner company that will process the material. The charcoal is being sold to steel industries in the region. To produce the same quantity of charcoal produced by burning the contracted 72,000 metric tons of railway ties, 200,000 eucalyptus trees covering an area of 35 km<sup>2</sup> would be necessary. This process will also avoid the consumption of 16 million litres of water, which would be used to water the eucalyptus trees during their seven-year growing cycle.

## Hazardous and non-hazardous waste [EN22]

In 2012, Vale generated a total of 1 million metric tons of waste, 97% non-hazardous and 3% hazardous. The nickel business accounted for approximately 38% of the total amount generated, followed by the fertilizers areas, which generated 29%. [4.13]

The total generated in 2012 is about 57% higher than in 2011, especially due to the refinement of the methodology for calculating data, particularly in the areas of Fertilizantes (incorporation of 288,000 tons of sludge that had not been informed in the previous report). Even when such waste is dumped in landfills the waste disposal profile calls for recovery. In 2012, recycling and recovery of materials. Approximately 42% of the allocation is for activities related to waste recovery. [4.14]



## Challenges

Minimize  
land use impact

Conserve  
and restore areas



## Results

Activities to recover 12.8 km<sup>2</sup> of  
degraded areas started in 2012

Partnerships with public and private institutions collaborate for the company to **develop conservation and restoration projects in the territories** where it operates

### Spills [EN23]

In 2012, 21 spills of hazardous products considered critical<sup>8</sup> were recorded at Vale's facilities, in line with its relevance matrix.

As spills can significantly damage the environment, the company has effective emergency response plans. All units acted to remediate the impacts of these occurrences in the most appropriate way, and to investigate these events in order to avoid further spills.

The company's contingency and prevention actions comply with legislation. The spills did not result in any irreversible damage. [4.15]

### Air emissions and noise [EN20]

Aware of its commitment to continuously improve the control mechanisms for its atmospheric emissions, noise and vibrations arising from its activities, in 2012 Vale invested US\$192.2 million in enhancing processes and reducing impacts. This amount is up 14% from 2011 and equivalent to 18.7% of the total sum allocated to the environment in 2012.

<sup>8</sup> A significant spill as classified by the GRI corresponds to the definition of a critical accident used by Vale, i.e. one that goes beyond an operational unit's boundaries and causes a residual impact on the environment and/or health and safety, inside or outside the operational unit, after the completion of mitigation procedures.

### Case

## Waste that generates value and social inclusion

Vale promotes the generation of jobs and income from its recyclable wastes, which are sent to associations of waste collectors in the locations where the company operates in Minas Gerais. In 2012, the company supplied 496 metric tons of recyclable materials (paper, cardboard, plastic, glass and wood) to eight institutions, which have 144 workers in all.

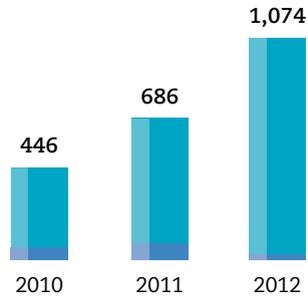
This initiative also involves giving technical support to these cooperatives, by donating equipment and providing technical advice to workers, accompanied with actions and guidance on selling these materials. The company is supporting the development of alternatives to contribute to recognizing and valuing this type of work, acting together with local communities.

This measure, besides transmitting value and recognition for work, complies with the principles of the new National Solid Waste Policy, which reinforces the social benefits of supporting the activities of recyclable waste collectors.



## Consolidated amount of waste generated [EN22]

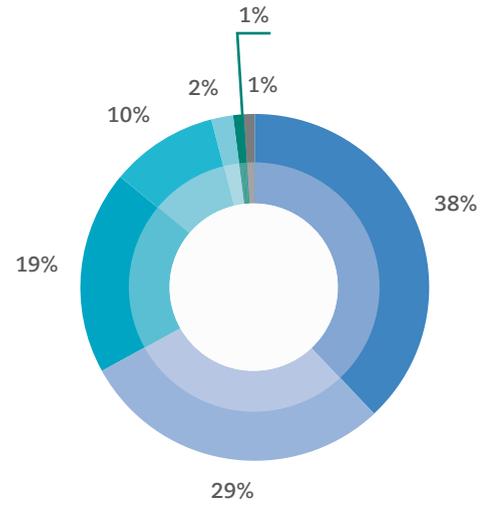
In thousand tons



	2010	2011	2012
<b>Non-hazardous</b>	385	603	1,044
<b>Hazardous</b>	61	83	30
<b>Total</b>	<b>446</b>	<b>686</b>	<b>1,074</b>

## Generation of non-hazardous waste [EN22]

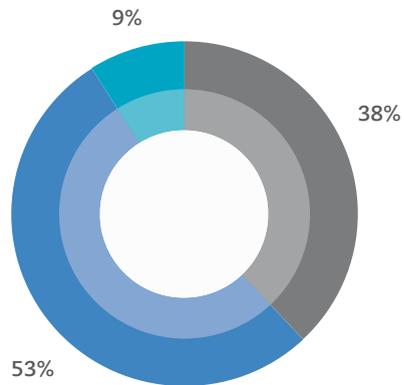
Total of 1,044 thousand tons (2012)



	%
<b>Nickel</b>	38%
<b>Potash/Nitrogen/Phosphate</b>	29%
<b>Iron ore</b>	19%
<b>Logistics</b>	10%
<b>Coal</b>	2%
<b>Manganese</b>	1%
<b>Copper</b>	1%

## Waste disposal<sup>I</sup> [EN22]

Total of 748 thousand tons (2012)



	%
<b>Soil disposal<sup>II</sup></b>	53%
<b>Reprocessing/Recycling</b>	38%
<b>Other</b>	9%
<b>Other</b>	<b>9%</b>
<b>Biological treatment</b>	4%
<b>Reuse/Re-refining</b>	2%
<b>Co-processing</b>	1%
<b>Composting</b>	1%
<b>Incineration</b>	1%

<sup>I</sup> Differences between the amount of waste generated and the final disposal figure are due to temporary storage.

<sup>II</sup> Soil disposal: external and internal sanitary landfills, waste rock piles and underground disposal.





**Wind fence in Tubarão Port Complex in Vitória (Espírito Santo), Brazil**

Picture: Sésiom França

Following the creation in 2011 of a specific management area for Atmospheric Emissions, Noise and Vibration, several initiatives were implemented in 2012 to improve the management of these issues. These included the launch of a technical training program in atmospheric emissions at operational units, an increase in the spreading of best practices, a greater presence in technical groups and the development of corporate documents by thematic sub-committees.

In 2012, System Management Procedures (applicable to units in Brazil) were published in Vale's Standardization System for the management of air emissions, noise and vibrations. Three sets of global instructions for managing these issues were prepared in 2012 and will be published internally in 2013.

Vale is promoting the development of dust suppressing products, in partnership with specialist companies, to cut diffuse emissions in its material storage, handling and transportation operations. In 2012, the company conducted multiple tests in its wind tunnel, a facility specially designed to evaluate the performance of dust suppressants in ore railway transportation. In addition, tests were performed using various dust suppressants on unpaved roads – a practice that may cut water use.

Since 2007, Vale has invested around US\$305 million at Tubarão Complex, Espírito Santo, in local environmental control technologies, reducing dust emis-

sions by 48% in recent years. The company is currently installing a sixth wind fence at the complex to surround Plant VIII's pellet stockyard, which will be approximately 1,100 metres long. Wind fences can reduce dust emissions in stockyards by up to 77%.

At Vale's Ouro Preto site, the company has finished installing a system to reduce particulate matter emissions in a ferroalloy production furnace. The project cost US\$16.2 million. Its innovation is that it uses a bag filter as a de-dusting system in a closed furnace. Unlike the usual system (gas scrubbers), bag filters do not use water, generating a dry solid residue instead of mud.

Another initiative is the use of hydro-seeding techniques, which enable rapid growth of plant species and prevent dust generation by wind on exposed soil surfaces.

In 2012, Vale emitted<sup>9</sup> 9,900 metric tons of particulate matter from fixed sources, generated primarily by its Nickel, Pelletizing and Fertilizer operations.

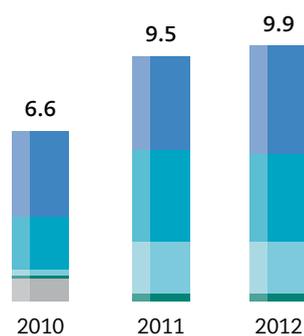
There was a 4.2% increase in particulate matter emissions in 2012 compared to 2011. This increase is due mainly to the Sudbury operations in Canada, where control equipment operated in an atypical

<sup>9</sup> Some areas are outside the 2012 reporting scope, such as CADAM, Vale Manganèse France and Vale Manganese Norway, which together accounted for 1.3% of Vale's figure in 2011. No new area entered the 2012 reporting scope in relation to the 2011 scope.



## Particulate matter emissions<sup>1</sup> [EN20]

In thousand metric tons



	2010	2011	2012
<b>Nickel</b>	3.3	3.6	4.2
<b>Pelletizing</b>	2.1	3.6	3.4
<b>Fertilizer</b>	0.2	2.0	2.0
<b>Manganese</b>	0.1	0.3	0.3
<b>Aluminum</b>	0.9	—	—
<b>Total</b>	<b>6.6</b>	<b>9.5</b>	<b>9.9</b>

1 Coal and copper emissions were not considered significant.

manner in the first half of 2012, resulting in higher dust production.

The ramp-up<sup>10</sup> of Vale's pelletizing plant in Oman, which increased its production by 215%, also contributed to the increase in emissions.

Fixed-source particulate matter emissions of nitrogen oxides (NO<sub>x</sub>) and sulphur oxides (SO<sub>x</sub>) do not produce any global effect, and have limited impacts on air quality in operational areas. [Vale also monitors emission of NO<sub>x</sub> and SO<sub>x</sub>. \[4.16\]](#)

Vale systematically monitors ambient noise<sup>11</sup> caused by its operations and continually identifies opportunities to reduce its impact. In 2012, an experimental acoustic barrier project was developed on the Vitória-Minas Railway in order to evaluate this technology's acoustic attenuation potential.

### Reduction of emissions in the steel sector

Vale has a 26.87% stake in Thyssenkrupp Companhia Siderúrgica do Atlântico (TKCSA). Located in Santa

Cruz, Rio de Janeiro, the plant's technology gives it the lowest intensity of carbon emissions among global steel companies, by reusing gases and heat to generate power.

While the global average for emissions at steel mills is 2.26 tons of CO<sub>2</sub> per ton of steel produced, TKCSA plans to produce 1.65 tons of CO<sub>2</sub> per ton of steel. TKCSA has so far achieved a figure of 1.83 tons of CO<sub>2</sub> per ton of steel, before even reaching full production. Using two gas turbines and one steam turbine with a nominal electricity production capacity of 490 MWh, CSA is self-sufficient in power and exports it to the grid in southeast Brazil.

Based on a Conduct Adjustment Agreement (TAC in Portuguese) signed with the state of Rio de Janeiro government in 2012, and amended in 2013, TKCSA has already fulfilled 85% of the approximately 130 improvement actions identified in an independent audit in order to obtain its operating licence. One of TKCSA's main actions was to install a dust extraction system in emergency wells, an innovative development in the global steel industry. According to technicians at the State Environment Institute (Inea in Portuguese), the system, launched in 2012, captures more than 98% of graphite particles. The remaining aims range from paving streets within the industrial complex to conducting studies on atmospheric dispersal of particles.

<sup>10</sup> Increased production from the beginning of the operation until usage of the unit's maximum capacity. Phase characterized by operational testing and operational adjustments.

<sup>11</sup> Noise resulting from the company's activities verified outside the premises, where the affected parties are located (communities).

In 2010, there were two cases of dust dispersal in the community, and after almost two years without incidents, in October 2012, there was another smaller case. TKCSA has taken steps to reduce the chance of recurrence. In none of these incidents were there breaches of air quality legal standards by monitored pollutants. According to the Air Quality Index (AQI), monitored by Inea and the municipal government of Rio de Janeiro, since the stage prior to construction, the region's air has been in the quality ranges of "good" and "OK"<sup>12</sup>, in compliance with legal parameters, with better quality than other neighbourhoods of Rio de Janeiro such as Copacabana, Botafogo and Centro.

Regarding local residents' exposure to particulate matter, from January 2011 to August 2012 a study was conducted by the State Environment Secretariat (SEA)<sup>13</sup> complemented by PUC/Rio de Janeiro, based on 2011 data from INEA. It was concluded that the average annual figures for breathable particles at two air quality monitoring stations were lower than

the average established by the United States Environmental Protection Agency (EPA) and the World Health Organization (WHO). It was also confirmed that emissions were in compliance with public health standards, including for sensitive groups such as people with asthma, children and the elderly.

### Environmental management and compliance [EN26, EN28]

To ensure compliance with its Sustainable Development Policy, Vale has a range of management instruments for the development of capital projects. These include a Best Practices Guide to Environmental Licensing and the Environment and a Licence to Operate Methodology.

In line with its commitment to its Sustainable Development Policy, Vale has developed an Environmental Management System (EMS), a global model with an emphasis on mitigating potential impacts and preventing risks associated with operations, considering the laws of each country. The EMS' requirements are included in a global standard (Standard 008) and are more restrictive than those of ISO 14001, a benchmark standard in environmental management. One of the goals of the EMS is continuous improvement in Vale's practices.

**12** Tolerable concentrations of pollutants in the air, in compliance with Brazilian legal standards (CONAMA) and Rio de Janeiro state standards.

**13** Report available at <http://www.thyssenkrupp-csa.com.br>  
» Publications » Reports » Report by Working Group on Resolution SEA 195 – Health.

**-77%**

**Wind fences**  
Fences that reduce the wind velocity over the stacks of coal, pellets and ore **reduce by 77% the dust emissions in Vitória (Espírito Santo).**

**Biodiversity management**  
83% of the units that require **special plan for biodiversity management have already implemented it.**

**30,000 hectares**

**Reflorestar**  
**30,000 hectares, or the equivalent area of 46,000 football fields.** This is how much the **Reflorestar** project, an initiative of the Espírito Santo government, supported by Vale, will expand the state's forest cover.



**Aerial view of Ilha Guaíba Terminal (TIG), in Mangaratiba (Rio de Janeiro), Brazil.**

Picture: Márcio Dantas Valença

In 2012, Vale invested approximately US\$110 million in environmental management, 11% of the company's total expenditure on the environment. Since 2010, the company has been expanding and consolidating the EMS in all the locations where it operates. Vale's management is based on continual monitoring and assessment of its operations, with the establishment of minimum requirements, including annual audits. In its management of environmental risks, Vale uses technical and operational procedures, control devices, qualified teams, specialist consultancies and periodic audits to identify and minimize the risks of its operations, besides remaining in compliance with legislation and other applicable requirements.

One of the procedures adopted is a set of corporate instructions related to risk management, which has the aim of presenting a system for analyzing hazards and their effects on different phases of the life cycle of our projects, in order to identify, evaluate, control, minimize and prevent risks in processes, activities, services and products, and their consequences, through tools appropriate to each scenario.

In Brazil, Vale is taking the necessary steps to comply with new rules on minimum protected areas of native habitat on land ("Legal Reserves") through the Rural Environmental Registry (CAR in Portuguese), as established by the new Forestry Law (Law 12,651 of May 25, 2012).

In 2012, four new cases<sup>14</sup> of non-compliance with environmental requirements were recorded. During this period, no significant fines or non-monetary sanctions were imposed<sup>15</sup>. [4.17]

<sup>14</sup> Legal proceedings are considered significant based on the following criteria: a) their value, including compensation claims and fines (greater than 10% of assets in the case of lawsuits, and more than US\$2.5 million in the case of environmental administrative processes); b) whether they involve a subject of interest to the company or affect the general public, regardless of value; c) non-monetary sanctions.

<sup>15</sup> In this report, Vale continues to disclose existing cases to which the significance criteria apply. However, the company now discloses only those values recognized as owed or already paid by Vale, to best meet the scope of the EN28 GRI indicator and to avoid any distortion of reality concerning judicial and administrative proceedings that, as they are awaiting final decision, cannot normally be accounted for precisely. Vale's Form 20-F report contains an estimated provision in line with accounting criteria.



# Climate change and energy

Vale is committed to reduce its projected 2020 global greenhouse gas (GHG) emissions by 5% (Carbon Target). The company believes in the importance of engaging its value chain and this was one of its main areas of action in 2012, training 55% of the invited suppliers on inventories of GHG emissions.

Contracts between Vale and its suppliers now include a voluntary clause for producing an inventory. This commitment reflects the company's concern with climate change's effects on its business, natural resources and society.

To achieve its global target and lead the company toward a low-carbon economy, Vale has the support and expertise of its operational areas and research centres, which seek innovative technological solutions and activities such as carbon capture and diversification of energy sources from renewable sources.

One example is the Logistics area, which includes emissions from railways and ships and accounts for around 10% of Vale's GHG emissions. The monitoring and use of fuel less carbon-intensive and energy efficiency actions were the main initiatives mapped to reduce emissions on Vale's railways.

Vale's energy management is another key aspect to achieving its Carbon Target.

As part of this initiative, 25 energy efficiency projects were concluded in different business areas, including those with the most intensive energy use, namely Fertilizers and Pelletizing, generating savings of approximately 53,000 MWh (around US\$6 million per year). To ensure alignment with the commitment to reducing Vale's greenhouse gas emissions, climate change indicators were included in the company's Action Plan on Sustainability. In addition, as examples of this commitment, the Vale Technology Institute is

conducting 15 research projects related to climate change and energy.

Vale's investments in clean energy made progress with the Estreito project, opened in 2012, and Belo Monte, under construction, ensuring hydro-power generation of 641 MW and 4,571 MW on average,<sup>1</sup> respectively. The company operates in partnership in these projects and has been committed to the efficient management of social and environmental impacts.

### Climate change strategy

Vale's strategy on climate change is based on the pillars defined in the Open Letter to Brazil on Climate Change.<sup>2</sup> Annually, Vale quantifies its GHG emissions and identifies opportunities for carbon capture/sequestration and emissions reductions, and develops and updates regulatory documents with corporate guidelines on the issue. In 2012, Vale's Global Climate Change Policy for Mitigating and Adapting to Climate Changes, which defines corporate guidelines for Vale on climate change, was updated to include new commitments, such as the Carbon Target

The company has tools to analyze risks and opportunities in terms of GHG emissions for Vale. One of them is the projection of GHG emissions according

<sup>1</sup> The generation values informed refer to the energy provided by both power plants, not only Vale's share: Estreito (30%) and Belo Monte (9%).

<sup>2</sup> Published in 2009 – <http://www.vale.com/>

Vale Espírito Santo ship at Tubarão Port in Vitória, Espírito Santo, Brazil



Picture: Mosaico Imagem

to long-term strategic planning data for each business unit. In addition, in 2012, the Guide to Reducing GHG Emissions was reviewed to better assist operating units to reach the Carbon Target. A GHG emissions simulation tool was also developed: the Emission Simulator. [This tool is presented in a user-friendly format and allows decision makers to compare alternatives in terms of GHG emissions.](#) [4.18]

**Engagement** [PI4.17]

Besides managing its own emissions, Vale seeks to mobilize its entire value chain around the same goal. To advance with this agenda, the company continued a series of training courses on emission inventories for its suppliers, which started in 2011. In 2012, Vale trained suppliers in North America, Europe, Africa and Asia, and has now covered from the beginning of the initiative 55% of its invited

suppliers, representing a total of 170 trained suppliers out of around 300.

[In addition, the company works with relevant stakeholders, such as the Brazilian Business Council for Sustainable Development \(CEBDS\) and the International Council on Mining and Metals \(ICMM\) in order to contribute to the consolidation of public policies and sector policies on the topic.](#) [4.19]

**Carbon reduction and capture projects** [EN18]

By establishing a Carbon Target, the company has reassessed its processes and sought to be more efficient in its activities and projects. Vale has an N<sub>2</sub>O reduction project in its nitric acid plants of units 1 and 2 in Cubatão. It is also replacing fuel oil with natural gas at its pelletizing plants in Fábrica and at Tubarão Complex, in Espírito Santo, and it has an energy recovery project in Dalian, in China, where hot air is re-circulated in order to dry products.

The projects at units 1 and 2 in Cubatão are registered within the scope of the Clean Development Mechanism (CDM), as established by the United Nations Framework Convention on Climate Change (UNFCCC). Together, they have achieved a reduction of around 280,000 tCO<sub>2</sub>e<sup>3</sup> per year. The projects in



**If you do not know how much you're consuming and how much it costs, how can you reduce consumption?**



Alexander MacDowall, energy superintendent, responsible for creating a system to measure power consumption  
Clydach, UK

<sup>3</sup> CO<sub>2</sub> equivalent: greenhouse gas emission measuring unit. This measuring unit considers the conversion of all types of greenhouse gas based on their global warming potential.





## Commitment

To reduce GHG emission by 5% by 2020 and influence the value chain in the same way



## Results

Development of **projects to reduce and capture carbon**

**170 suppliers trained** on GHG emission inventory

Fábrica, at Tubarão Complex and in Dalian have produced a reduction of 402,000 tCO<sub>2</sub>e per year.

In 2012, other initiatives were implemented at Mariana Complex, Água Limpa mine and Voisey's Bay mine. At Mariana, old backhoes were replaced with new ones with lower diesel consumption. At Água Limpa, the average transport distance was reduced in order to cut fuel consumption and increase the mine's productivity. At Voisey's Bay, an electric heater generator was replaced with a glycol-based system, which resulted in a reduction in the consumption of diesel fuel and consequently GHG emissions. Together, these actions have reduced emissions by 1,300 tCO<sub>2</sub>e.

At its coal mines, Vale is implementing mechanisms to reduce methane emissions. One of its basic principles is a commitment to allocate resources to conduct research projects for carbon capture and storage (see case in the next page).

All the aforementioned projects have produced a reduction in emissions of approximately 1,4 million tCO<sub>2</sub>e.

In order to add further value to the forest areas protected by Vale, in 2012 an effort was made to quantify their carbon stock in Brazil. It was concluded that Vale's 17 Private Natural Heritage Reserves (RPPNs in Portuguese) in the state of Minas Gerais are storing 3.5 million metric tons of CO<sub>2</sub>, which is

equivalent to the current emissions of the company's fertilizers and coal areas in a year, while the Vale Natural Reserve in the state of Espírito Santo stores approximately 9.3 million metric tons of CO<sub>2</sub>, which is equivalent to annual emissions from the pelletizing, nickel and iron ore areas.

Vale Florestar is another initiative that has contributed to the capture and storage of CO<sub>2</sub>. In 2012, Vale registered Vale Florestar's Carbon Project within the scope of the Clean Development Mechanism. As a result, Vale is entitled to receive carbon credits from the UNFCCC, estimated as 4.7 million tCO<sub>2</sub>e on average for 17 years.

Furthermore, Vale and the Vale Technology Institute have been developing a series of investigations on the issue of climate change and energy efficiency, including the following: "Carbon sequestration and recovery of deforested mangrove forests on the Ajuruteua peninsula in the municipality of Bragança in Pará," "Production and use of fine biomass in co-firing with coal in blast furnaces," and "Innovative, sustainable and integrated processes to obtain biodiesel and hydrogen."





Picture: Leonardo Ferreira

Truck operating in Moatize, Tete province, in Mozambique

## Case

# System reduces emissions in coal mines

At Vale Australia, the installation of ventilation fans in coal mines results in better air circulation, which helps to dilute the methane concentration to safe levels. This safety initiative is complemented by well drainage systems before and after mining, which extract gas with high concentrations of methane. This gas is used for power generation or burned to reduce greenhouse gas (GHG) emissions. In 2012, at Integra mine, wells that extract gases from the mined area (underground mine) transferred 34.8 million m<sup>3</sup> of this gas through a pipe network to a thermal power plant. This process generated power equivalent to 361,000 MWh, enough to power around 55,000 Australian families<sup>i</sup> for a year and avoiding emissions of 207,000 tCO<sub>2</sub>e.

At Carborough Downs, the drainage well system extracts gases in coal mines before mining begins and sends them for combustion in a flare (combustion equipment) to transform all gases into CO<sub>2</sub> and H<sub>2</sub>O. In 2012, 46.1 million m<sup>3</sup> of gases (91.2% CH<sub>4</sub> and 0.3% CO<sub>2</sub>) were flared, avoiding total emissions of 502,000 tCO<sub>2</sub>e, equivalent to approximately 140,000 cars per year in Australia.<sup>ii</sup>

<sup>i</sup> Based on the average consumption of an Australian dwelling of 6,570 kWh per year.  
<sup>ii</sup> Based on 15,000 km traveled, consuming 10L/100km of fuel oil byproduct.

## Energy [ENS, EN7]

Vale seeks to promote the conservation and rational use of energy by mapping and implementing opportunities to reduce energy consumption (both in existing operations and in capital projects), adopting energy management tools, reviewing and preparing technical documents focused on the rational use of resources, and holding workshops and technical forums to mobilize various areas of the company around the potential for energy saving.

In 2012, investments in energy efficiency projects amounted to US\$22.3 million. Another US\$3.8 million was invested in engineering services, focused on reducing energy consumption in operational units and capital projects.

The mapping and implementation of opportunities to reduce energy consumption continued in 2012. The company identified 47 projects for a portfolio of improvements. The potential of all actions together will result in an annual energy saving of 101,000 megawatt-hours (approximately 364,000 GJ), enough to supply more than 670,000 homes for the same period.

Many projects in this portfolio are multi-year, and out of 47 initiatives, 25 were completed in 2012, including those with a more intensive use of energy (Fertilizers and Pelletizing), involving investments of US\$6.8 million. The financial saving was US\$5.7 million per year and US\$43 million throughout the lifetime

of the projects. In inputs, 3.2 million litres of diesel and 53,000 megawatt-hours will be saved, which represents a reduction in emissions of approximately 17,000 metric tons of CO<sub>2</sub>e.

Mapping of opportunities to cut energy consumption allows the company to identify areas with the greatest potential to develop strategic actions. These are concentrated in material transportation systems (pumping and conveyor belts), utility systems (ventilation, water withdrawal and compressed air) and thermo-intensive systems (furnaces, boilers and burners) whose consumption may be reduced.

In 2012, the implementation of the Energy Information System was completed at all pelletizing operations in Vitória and at Vale Fertilizantes (including Bayóvar, in Peru). This tool will make it possible to monitor the energy performance of these units and map opportunities for reducing consumption.

Another example of strategic action is a project for replacing material transportation using diesel trucks with an electrically powered pipeline. This initiative consists of pumping products from the Água Limpa plant in Minas Gerais straight to a loading facility,

crossing 5.5 km. In 2012, the company completed the detailed engineering design for this process and provided the funds to purchase the equipment needed. [Read more in the table of energy efficiency initiatives.](#) [\[4.20\]](#)

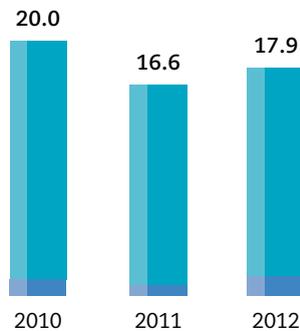
#### GHG emissions [PI4.17, EN16, EN17]

Vale's total GHG emissions, defined as the sum of its scope 1<sup>4</sup> and Scope 2<sup>5</sup> emissions, were 17.9 million metric tons of CO<sub>2</sub> equivalent in 2012. To consistently compare emissions, it was necessary to recalculate the 2011 inventory, considering the same reporting scope of 2012 (emissions from mergers and acquisitions and those from divestitures) and incorporating the methodological changes made in the current inventory. Notably, the company sold ferroalloy plants in France and Norway, coal assets in Colombia and kaolin assets in Brazil. In addition, due to an improvement in the collection of data at Australian mines, a

- <sup>4</sup> Scope 1: An organization's direct emissions, covering emissions from fuel use and production processes.
- <sup>5</sup> Scope 2: An organization's indirect emissions, covering emissions from the purchase of electricity and process steam.

### Greenhouse gas emissions [EN16]

Scope 1 and 2 – million metric tons of CO<sub>2</sub>e

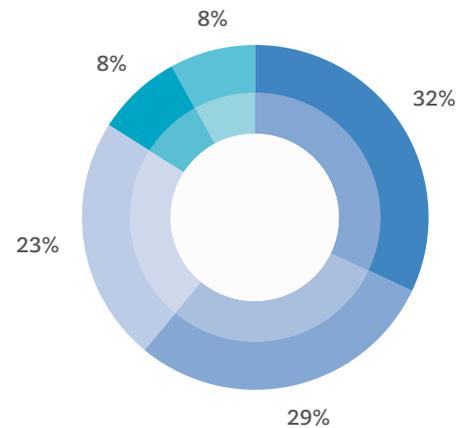


	2010	2011 <sup>I</sup>	2012
<b>Scope 1</b>	18.7	15.8	16.4
<b>Scope 2</b>	1.3	0.8	1.5
<b>Total</b>	<b>20.0</b>	<b>16.6</b>	<b>17.9</b>

<sup>I</sup> Recalculated total 2011 emissions: 16.6 million metric tons of CO<sub>2</sub>e. The emissions report the previous year, before the correction, were 16.9 million metric tons of CO<sub>2</sub>e.

### Emissions by source<sup>I</sup> [EN16]

Scopes 1 and 2 - Total: 17.9 million tons of CO<sub>2</sub>e (2012)

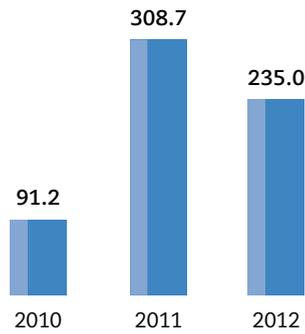


Activity - disaggregated	2012
<b>Mobile combustion</b>	32%
<b>Stationary combustion<sup>II</sup></b>	29%
<b>Industrial process<sup>III</sup></b>	23%
<b>Purchase of electricity and steam</b>	8%
<b>Fugitive<sup>IV</sup></b>	8%

- <sup>I</sup> Vale's Agricultural emissions represent approximately 0.1%.
- <sup>II</sup> Fuel consumption, use of explosives and flares.
- <sup>III</sup> Pellet burning, nickel and co-products, ferroalloys, ammonia and urea, rock phosphate and nitric acid
- <sup>IV</sup> Coal mining, post-mining and use of refrigerant fluid.

## Indirect GHG emissions<sup>I</sup> [EN17]

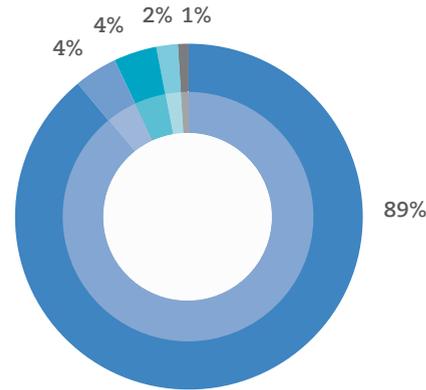
Scope 3 - million tons of CO<sub>2</sub>e



<sup>I</sup> Cooling of emission related to scope 3 are a consequence of reduced activity in downstream stage in Vale's value chain.

## Sources of indirect GHG emissions<sup>II</sup> [EN17]

Scope 3 - Total: 235.0 million tons of CO<sub>2</sub>e (2012)



	%
<b>Processing of iron ore</b>	89%
<b>Use of Vale products (thermal coal and fertilizers)</b>	4%
<b>Mobile sources used</b>	4%
<b>Purchasing of materials and services</b>	2%
<b>Purchasing of energy inputs</b>	1%

<sup>II</sup> The categories, purchase of capital goods, employees air travel and ground transportation hired, showed no significant emission.

retrospective revision was made to the data reported for 2011, including significant emissions sources<sup>6</sup>.

The value of total GHG emissions in the inventory for the year 2011 was adjusted from 16.9 to 16.6 million tonnes of CO<sub>2</sub> equivalent. Considering total emissions, there was a 4% increase in scope 1 emissions compared to 2011, from 15.8 million tCO<sub>2</sub>e in 2011 to 16.4 million tCO<sub>2</sub>e in 2012. This change was due to organic growth in some businesses, such as an expansion in Vale's fleet of ships to place chartered ships, the inclusion of the Tres Valles copper operations and Moatize coal operations, and increased production in Oman.

In relation to Scope 2, there was approximately an 80% increase in emissions compared to 2011, from 0.83 million tCO<sub>2</sub>e in 2011 to 1.5 million tCO<sub>2</sub>e in 2012, despite Vale maintaining similar power consumption. This is mainly due to an increase in the GHG emission factor of the National Interconnected System in Brazil, due to low precipitation in 2012, so the share of renewable energy was lower. The increase in production in Oman also contributed to this increase in Scope 2 emissions.

<sup>6</sup> There was an increase in Scope 1 emissions, given that significant sources of emissions were not included. After this correction, these sources were included retrospectively.

Approximately 61% of Vale's total emissions result from the use of fuels for energy purposes in mining activities and internal transport, logistics services, oven heating, thermoelectric power generation and steam production; 23% result from industrial processes (production); approximately 8% from fugitive emissions in coal mining, post-mining activities, and use of refrigerant fluid, and 8% from the purchase of electricity and steam (Scope 2).

Within the 23% of emissions resulting from industrial processes, pellet and nickel production accounts for the biggest GHG emissions. The chart in the previous page shows a breakdown of Vale's total emissions (scopes 1 and 2) according to the different types of sources.

Regarding other indirect emissions (scope 3), which include Vale's value chain, a breakdown of sources is shown in the chart above. The most significant scope 3 categories<sup>7</sup> are processing and use of the product, purchase of materials and services, purchase of raw materials, and purchase of energy inputs. [4.21]

<sup>7</sup> Categories were set according to the document Corporate Value Chain (Scope 3) Accounting and Reporting Standard.



Aerial view of Igarapava Hydroelectric Power Plant, located on the border of the states of São Paulo and Minas Gerais, Brazil

### Risk management [EC2]

Vale regularly monitors the most significant risks and annually publishes them in the CDP questionnaire,<sup>8</sup> including information on its management of GHG emissions.

Risks are classified as physical, regulatory, or other. The imposition of specific taxes and fees, for example, is a regulatory risk that may have restrictions on the operating model, leading to cost increases.

Two important initiatives were developed in relation to this issue in 2012: analysis of the company's regulatory documents with respect to risk and verification of how the physical risks of climate change could be addressed in existing processes. The other was the establishment of a group – formed by the Legal, Climate Change and Institutional Relations departments – with the mission to create a tool to address major regulatory risks. These risks are classified and sent for analysis by the group according to their potential impact.

Besides risks, the company also identifies opportunities related to climate change. In the regulatory sphere, the maintenance and growth of associated carbon markets is likely to provide solu-

tions to relieve projects. [See the table of risks and opportunities.](#) [4.22]

### Energy generation

Energy is an extremely important input in Vale's businesses and occupies a strategic place in its planning. The company seeks to guarantee energy supplies for the continuity of its operations, investing in renewable energy, energy efficiency and technology.

In 2012, Vale took important steps towards this goal. Estreito hydroelectric plant, built on the Maranhão side of the Tocantins River, with installed capacity of 1,087 megawatts, will result in average energy supplies of 641 megawatts,<sup>9</sup> following investment of US\$97.3 million in 2012. This power is able to supply a city of around 3 million inhabitants. Vale holds a 30% stake in the Estreito Power Consortium, corresponding to assured energy of 192 MW on average, equivalent to 21% of the power consumed by Vale in Brazil in 2012.

After the establishment of Estreito plant, the company now has equity stakes in 12 hydroelectric power plants and nine small hydroelectric power facilities in operation in Brazil (the Igarapava, Porto Estrela, Funil, Candonga, Aimorés, Capim Branco I, Capim Branco II, Machadinho and Estreito hydroelectric power plants, and Ituerê, Mello, Glória and Nova Maurício small hy-

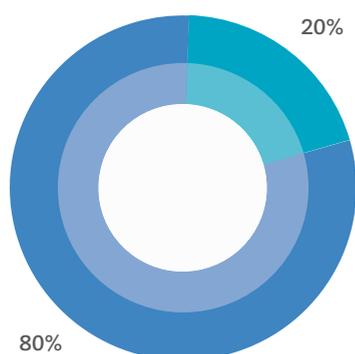
<sup>8</sup> The Carbon Disclosure Project (CDP) is an international non-profit organization that has developed a comprehensive system for companies and cities to measure, publish, manage and share information on emissions and other environmental topics.

<sup>9</sup> The generation values reported refer to the assured energy of the entire plant and not only Vale's share: Estreito (30%).



## Consolidated energy sources [EN3, EN4]

Total = 225 thousand TJ (2012)



Renewable	20%
Renewable electricity from Grid	14%
Renewable fuel <sup>I</sup>	6%
Non-renewable	80%
Diesel	22%
Natural gas	15%
Fuel oil	12%
Shipping fuel	10%
Coal and coke	9%
Non-renewable electricity from Grid	5%
Other <sup>II</sup>	8%

<sup>I</sup> Small hydroelectric power plants, biomass, biodiesel, ethanol and charcoal.

<sup>II</sup> Gas Fuel, Gasoline, Kerosene, Propane, HLR, methanol and Jet Fuel, Electricity and Steam (outside the grid).

droelectric power facilities), Canada (the High Falls I and II, Wabagishik, Nairn and Big Eddy small hydroelectric power facilities) and Indonesia (the Balambano, Larona and Karebbe hydroelectric power plants).

Vale also holds a 9% stake in Norte Energia, a special purpose entity set up to build the Belo Monte hydroelectric power plant (11,233 MW capacity and 4,571 average-MW of assured energy<sup>10</sup>), which is expected to be operational in 2015. Belo Monte will be able to meet 40% of residential consumption across the country, thereby constituting a key investment to serve Brazilian economic and social growth.

The company also continued its studies into wind power generation, advanced its biodiesel program and improved its management of clean energy resources. Investments in renewable sources in 2012 totalled US\$120.1 million, US\$112.1 million (capital investment) in hydroelectric projects, US\$4.5 million (current investment) in hydropower, and \$3.5 million (research and development) in biomass, wind and hydropower. As a result, 20% of Vale's energy now comes from renewable sources.

### Belo Monte hydroelectric power plant

Investments in power generation projects, such as the Belo Monte hydroelectric power plant, are of great importance to sustain the Brazil's economic growth and ensure energy for Vale's operations. Before joining the project, the company reviewed the Environmental Impact Assessment, the Environmental Impact Report and the Basic Environmental Plan, to make sure Belo Monte is aligned with its sustainability guidelines.

The Belo Monte hydroelectric project's social and environmental investments will total US\$1.9 billion. In compliance with environmental licences, programs were established in the Basic Environmental Plan approved by Ibama. The Indigenous Component has been prepared under the guidance of the National Indian Foundation (FUNAI), taking into account the expectations of indigenous people, identified during consultation meetings prior to the issuance of the environmental licences. Besides the implementation of mitigation programs and compensation for expected environmental impacts, the project anticipates local basic infrastructure investments, particularly in health, education and public safety areas. Regionally, the entrepreneur is a co-participant in the Sustainable Regional Development Plan, which will receive US\$255.8 million to develop projects in four thematic areas: land use, land registry and environmental management, infrastructure for development, promoting productive activities, social inclusion and citizenship.

<sup>10</sup> The generation values reported refer to the assured energy of the entire plant and not only Vale's share: Belo Monte (9%).



## Commitment

To invest in renewable energy sources, energy efficiency and technological innovation



## Results

### Investments in clean energy

25 energy efficiency projects completed

15 projects developed by Vale Technology Institute

These projects are designed for the 11 municipalities near the Belo Monte hydroelectric power plant, which are part of the Xingu Consortium. The projects are selected and monitored by technical chambers and a steering committee coordinated by a representative of the Chief of Staff's office, and also including representatives of the federal, state and municipal governments, regional economic interests, NGOs and trade unions.

Thus, Vale believes the project will leave a positive legacy for the region and its area of influence. For more information, please visit the Norte Energia website ([www.norteenergiasa.com.br](http://www.norteenergiasa.com.br)).

#### Estreito hydroelectric power plant

Vale's investment in the Estreito Hydroelectric Power Plant, as in the case of Belo Monte, aims to ensure renewable energy at a competitive cost.

The plant has environmental programs and social responsibility actions, with initiatives in the areas of environmental conservation, appreciation of cultural and historical heritage, citizenship, education, health, culture and recreation, involving the effective participation of communities. Social investments will provide for the implementation of 118 projects, of which 74 have been completed.

Mutual agreements have also been signed with 12 municipalities of the area covered for the execution of building work and services in infrastructure, health, education and security. These works and services,

which are not provided for in the compensation and mitigation conditions in the project's environmental licensing process, were set in partnership with municipalities, according to the main needs of the communities. They include the following: the purchase of new medical and outpatient equipment and hospital reforms; the restoration and expansion of health centres; and the construction and renovation of schools, libraries and municipal administrative offices. Partnerships with state governments have also been created. For more information, please visit the Estreito Energia Consortium's website ([www.uhe-estreito.com.br](http://www.uhe-estreito.com.br)).

#### Biodiesel

In line with its environmental commitments, Vale has the goal of reaching a 20% level of biodiesel (a fuel made from renewable sources) in the mixture of fuel used in its operations in Brazil. In the second half of 2015, a biodiesel plant, designed with a production capacity of 200,000 metric tons per year, will start operating in order to meet the demand of the North System's activities in Brazil.

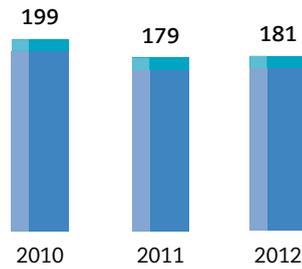
The raw material chosen for the production of biodiesel is palm oil, and through its subsidiary, Biopalma, Vale is making progress in its project to plant palm trees and produce palm oil.

Important steps for future production of biodiesel were taken in 2012. At the beginning of the production chain, the area planted with palm trees reached approximately 53,000 hectares, including Vale's own planting and family farming. Vale will



## Total direct energy consumption [EN3]

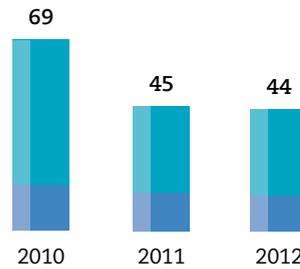
Thousand TJ/year



	2010	2011	2012
<b>Renewable</b>	12	13	13
<b>Non-renewable</b>	186	166	168
<b>Total</b>	<b>199</b>	<b>179</b>	<b>181</b>

## Total indirect energy consumption [EN4]

Thousand TJ



	2010	2011	2012
<b>Renewable</b>	52.2	31.0	31.0
<b>Non-renewable</b>	16.3	13.7	13.0
<b>Total</b>	<b>69</b>	<b>45</b>	<b>44</b>

plant 60,000 hectares of palm trees by 2014, reaching a total of 80,000 hectares in 2015 – including 20,000 hectares of family farming.

In 2012, the first palm oil extraction unit was inaugurated in the municipality of Moju (Pará, Brazil) with a processing capacity of 120 metric tons of fruit per hour. The second extraction plant will be in Acará (Pará, Brazil) and it is scheduled to go into operation in 2014. It will reach its maximum processing capacity of 560 metric tons of fruit per hour in 2017. Not all the palm oil produced by Biopalma will be used for biodiesel production; the surplus will be sold on the market.

The conceptual engineering design of the biodiesel plant in Pará that will supply the North System in Brazil was also completed in 2012. There is the possibility of expanding the plant's production capacity in 2017, to supply all operations in Brazil, since the area planted with palm trees is capable of meeting this demand.

The production of palm oil is an important vector for social inclusion in the region, through the generation of jobs and income. The agricultural part alone should generate around 5,000 direct jobs and

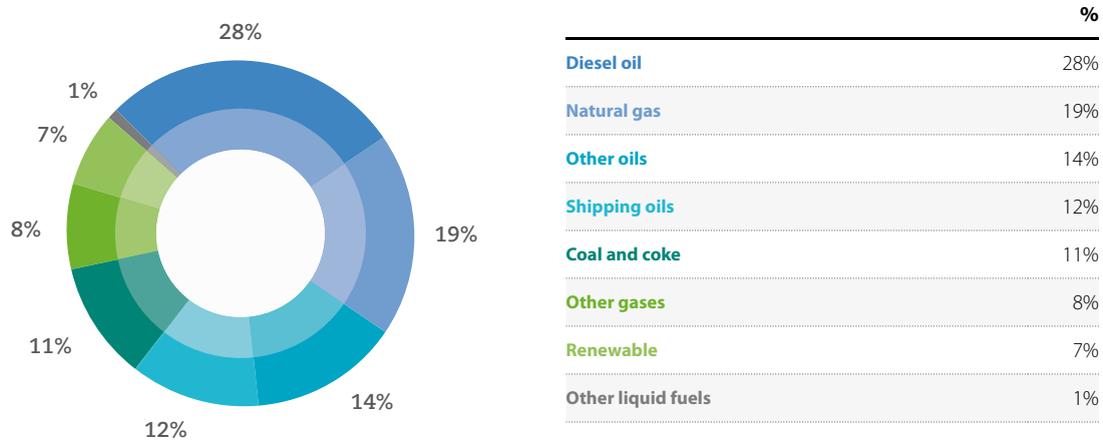
the company as a whole will generate 6,000 direct jobs by 2014. The first oil extraction plant has 180 employees, many of them trained through training programs sponsored by the company, in partnership with Senai/Pará. Considerable investment is being made in continuous training processes in employee safety and occupational health, as well as management techniques.

The family farming program reinforces the project's social inclusion benefits, strengthening a model of socioeconomic development that has significant positive impacts on the quality of life of the population in the area directly affected by the project. The project has the support of the National Program for Strengthening Family Agriculture (Pronaf, in Portuguese) and currently has 294 participating families. The target is to have 2,000 families involved in 2014. In addition to palm trees, Biopalma's family farming network is supported in production diversification, food procurement, formation of cooperatives, health, academic and professional education, and land and environmental registry. Thus, Biopalma is investing not only in generating household income, but also in the human and social development of the region.



## Direct energy consumption - Type of fuel [EN3]

Total: 181 thousand TJ (2012)



### Energy consumption [EN3, EN4]

Vale's direct energy consumption in 2012 showed an increase of 2,000 TJ (1.2%) compared to 2011. Analyzing the growth in fuel consumption through base-year consolidation (not counting the effect of units sold), growth is even higher, reaching 4% (6,000 TJ). This increase is mainly explained by the expansion of Vale's fleet and the growth of operations such as Moatize, Mozambique, and Oman. Together, operations and the fleet of ships represent an increase of 13,000 TJ in Vale consumption in 2012. While the operations and fleet of ships have raised consumption, there was a significant reduction in direct energy consumption in Pelletizing in Brazil, due to units sold by the company (Vale Manganèse France, Vale Manganese Norway, CADAM and Vale Colombia).

Analyzing fuel consumption, it can be seen that oil products (diesel oil, shipping oil and other oils) are still the most significant, accounting for 54% of total direct energy consumption. Among gases, which represent the second largest type of fuel consumed, natural gas corresponds to 19% of consumption.

By comparing fuel consumption in 2012 to 2011, consumption of diesel (b2, b3, b4, b5) increased by

5%, due to increased coal production in Moatize; a reduction in consumption of coal and natural gas, due to reduced production of pellets in Brazil; and the increase in consumption of IFO shipping oil by 66%, due to expansion of the fleet of ships.

In indirect energy consumption, there was a reduction of 1,000 TJ (2.5%). This reduction is mainly due to the sale of the Manganèse France and Manganese Norway units. Analyzing through base-year consolidation, there was growth in consumption of electric energy of 5% (2,000 TJ). Other business areas also showed the abovementioned increase in indirect energy consumption, either through increased production or new units.

### Self-production and consumption

The total amount of electric energy consumed by Vale in Brazil in 2012 was approximately 8.5 TWh. Of this, 5.4TWh was generated by Vale. This represents 64% of self-production in Brazil, whose matrix is based on hydroelectric power.

Vale's energy self-production across the world was 68% in 2012. Besides Brazil, Vale produces electricity in Canada and Indonesia.

## Vale acknowledges the inherent impacts of its activities on water resources and works to ensure its conservation, protection and quality, developing initiatives that go beyond compliance with legal requirements.

In 2012, Vale continued investing in and promoting the use of technologies for the development of programs and actions that result in a reduction in water demand and total consumption, waste control, minimization of effluent generation and an increased reuse percentage. These initiatives demonstrate that Vale's commitment extends beyond reducing the use of new water.

In promoting harmonious coexistence concerning the use of the resource, the company participates with other segments of society in stakeholder engagement mechanisms such as river basin committees and councils in Brazil, to discuss and assist in the development of public policies.

These initiatives reflect Vale's alignment with different cooperative efforts related to water, thereby contributing to guaranteeing multiple present and future uses.

### **New challenges** [PI 4.17]

In 2011, Vale faced the challenge to reduce the new water demand of operations through new or current technologies. This has been successful since then. The company believes that reuse and recycling actions are important to reduce new water withdrawal and reflect Vale's approach to the topic, but they are not sufficient to make the system efficient. The ideal situation is to develop processes that require the least possible use of the resource, such as ore processing using its natural moisture. As a result, Vale has made the commitment to reduce the total water demand of its operations in the coming years.

Some Vale units have established specific demand reduction targets – i.e. withdrawing less water per ton produced or moved within the Action Plan on Sustainability (see the table in the chapter Strategic Vision).

It is important to consider that the mining industry does not have significant water use when compared to other sectors, as can be noted in several international benchmarks, such as a report by the United Nations Environment Program entitled *Towards a green economy*<sup>1</sup> published in 2011. An important characteristic of the sector is the need to lower the groundwater level in the mineral extraction processes to allow the extraction of minerals. This activity makes the withdrawal volumes larger than the company's actual consumption. In Brazil, this process is authorized by state institutions responsible for the management of water resources.

<sup>1</sup> Report available at [www.unep.org/greeneconomy](http://www.unep.org/greeneconomy).



## Challenges

Guarantee the **harmonious coexistence** with **stakeholders** on **water use**

Use technology to **reduce the demand for new water** in operations



## Results

Participation in involvement tools for the **development of public policies**

**Investment and use of technologies** to go beyond the reduction of new water use

Participation in public policies debates reflects Vale's alignment with different cooperative efforts related to water, thereby contributing to guaranteeing multiple present and future uses

In 2012, Vale also produced three management system procedures (PGS in Portuguese) on flow meters, effluent treatment and management. The company has also developed training materials related to effluent treatment (oily and sewage) and environmental monitoring.

### Water footprint

In 2012, Vale started the company's water footprint analysis. This indicator shows the consumption of fresh water directly and indirectly involved in the production process of consumer goods and services. The company has developed a project to evaluate the technical, methodological, institutional and economic application of the indicator, and has held an internal workshop to publicize the issue and assess its implications in mining. The main challenge related to that study is to identify possible methodological adaptations that allow greater applicability to mining reality. [4.23]

### Reuse strategies <sup>[EN10]</sup>

Water reuse is strategic for Vale. There were significant advances in this area during 2012, with the introduction of important actions for reuse and waste reduction, in line with each unit's characteristics.

The actions developed included the installation of tanks and pumping systems in sewage treatment plants at Ponta da Madeira Terminal Port in São Luís, in the Brazilian state of Maranhão. Treat-

### Analysis and regulations

One of the initiatives to guide the optimal use of water in 2012 was the launch of the Water Resource Management Instructions. This document sets out principles, guidelines, tools and responsibilities for the proper management of the issue in Vale's global operations, in accordance with international regulations and technical references.

Another advance during the year was the preparation of the Procedure for the Selection of Technologies for Effluent Treatment. This document, produced by the Water Resources Technical Group, lists guidelines for selecting and implementing applicable effluent treatment systems in all company's operations.





Aerial view of Sossego Mine, in Canaã dos Carajás, Pará, Brazil

Picture: Agência Vale

#### Case

## Sossego mine recirculates more than 99% of water used

Located in Canaã dos Carajás, in the Brazilian state of Pará, Sossego Mine was Vale's first copper venture. In 2012, after a series of actions to increase water circulation, the operation was able to reuse 99% of the water used in production processes. This saving has represented a reduction of approximately 900,000 m<sup>3</sup>/year of water that was previously pumped from the river. This amount is enough to supply a town of 25,000 people for a period of six months.

The initiative began in 2008 and the first step was the calculation of the project's water balance. From this, initiatives were developed to reduce the use of water originating from the river and replace it with process water.

After surveying the places where water from the Paraupébas river was used, improvements were implemented to reduce this consumption, such as, the use of process water in the pumping of ore pulp.

ed effluents are used in the processes of sprinkling roads, spraying ore piles and irrigating green areas. This initiative has also been deployed at the concrete centre as part of the complex's expansion project.

The water recirculation process at Sossego mine in Canaã dos Carajás, in Brazil, also presented positive numbers during the year. Read more in the case on the side.

**Efficient use of water resources** To ensure the sustainability of the Itacaiúnas River basin in the Brazilian state of Pará, the Vale Technology Institute (ITV) is developing a project to create new technologies for quantitative and qualitative monitoring of water resources. Eight new automatic monitoring stations will be placed in the river basin, as a basis for developing an integrated system for the most efficient use of water resources. This will directly benefit the local population, ensuring multiple use of water, one of Vale's commitments.

With the data obtained by the systems, it will also be possible to assess the availability of water for Vale's operations, helping to avoid waste. It is expected that by the end of 2015, the system will be in operation, transmitting data in real time via satellite.



Thickeners of iron ore processing plant, in Carajás, Parauapebas (Pará), Brazil

Picture: Olegário Reis Júnior

#### Withdrawal and reuse [EN8, EN9, EN10]

In 2012, new water withdrawal at Vale was reduced by approximately 9% or 36.7 million cubic metres, and reuse was increased by 7 percentage points. This is primarily due to the sale of assets that are no longer in the reporting scope. Even when considering the same reporting scope<sup>2</sup> in 2011 and 2012, water withdrawal fell by approximately 3.5%, and reuse increased by 4 percentage points, which is consistent with the company's commitment made in 2011 to reduce new water demand.

Several factors contributed to the decline in new water demand, such as in Carajás (an area that represents approximately 5% of Vale's entire water withdrawal), where there was a 24% reduction in water withdrawal in 2012. This was a result of changes implemented in the iron ore screening process, which now uses the material's own moisture, eliminating the need to withdraw water.

Improvements in the measurement system, which permitted more accurate data reporting from units, as well as the shutdown of some production units, are other factors that contributed to this reduction. There was also an increase in rainwater collection as part of the volume of saved water, an alternative supply source. [4.24]

<sup>2</sup> To assess actual indicator performance, the following areas were not considered: CADAM, VMN (Vale Manganese Norway A S), Cubatão Domenico Rangoni, Vale Colombia, Siderúrgica Ferro Gusa and VMF (Vale Manganese France), sold in 2011; and Moatize Expansion, Vale Florestar, Biopalma and FNS (Ferrovia Norte Sul), incorporated in 2012.

#### Monitoring [EN9]

In 2012, Vale's Water Resources area continued its study to improve the network of flow meters at the main operational units that are heavy water users. It is expected that the units that already have the meters installed will show a reduction of around 5% in water use. This is because increased flow control facilitates more efficient management of water within their own facilities, identifying new ways to reuse water and reduce water demand and effluent generation.

In 2012, flow meters were installed and adjusted at Manganês do Azul operation in Pará and Itabiritos Complex in Minas Gerais. Half of planned meters were installed at Ponta da Madeira Complex in São Luís, Maranhão, and the need to install the rest of the meters will be assessed in 2013. The installation of meters at Paraopeba Complex in Minas Gerais, planned for 2012, was postponed for the following year due to budget adjustments.

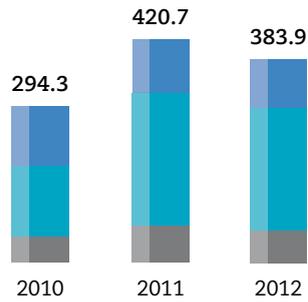
As part of another water use monitoring initiative, diagnoses were conducted at 14 of Vale Fertilizantes' operational units in 2012. Among actions suggested and planned for 2013 is a new study of the technical and financial feasibility of using reused water in the flotation process, one of the heaviest areas of water demand in the fertilizer industry. In these diagnoses, opportunities for reducing effluent generation were also assessed.

A project to revise the water balance and calculate water resource performance indicators in Thompson, Canada, was also carried out in 2012. An



## Total water withdrawn by source [EN8]

In million m<sup>3</sup>/year

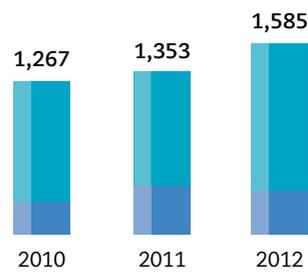


	2010	2011	2012
<b>Ground source</b>	112.3	101.0	92.6
<b>Surface source</b>	132.2	251.1	231.0
<b>Other<sup>1</sup></b>	49.8	68.6	60.3
<b>Total</b>	<b>294.3</b>	<b>420.7</b>	<b>383.9</b>

<sup>1</sup> Captured rainwater, piped water supplied by water companies and water from other organizations. Water from surface or underground surfaces withdrawn exclusively for use by third parties is also included in this category.

## Total volume of water recycled and/or reused + withdrawn water<sup>1</sup> [EN10]

In million m<sup>3</sup>/year

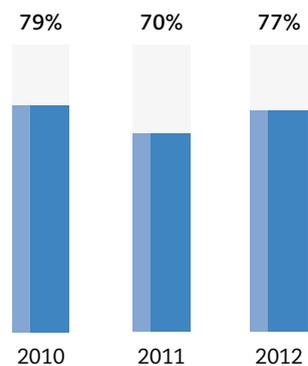


	2010	2011	2012
<b>Recycled and/or reused water</b>	998	953	1,227
<b>New water</b>	269	400	358
<b>Total</b>	<b>1,267</b>	<b>1,353</b>	<b>1,585</b>

<sup>1</sup> To calculate the percentage of recycled and/or reused water for this indicator, the total volume of water withdrawn does not include collection for third party use. Hence, the value is different from the value presented in the graph above.

## Percentage of water recycled and/or reused + withdrawn water [EN10]

In %



additional purpose of this project was to identify potential opportunities for water use optimization.

### Multiple uses of water

Local water availability studies are performed during the project development stage and updated whenever necessary, taking into consideration other users, their water demands and possible supply sources. This work helps the company plan and prioritize conservation actions and identify areas of potential conflict.

As shown on the map<sup>3</sup> of water stress on the page on the side, out of 10 Vale operations with greatest water uptake, nine are located in regions with a below average water stress risk rating. Of Vale's total operations, fewer than 10% are in areas of high to extreme risk of water stress, divided into four regions: Oman, China, Peru and New Caledonia. These operations represent 6% of Vale's total new water intake, of which 64% is seawater intake. Furthermore, the Dalian operation, in China, presents a high rate of water reuse, with 99% of demand met by water reuse.

In addition to issues relating to natural scarcity of water, there are operations located in regions where there is competition for water use due to the existence of other users. In these cases, Vale seeks to act in the River Basins committees, where water uses in

basins are discussed and prioritized. An example is the company's participation in River Basin Committees for the Paraopeba, Velhas, Doce, Piranga, Piracicaba and Santo Antônio rivers in Minas Gerais.

Underpinned by its commitment to contribute to water resource management, Vale also participates in technical discussion forums at the Brazilian National Environment Council (Conama in Portuguese) and the National Water Resources Council (CNRH), in Brazil, among other bodies. This year, for example, Vale participated in meetings of the Technical Water Board of the Brazilian Business Council for Sustainable Development (CEBDS, in Portuguese) and the Water Resource Network of the National Confederation of Industry (CNI), at which water resource management tools and performance indicators were discussed.

At these meetings, Vale contributes information and monitoring data in order to prevent conflicts, as well as anticipating measures and actions needed to ensure access to water.

Vale is attentive to global and local discussions on water and liaises with sector and government entities with the aim of participating in and anticipating regulatory changes and trends so that its internal management reflects these demands.

<sup>3</sup> Data generated using the World Resources Institute's Aqueduct tool and indicators reported in this report. [www.aqueduct.wri.org](http://www.aqueduct.wri.org)



Aerial view of Bayóvar phosphate mine, in Piura, Peru

Picture: Agência Vale



## Location of Vale's operations and water stress risk areas

# 10%

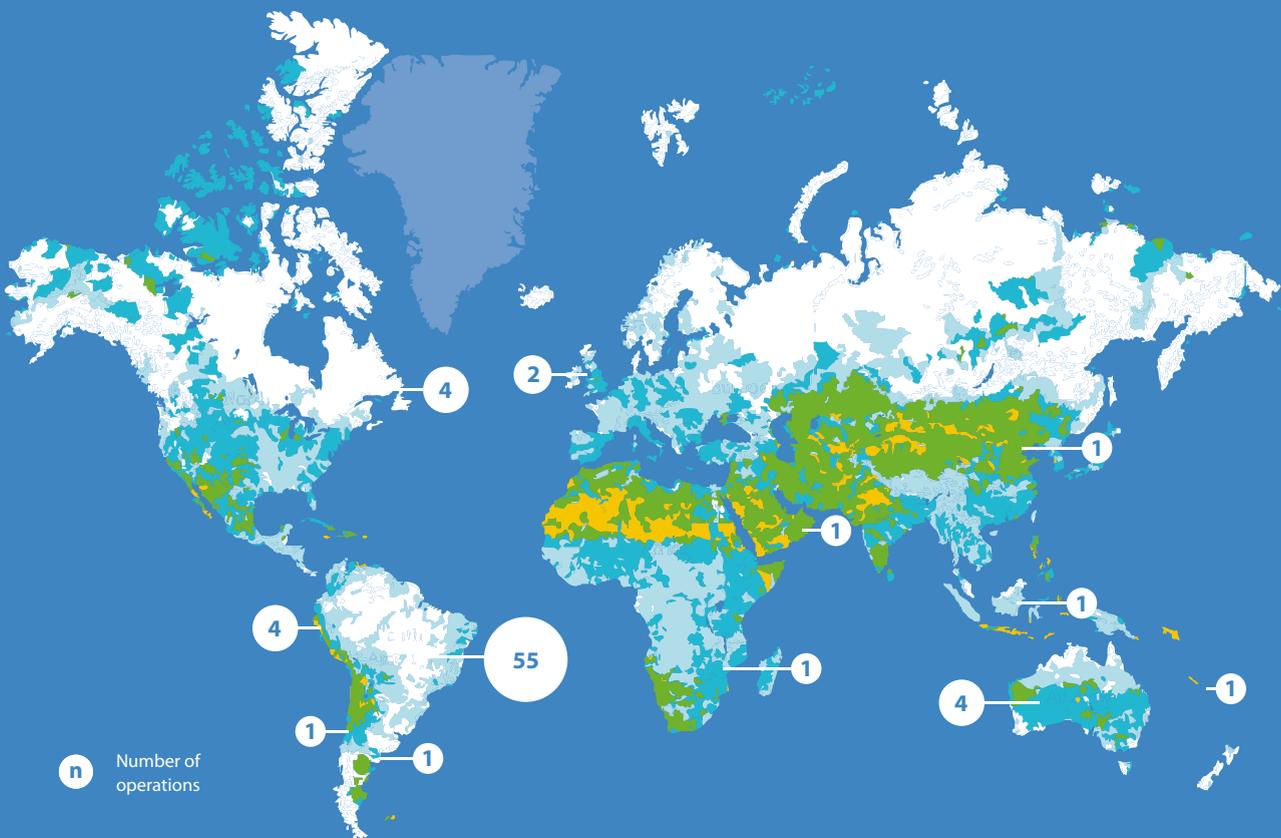
Less than 10% of Vale's operations are located in areas of high or extreme risk of water stress.



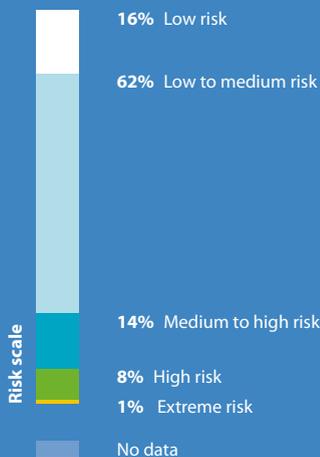
New water withdrawals in regions of high or extreme risk of water stress represent 6% of Vale's total withdrawal.



Out of the ten Vale operations with higher water withdrawal, nine are in regions classified as below medium risk.



**n** Number of operations



In Bayóvar, Peru, 64% of new water withdrawn by Vale's operations comes from the Pacific Ocean.

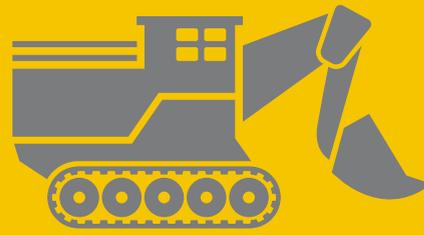
# 99%

of the water demand of Vale's operation in China is supplied by reuse water from the unit itself.



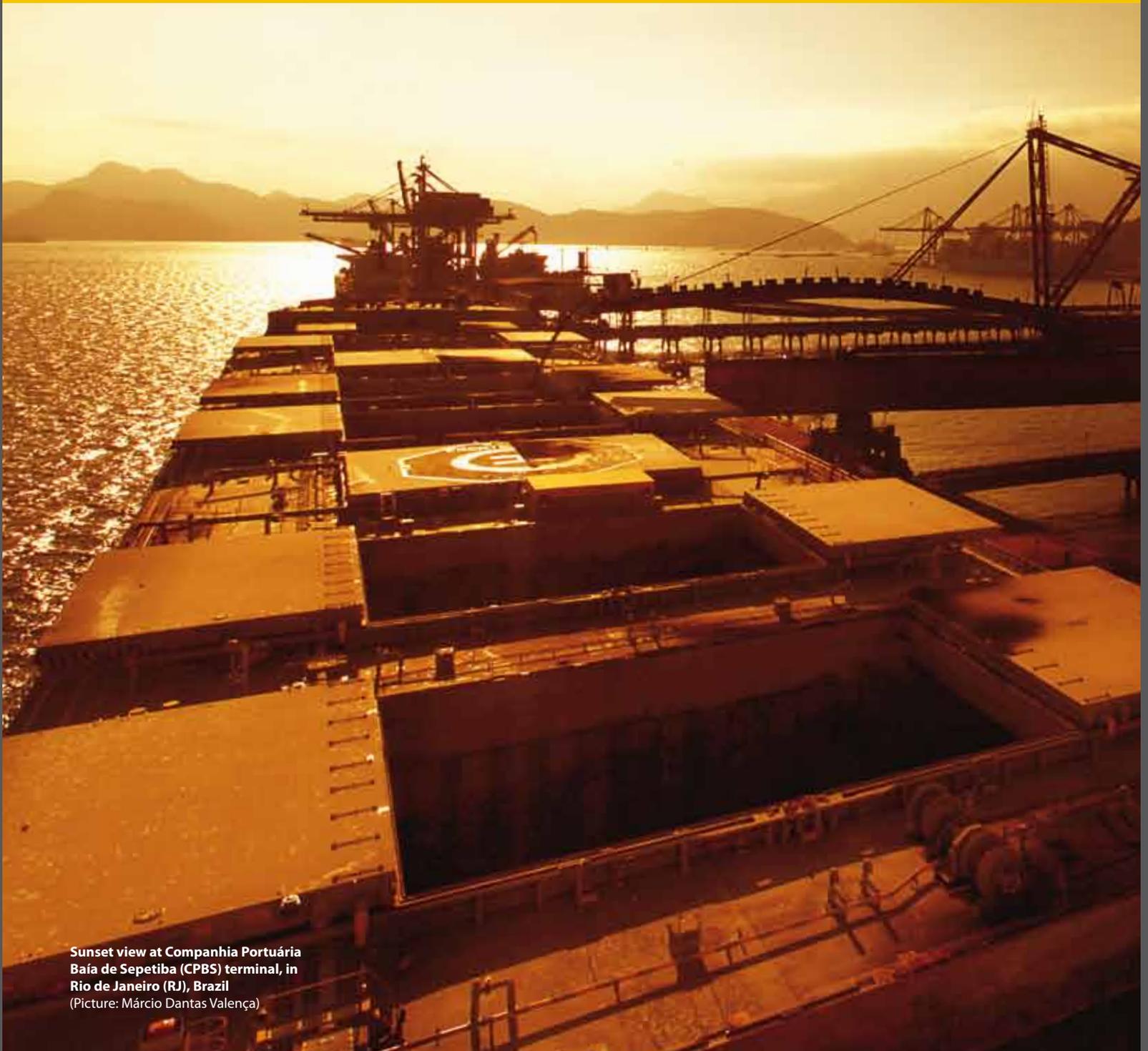
# 9,000

about nine thousand companies complied with the Supplier Code of Conduct since 2009



# 2

new projects were delivered in 2012: Salobo in Carajás, and Lubambe in Zambia



Sunset view at Companhia Portuária Baía de Sepetiba (CPBS) terminal, in Rio de Janeiro (RJ), Brazil  
(Picture: Márcio Dantas Valença)



Creating value

# Promoting sustainability in the value chain



## Creating value

# Value chain

Aware of its influence in promoting the sustainability agenda, Vale has strengthened its contractual commitments with regard to sustainable development, including guidelines for human rights, in particular to prevent infringements of such rights in the value chain.

Vale is also committed to maintaining transparent dialogue with its entire production chain and establishing relationships with entities that share the company's principles and values. An example of this was the mobilization of major actors to find solutions for issues related to the pig iron chain.

Vale has remained faithful to its commitment to develop its suppliers in the regions where it operates. In this context, the company seeks to give more autonomy to its business areas and foster local purchases. The Inove program has benefited 532 companies through classroom and distance training courses since 2008, and has awarded US\$613.8 million in funding and credits. Through these efforts, Vale expects to strengthen local development.

### **Pig Iron** [PI4.17]

In 2012, through an engagement process to promote the sustainability agenda in the value chain, Vale supported the Charcoal Sustainability Protocol, created by steel companies under the auspices of the Brazilian Steel Institute (IABR).

This protocol aims to raise awareness in the supply chain about the importance of sustainable charcoal production, aiming at eliminating practices and activities that violate labour rights or cause damage to the environment. The document's commitments also

include working with the government to develop a social and environmental awareness program with charcoal suppliers and maintaining business relationships only with companies that meet all legal environmental requirements. Through this step, Vale has reinforced its commitment to mobilize major actors in finding solutions to issues in the pig iron chain.

The first stage of the program developed by IABR is the creation of a certification standard for the Protocol commitments to be met. This instrument will allow the market itself to purchase products only from companies that join the Sustainability Program proposed by the Protocol. The Program of Engagement and Assessment in the Pig Iron Chain, prepared by Vale in 2011, will serve as an input for the construction of the certification methodology.

A sustainability bonus for companies that use more than 80% of coal from self-owned forests was maintained by Vale in 2012.

The processes of selecting and registering Vale's suppliers are performed in compliance with the requirements in its Human Rights and Sustainable Development policies.



Vale Italia ship in port Rotterdam, the Netherlands.

Picture: Jan Paul Mioulet

### Promotion of the sustainability agenda

[PI4.17, HR1, HR2, HR6, HR7]

Vale's supplier relationship management encompasses three stages: qualification, based on the company's values; evaluation of compliance with legal and contractual obligations; and monitoring of companies' development and financial health.

Since 2009, when the Suppliers' Code of Conduct (available at [www.vale.com](http://www.vale.com)) became mandatory for the registration of all new suppliers in Vale's database, more than 9,000 companies have undertaken to comply with this document. The objective is to have 100% compliance among active suppliers in 2014. In addition, a sustainability clause in line with the Suppliers' Code of Conduct, Vale's Sustainable Development Policy and Human Rights Policy has been used in draft contracts with suppliers in Brazil since 2010. There is an ongoing review process to include this aspect in contracts with suppliers outside Brazil.

Selection and registration processes are guided by compliance with legal, fiscal, tax, health, safety and environmental criteria. Records are updated by periodically checking compliance with these requirements. Accordingly, promoting respect for human rights in the value chain includes the use of contractual clauses and legal compliance

Vale believes that it must contribute to human rights awareness raising and promotion actions, even in places where its influence is minor.



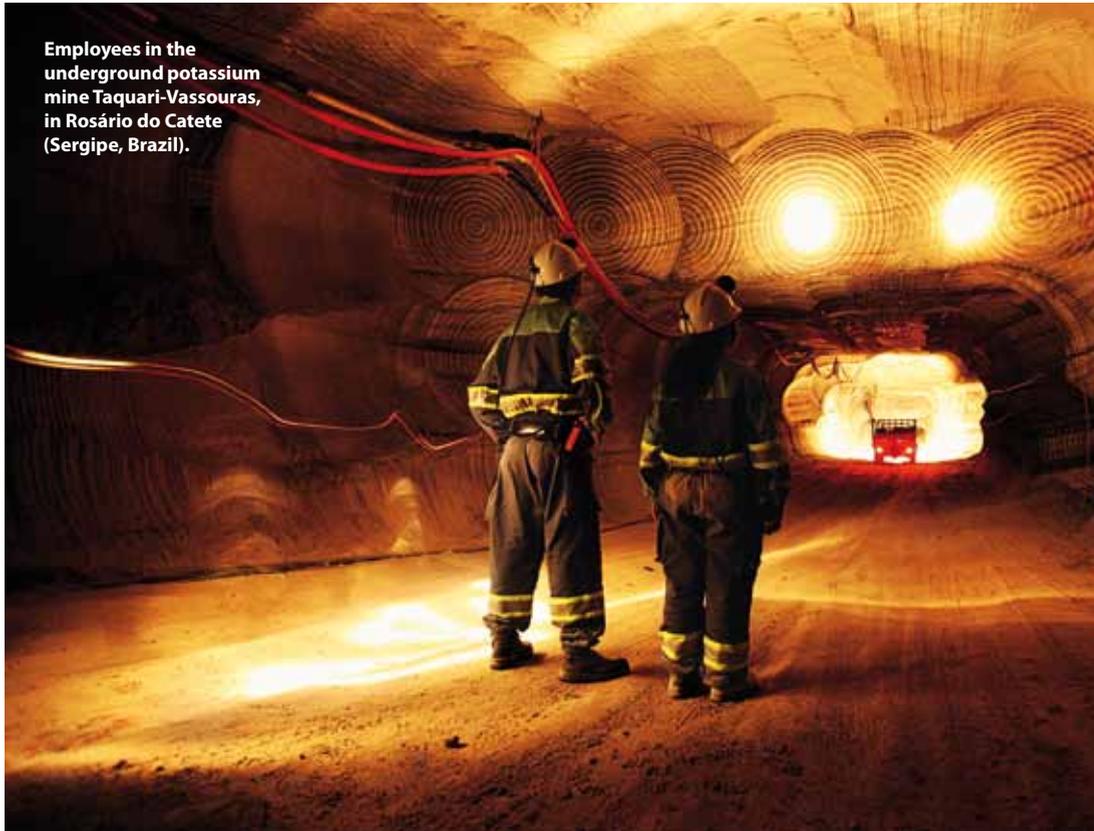
documentation. Furthermore, in Brazil, all company document data are checked to ensure they do not have environmental and/or labour problems.

The company maintains a monitoring mechanism based on the list published by the Ministry of Work and Employment that identifies cases of companies and/or individuals reported for possible occurrences of forced labour. Based on this list, Vale checks suppliers' records to ensure that none of them are involved in such issues.

In case of human rights violations – duly proved by government authorities and through instruments provided for in legislation – the supplier, partner or customer is notified and instructed to take corrective measures. If such companies fail to comply they



Employees in the underground potassium mine Taquari-Vassouras, in Rosário do Catete (Sergipe, Brazil).



Picture: Márcio Dantas



**When a micro or small supplier is qualified and accredited by a company like Vale, it is also accredited to become a supplier of other large companies too. In this way, they gain autonomy, market potential and development.**

Fábio Feijó, Supply Manager  
Rio de Janeiro, Brazil

will be subject to disciplinary measures, including termination of contracts signed between the parties, and they will be removed from the company's list of suppliers.

In 2012, besides developing a strategic risk management chart regarding human rights violations for Vale projects, work began on developing a risk assessment mechanism in this area for suppliers. The company participated in national and international forums concerning this issue, such as the working groups of the Ethos Institute, the International

Council on Mining and Metals (ICMM), the Global Business Initiative (GBI), BSR and the United Nations Working Group (UNWG).

Vale's units in Brazil have 117 contracts with suppliers of products and services that are critical<sup>1</sup> in matters related to human rights, and none of these suppliers have been found to have committed violations of such rights. Of this total, only suppliers with contracts in effect at the end of 2012 were taken into account, and not occasional suppliers.

With regard to child labour, exposure of young people to hazardous work and incidents of forced labour or slave-like labour, internal risk at Vale sites may be considered non-existent.

The company conducts specific monitoring of areas and sectors in its value chain with the greatest criticality and involvement in terms of human rights violation, and it is developing tools to help manage such issues.

At all its units, Vale only employs its own employees and contractors with contracts governed by

<sup>1</sup> Suppliers that conduct activities related to business security and the supply of timber, charcoal and pig iron.





## Commitment

Promote the sustainability agenda between suppliers and customers

Develop suppliers where Vale operates



## Results

Reinforcement of the contractual commitments on sustainable development

More autonomy to the business areas and support to local purchase

the Consolidated Labour Laws (CLT in Portuguese), which are very strict in this field. Furthermore, it requires that the whole supply chain (suppliers and customers) respect Convention 138 of the International Labour Organization (ILO), which addresses the minimum age for entering employment.

In addition, since 2008, the company has included clauses in contracts with its customers in Brazil allowing it to terminate iron ore supply contracts if there is evidence of non-compliance with obligations relating to environmental protection and the non-use of child and/or slave labour.

In relation to mergers and acquisitions<sup>2</sup>, social aspects are of the utmost importance to strategic decision making, considering possible risks and social impacts. Commitment to human rights is one of the topics assessed.

In the area of health and safety, and with the aim of creating a program to engage its leading suppliers in construction, assembly and project management, Vale created the Supplier Zero Harm program in 2011.

As part of the program, 60 companies working on Vale's betterment and capital projects were involved through collaborative workshops. At the first meeting, 12 initiatives for capital projects that could contribute to achieving zero harm were selected out of more than 200 different suggestions. In the second stage of the workshop, Vale's Health and Safety area selected a number of actions undertaken by companies to present to the group. These actions focused on implementing the 12 initiatives.

Since then, Vale has been tracking and monitoring the actions undertaken by the participating suppliers. By the end of 2012, 96% of these actions had been completed or were in progress. An example of an initiative arising from the workshop is a tool for sharing lessons learned and best practices among suppliers.

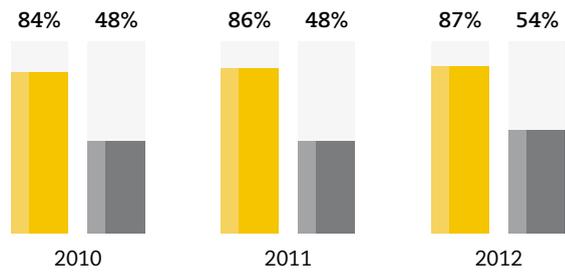
For betterment projects, twelve initiatives were also prioritized. These will be validated and monitored over the course of 2013 by the Health and Safety area together with the Procurement area.

As part of its commitment to reducing its impact on climate change and creating long-term value, Vale

<sup>2</sup> In 2012, there was no assessments for new merger and acquisition processes.

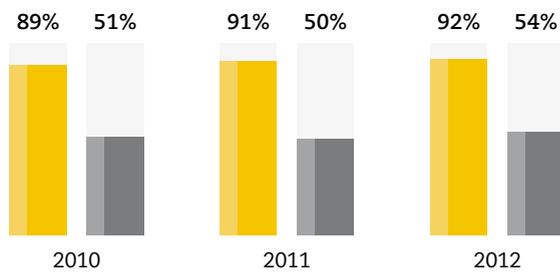


## Percentage of local purchasing in monetary terms - Global results [EC6]



	2010	2011	2012
Average percentage of purchases in the countries	84%	86%	87%
Average percentage of purchases in the state/region of countries	48%	48%	54%

## Percentage of local purchasing in monetary terms - Brazil [EC6]



	2010	2011	2012
Average percentage of purchases in Brazil	89%	91%	92%
Average percentage of purchases in main states <sup>1</sup>	51%	50%	54%

<sup>1</sup> The average percentage of purchases made in states considers acquisitions by major operations in Espírito Santo, Maranhão, Minas Gerais and Pará.

Suppliers play a key role in fulfilling Vale's mission of transforming natural resources into prosperity and sustainable development.

has developed the Greenhouse Gas Emissions Management program in the Value Chain. To engage its suppliers in this effort, Vale provides training to help companies establish their emission inventories and find new ways of enhancing their emissions management and improving any practices that they already undertake.

This initiative is part of the Vale Carbon Program, which is governed by the company's Global Climate Change Mitigation and Adaptation Policy, including different preventive actions for global warming. [Contracts between Vale and its suppliers already include a voluntary clause concerning the establishment of a greenhouse gas inventory. Read more in Climate Change in page 77. \[5.01\]](#)

### Development of local suppliers [EC6]

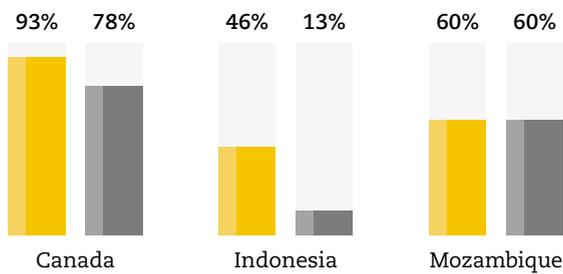
Vale is committed to developing local suppliers in order to boost the economies of the regions where it operates and to qualify and encourage companies to operate in an increasingly competitive market.

In late 2012, aligned with its strategic plan, Vale began a process of integrating service provision activities with its business areas, including, among other Procurement activities, those previously performed by the Shared Services Organization. At the same time, the Procurement area began to redesign processes, including structuring certain purchasing solutions, providing its internal clients with more autonomy and encouraging local purchases. The aim of this initiative is to increase the speed and flexibility of purchasing and contracting processes.

One of Vale's initiatives to strengthen its supply chain is its Local Content Program, known as Inove, which aims to develop local suppliers through training, credit lines and business incentives. Since its creation in 2008, it has awarded around US\$613.8 million in funding and loans, while 532 companies have participated in classroom and distance learning initiatives.

## Percentage of local purchasing in monetary terms - Other countries [EC6]

(2012)



	2010	2011	2012
Average percentage of purchases in the country	93%	46%	60%
Average percentage of purchases in the provinces/states	78%	13%	60%

### Case

## Fuel helps produce more with less

As part of its strategy to seek economic and sustainable solutions for its demand for fuel, Vale began negotiations in 2012 with BR Distribuidora to purchase green petroleum coke in order to replace anthracite at the Vargem Grande pelletizing unit in Minas Gerais, Brazil, which started to operate using this fuel in 2013. This will bring economic and environmental benefits.

Green petroleum coke is a solid fuel, resulting from the process of refining oil in the manufacture of products such as diesel and gasoline. Among its advantages is low sulphur concentration (1%), below the average of rate 1.6% in anthracite. Vale forecasts a reduction in emissions of greenhouse gases, to be measured in 2014. Another possible gain, which will only be proved after production testing, is a reduction in the use of natural gas in the process of burning pellets, estimated at 11%.

Due to its higher calorific power, green petroleum coke should also generate a decrease in volume required for the same level of production. Through this agreement, Vale will stop importing anthracite and will only use the Brazilian product in this operation. BR Distribuidora is Vale's current green petroleum coke supplier at its pelletizing (Fábrica) and manganese (Ouro Preto and Barbacena) units.

In 2012, in partnership with the Brazilian Service to Support Small and Micro Companies (SEBRAE), the program trained more than 500 companies, helping them to identify opportunities to enhance their management.

In 2013, Inove faces the following main challenges: to support Vale's Procurement area in operations located in other countries; to expand its scope of work to implement products and solutions in the second link in the supply chain; and to introduce local content control and assessment tools for Vale's indirect suppliers hired via major local companies.

### Supplier performance

Vale has a program for measuring the performance of its suppliers of goods and services, in order to encourage hiring those most suited to the needs of the company. Assessments are conducted quarterly, taking into account technical, health and safety and environmental aspects, as well as compliance with legal and labour obligations. Since 2012, there has also been a specific sustainability category.

Vale's Supplier Performance Index (IDF in Portuguese) covers 100% of its suppliers in Brazil and, since 2011, it has also been monitoring the performance of

companies in Mozambique, Peru, Argentina, Paraguay and Malaysia. This international rollout of the program represents the consolidation of Vale's global standard for assessing and monitoring suppliers.

The Supplier Performance Index is also used to help generate a ranking of Vale's best suppliers, which are recognized with the Value Supplier Award every year in several categories. In 2012, a new category was created, Outstanding Sustainability, to highlight companies that had the best combination of social, environmental and economic actions. The idea is to promote the observation of suppliers' practices by evaluating the quality of services hired by Vale, together with the sustainable policies and guidelines adopted and disclosed by contractors.

In 2013, Vale began a comprehensive review of the indicators and questionnaires used by the program, in an attempt to make them closer to the reality of market transformations and extending the benefits gained from their results. [\[5.02\]](#)

**Customers** [PI4.17, PR1, PR2, PR3, PR5, PR7, PR9, MM11, EN26]

Vale understands that the successful implementation of the sustainability agenda will mean long-term competitiveness. Vale's strategy to win new markets and maintain current ones is operational excellence to improve the quality of products,

strengthen long-term relationship with customers and find solutions that meet its business needs, in order to minimize negative impacts and maximize value. The same approach is adopted in relation to different links in the value chain, such as suppliers of raw materials and service providers.

Vale's businesses are conducted primarily with other businesses (business to business), and not with final consumers (business to consumer). To assess product delivery and performance, Vale conducts technical visits, meetings, interviews, conference calls, trade shows, exhibitions, call centres, technical assistance and customer satisfaction surveys – actions that predominates in Vale's relations with its customers and other stakeholders. These mechanisms generally involve teams from commercial areas, such as Marketing, Research, Planning and Development, depending on the business. In the case of Vale Fertilizantes, for example, its products may be evaluated at any time via the company's website.

It is important to remember that to meet the specific needs and characteristics of each market segment, the mechanisms, methodology, frequency, and approach vary across business areas. [\[5.03\]](#)

Life Cycle Analysis (LCA) is another tool used by Vale to produce significant gains in the eco-efficiency of its

More than a tool to manage contracts, the Supplier Performance Index is a powerful tool for the efficient management of supplies and relationships with suppliers.

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Employee on the premises of Bayóvar phosphate mine in Piura, Peru

Picture: Agência Vale



Reclaimer in operation,  
at Ilha Guaíba  
Terminal, in Rio de  
Janeiro (RJ), Brazil



Picture: Márcio Damias Valença

products. In this process, environmental impacts are determined, especially taking the following aspects into account: energy consumption, greenhouse gas (GHG) emissions, water consumption, effluent generation, toxicity and potential risks. [5.04]

In terms of customers' health and safety issues regarding the handling and use of products, Vale has standardized procedures for handling complaints. Operational units follow specific procedures for reporting and handling any non-compliance associated with quality. In this way, the causes of problems are properly identified and preventive actions are duly implemented. From an environmental and product safety point of view, any change in the composition of products requires a review of safety data sheets and reporting to customers

To ensure customer safety when using its products, Vale maintains a registration process for chemicals exported or produced in the European Community, particularly in the base metals area. Based on experience of European Community Regulation (EC 1,907/2006 Reach), Vale put in place a routine to monitor similar regulations in other parts of the world. [5.05]

Other customer relationship and support initiatives, in particular regarding the analysis of potential environmental impacts at the post-sale stage, include Technical Cooperation Agreements (TCAs), visits and consulting assignments. The systematic compilation of total greenhouse gas emissions reductions in the use and post-sale of Vale's ferrous products is hampered by the very breadth of its portfolio and, in many cases, even by information confidentiality criteria between the company and its customers.

In 2012, in terms of regulations, there were no reported cases of non-compliance or penalties related to Vale's product sponsorship, advertising and promotions, and there were no problems concerning the provision and use of its products and services.

## Creating value

# Value added

2012 was a challenging year for the global economy, which grew below its long-term trend for the second consecutive year. Nevertheless, Vale delivered two new production projects: Salobo, in Carajás, and Lubambe, in Zambia.

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A world class asset, Salobo (Brazil) is an operation of copper with gold; Lubambe (Zambia) is the first copper mine in the heart of the African copper belt, the most promising region in the world in terms of copper production growth potential.

The company also reached milestones that permitted expansion in Carajás – the richest iron ore region in the world – and the provision of logistical capacity to expand its world-class coal operations in Mozambique.

As its economical performance was adversely affected, Vale's underlying net income of non-controlling shareholders fell to US\$5.5 billion from US\$22.9 billion in 2011. The total amount distributed to shareholders as dividends and owned capital interest in 2012 was US\$6 billion. In 2012, the prices of minerals and metals fell in general, and this affected the company's revenue, which totalled US\$48.8 billion, 22% down from the previous year. This fall was caused by a destocking cycle that took place mainly due to weak global steel demand.

However, market conditions improved in the last few months of the year. Iron ore production in the fourth quarter hit a new record and there was a recovery in prices starting in mid-September 2012.

Shipments of iron ore and pellets reached a record level of 303.4 million metric tons in 2012. At the end of the year, prices rose to US\$140.75 per ton, and continued to increase in early 2013.

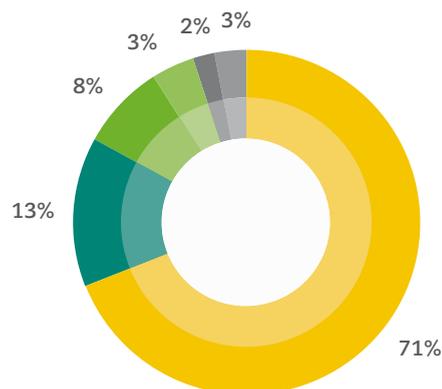
Some of Vale's projects that started up in 2010 and 2011 began growing in 2012. Ramp-ups<sup>3</sup> at the Moatize, Oman I & II and Bayóvar projects permitted record production of coal, pellets and phosphate rock. In addition, the Vale Nouvelle Calédonie (VNC) integrated operation proved to be technically feasible.

More information on Vale's results can be found at [www.vale.com](http://www.vale.com), in the Investors section, in Form 20-F.

<sup>3</sup> Most of the potential for growth and value creation will materialize in the next few years.

## Revenue by product

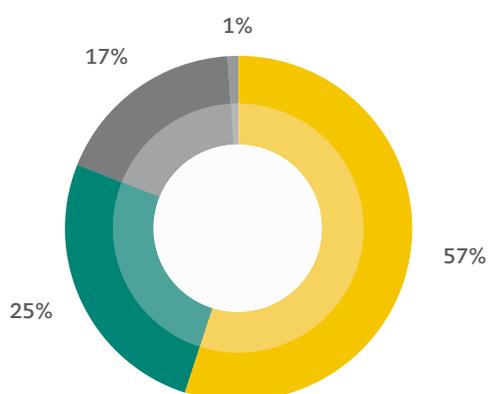
US\$ 48.8 billion (2012)



	%		%
<b>Ferrous</b>	<b>71%</b>	<b>Ferrous</b>	<b>71%</b>
Iron ore and pellets	70%	Iron ore and pellets	70%
Manganese and ferroalloys	1%	Manganese and ferroalloys	1%
<b>Base metals</b>	<b>13%</b>	<b>Base metals</b>	<b>13%</b>
Nickel	9%	Nickel	9%
Copper	4%	Copper	4%
Fertilizers	8%		
Logistics services	3%		
Coal	2%		
Others	3%		

## Revenue by destination [PI2.7]

US\$ 48.8 billion (2012)



	%		%
<b>Asia</b>	<b>57%</b>	<b>Asia</b>	<b>57%</b>
China	36%	China	36%
Middle East	2%	Middle East	2%
Rest of Asia	19%	Rest of Asia	19%
<b>Americas</b>	<b>25%</b>	<b>Americas</b>	<b>25%</b>
Brazil	19%	Brazil	19%
Rest of Americas	6%	Rest of Americas	6%
Europe	17%		
Rest of the world	1%		

## Economic value generated and distributed<sup>I</sup> [EC1,PI2.8]

US\$ Million (2012)

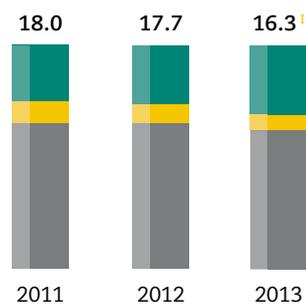
	Brazil	South America except Brazil	Canada	North America except Canada	Australia and Asia	Europe	Africa	Total
<b>Direct economic value generated</b>								
Revenues	41,316	924	4,684	–	1,693	181	536	49,154
<b>Economic value distributed</b>								
Operating costs	21,743	691	3,683	5	2,376	28	633	29,159
Employees' salaries and benefits	3,237	76	1,254	5	469	47	141	5,229
Payments to capital providers	6,275	—	—	2,139	—	—	—	8,414
Payments to the government <sup>II</sup>	3,089	235	265	(19)	262	(328)	45	3,549
Spending in the community	258	2	15	0	13	0	29	317
<b>Total</b>	<b>34,602</b>	<b>1,004</b>	<b>5,217</b>	<b>2,130</b>	<b>3,120</b>	<b>(253)</b>	<b>848</b>	<b>46,668</b>
Economic value generated minus economic value distributed	6,534	(80)	(533)	(2,130)	(1,427)	434	(312)	2,486

<sup>I</sup> The accounting standard used is that of USGAAP, with some adjustments, as established by the GRI methodology: besides gross operating revenue, revenue in the table includes financial results and those resulting from asset sales.

<sup>II</sup> The figure for payments made to North American governments (excluding Canada) was amended in 2001 to US\$11 million. Thus, the total amount of "payments to the government," in 2011, increased to US\$9,536 million and the "economic value generated minus economic value distributed" resulted in US\$9,093 million.

## Investments by type

(US\$ billion)



	2011	2012	2013
<b>Maintenance of existing operations</b>	25%	26%	31%
<b>Research and development (R&amp;D)</b>	10%	9%	6%
<b>Project execution</b>	65%	65%	62%
<b>Total</b>	<b>18.0</b>	<b>17.7</b>	<b>16.3</b>

<sup>1</sup> Estimated value of budgeted investment

## Production volume [PI2.8]

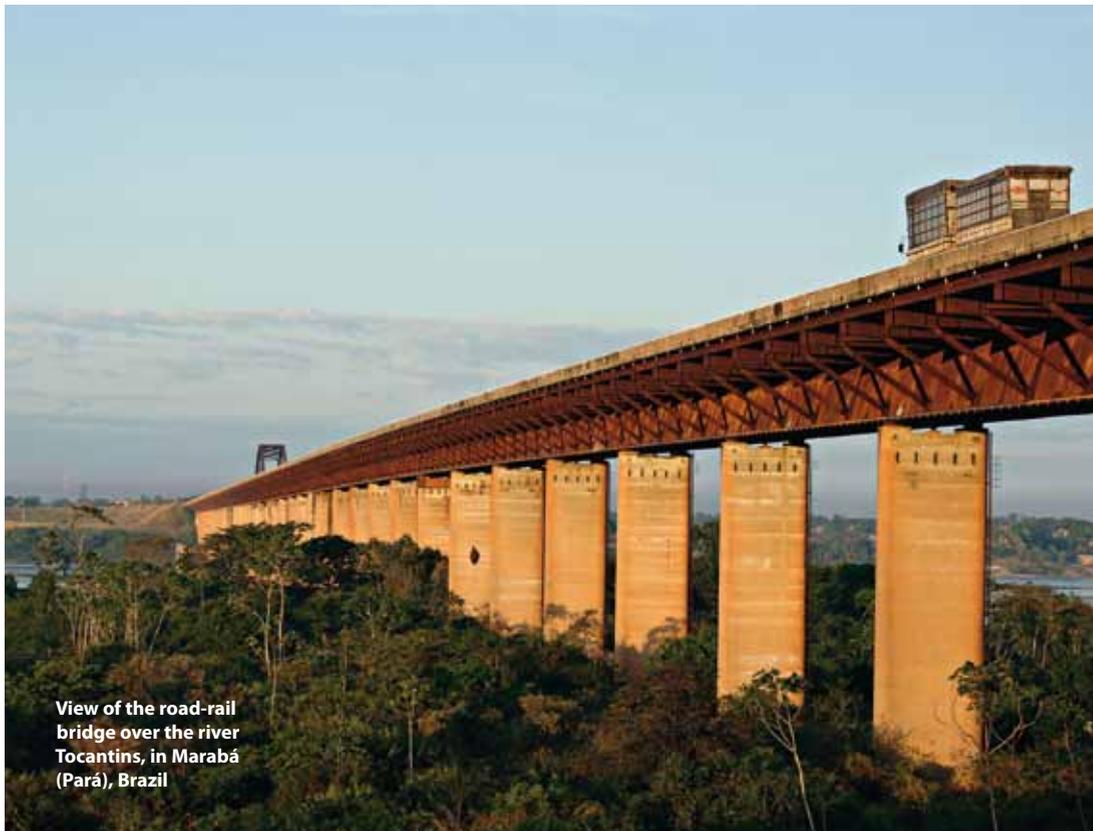
In thousand metric tons

Product	2011	2012
Iron ore <sup>1</sup>	322,632	319,960
Pellets <sup>1</sup>	53,817	55,067
Manganese ore	2,556	2,365
Ferroalloys	436	390
Metallurgical coal	2,766	5,083
Thermal coal	941	1,999
Nickel	242	237
Copper	302	292
Cobalt (metric tons)	2,675	2,343
Platinum (thousand troy ounces)	174	134
Palladium (thousand troy ounces)	248	251
Gold (thousand troy ounces)	189	165
Potash	625	549

Product	2011	2012
<b>Phosphate</b>		
Phosphate rock	7,359	7,982
Monoammonium phosphate (MAP)	823	1,201
Triple superphosphate (TSP)	811	913
Single superphosphate (SSP)	2,638	2,226
Dicalcium phosphate (DCP)	580	511
<b>Nitrogen</b>		
Ammonia	619	475
Urea	628	483
Nitric acid	468	478
Ammonium nitrate	458	490

<sup>1</sup> Volumes in 2011 have been adjusted to include figures concerning affiliates.





**View of the road-rail bridge over the river Tocantins, in Marabá (Pará), Brazil**

Picture: Rogério Reis

### Multiplying value

In 2012, Vale's investments totalled US\$17.7 billion, in line with the amount invested in 2011, but 17.2% below the budget of US\$21.4 billion. Of total investment in the period, US\$11.6 billion was allocated for project development, US\$4.6 billion for supporting existing operations and US\$1.5 billion for R&D.

The non-core assets disposal program is another element of Vale's greater focus on capital allocation. During the period, this program generated US\$1.5 billion, simplifying the company's asset portfolio and focusing management attention on issues that really matter to maximize value.

As already mentioned, two production projects were delivered in 2012: Salobo (Brazil) and Lubambe (Zambia). In early 2013, Vale suspended its Rio Colorado potash project in Argentina, because in Vale's opinion the project's present conditions were not in line with its policy of disciplined capital allocation and its commitment to creating value. The company is committed to honouring its concession-related commitments. It plans to map options for improving the project's prospects and will evaluate a subsequent resumption of the project.

Health and safety are priorities at Vale, as well as sustainability and supporting the communities where it operates. In 2012, US\$1.0 billion was spent on environmental protection and conservation, and US\$317.2 million on social programs to improve the quality of life and create opportunities for social and economic mobility.



Vale acknowledges that there is still work to be done, but believes that the results and actions presented throughout the report and given previous commitments, reveal the company's commitment to share value with its stakeholders in the regions where it operates.



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EC5 Standard entry level wage compared to local minimum wage. <sup>1</sup>	1	9	6	40



Indicator	Global Compact Principles	ICMM Principles	ISE Dimensions	Page
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EC7 Local hiring.	6	9	6	50
<b>Management Approach: Indirect economic impacts</b>	1, 4, 6–7	—	—	49
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EN3 Direct energy consumption.	8	6	5	83, 85, 86
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EN6 Eco-efficient products and services. <sup>2</sup>	—	—	—	—
EN7 Initiatives to reduce indirect energy consumption and reductions achieved. <sup>1</sup>	8–9	6	5	79
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EN9 Water sources affected by withdrawal of water. <sup>1</sup>	8	—	—	90
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Indicator	Global Compact Principles	ICMM Principles	ISE Dimensions	Page
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\* In this report.

¶ Indicators reported partially. More details in the digital file.

|| Not reported because it is non-material. More details in the digital file.



# Credits

## **General coordination**

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# Summary of the digital file

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- [2.03] research and innovation
- [2.04] Integrated risk management
- [2.05] Legal Compliance
- [2.06] Ethics
- [2.07] Human rights
- [2.08] Institutional partnerships

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- [3.03] Health and safety
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- [3.10] Fighting discrimination
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- [5.02] supplier performance
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- [6.01] GRI Summary



## [1.01] Materiality

### Identification

Identification of topics from diverse sources.

**Primary sources** – Inputs from the results of the materiality process in 2010; Interviews with senior management (21); Interviews with specialists (14); Panel of specialists; Analysis of media.

**Questions identified** – Communities; People; Health and Safety; Climate Change; Energy; Water; Land Use; Globalization; Government; Value Chain; Education; Waste; Biodiversity; Innovation; Consumer Culture.

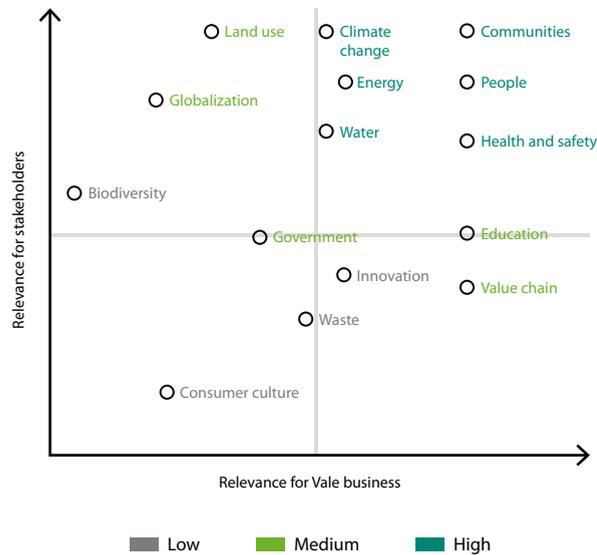
### Prioritizing topics

Consistent use of filters to identify the most material topics and prepare the materiality matrix.

**Inclusive filters** – Impact on reputation; Regulatory impact; Business continuity; Frequency of topic.

**Exclusive filters** – Alignment with business strategy.

### Materiality matrix



### Validation

Involvement of senior management and key stakeholders to validate the materiality matrix.

**Internal validation** – Involvement of Board; validation by CEO and senior management; Review by Department responsible for the sustainability agenda.

**External validation** – External opinion on Sustainability Report from specialist consultancy.

## [2.01] Dialogue mechanisms [PI4.14,PI4.15,PI4.16]

### Communications with stakeholders

#### Communication Tools

##### General public

- Vale's Sustainability Report
- Reporting Channel (described at [www.vale.com](http://www.vale.com))
- Talk to Us (available at [www.vale.com](http://www.vale.com))
- Vale websites (Global, Brazil, Canada, Australia and Malaysia)
- Reputation survey in Operating Areas and Larger Brazilian Capitals<sup>I</sup>
- Communication Campaigns
- Social Medias (Facebook, Youtube and Twitter)

##### Shareholders, debenture holders and investors

- Form 20F reports, press releases, fact sheets, announcements and minutes of General Shareholders' Meetings, quarterly financial reports and reference forms
- Visits to Vale operations
- Meetings with investors
- Email: [rio@vale.com](mailto:rio@vale.com)
- Telephone of Investor Relations Department: 55-21-3814-4540
- Reporting Channel (described at [www.vale.com](http://www.vale.com))

##### Customers

- Campaigns
- Special events
- Visits and meetings at Vale
- Satisfaction surveys
- Reporting Channel (described at [www.vale.com](http://www.vale.com))

##### Employees

- Internal publications
- Vale Brazil Intranet (Brazil, Canada and Global)
- Global Employee Survey<sup>II</sup>
- Special events, internal campaigns and direct communications
- Reporting Channel (described at [www.vale.com](http://www.vale.com))

##### Suppliers

- Visits and meetings at Vale
- Exchange programs
- Structured meetings
- Reporting Channel (described at [www.vale.com](http://www.vale.com))

#### Communication Tools

##### Communities

- Socioeconomic diagnoses
- Meetings for prior consultation
- Interviews
- Focus groups and visits to units
- Meetings with Leader Program
- External disclosure - News
- Railways hotline - channel service for users of passenger trains Vitoria-Minas Railway (EFVM) and Carajás Railway (EFC) - 0800 285 7000
- Reporting Channel (described at [www.vale.com](http://www.vale.com))
- Stakeholders Observatory
- Social dialog events
- Direct contact with DIRC staff (in person and via telephone)
- Site (Contact Us)

##### Governments and civil society

- Participation in associations and entities
- Meetings for prior consultation
- Interviews
- Reporting Channel (described in [www.vale.com](http://www.vale.com))
- Visits and meetings at Vale
- Participation in conferences, forums and debates

##### Press

- Press Room in Vale.com
- Advisors phones and contact emails (available in Press Room)
- Webcast
- In person press conferences
- Conference calls
- Face to face interviews
- Visits to Vale operations
- Visits to newsrooms
- Debates
- Press releases and notes
- Networking lunches
- Reporting Channel (described at [www.vale.com](http://www.vale.com))

<sup>I</sup> Quantitative study conducted annually by the Vox Populi Institute in Brazil.  
<sup>II</sup> Quantitative study conducted with all Vale employees worldwide.



## [2.02] Governance [PI4.1,PI4.4,PI4.5,PI4.6,PI4.8,PI4.9]

### Board of Directors

The Board sets general guidelines and policies for Vale's business, reviews plans and projects proposed by its Executive Officers, and monitors their implementation. It is composed of 11 members and alternate members, with an alternate position vacant. These are elected at general shareholders' meetings or appointed by the Board of Directors pursuant to Article 11, §10 of the Bylaws<sup>1</sup>, for a term of two years. In December 2012, the Board comprised nine directors appointed by the controlling shareholders, one independent member not associated with the controlling group and one member elected by the company's employees.

Through annual General Meetings, or Extraordinary Meetings (whenever called by the Board of Directors), minority shareholders express their opinion on matters on the agenda.

Non-controlling shareholders holding common shares that represent at least 15% of total voting capital, and preferred shares representing at least 10% of share capital, have the right to appoint one member and one alternate member to the Board of Directors.

In this event, if neither the holders of common shares or holders of preferred shares meet the limits, then they may join their shares and once the percentage reaches 10% of total capital they may jointly appoint a member and an alternate member to the Board of Directors<sup>2</sup>.

Members of the Board of Directors receive fixed-sum remuneration. The total annual sum for director's and officer's compensation is determined at the shareholder's Ordinary General Meeting, taking into account the respective responsibilities, time dedicated to work, skills, professional reputation and prevailing market values.

The Board of Directors is not subject to a formal self-assessment process. The members of the Board of Directors have recognized reputations in the areas of finance and capital markets, corporate governance, mining activities, minerals marketing, and sustainability. The Chairman of the Board, Mr. Dan Antonio Marinho Conrado, and other members of the Board of Directors hold no executive officer position at the company.

Internal audit is directly subordinated to the Board of Directors. The head of internal audit is appointed and dismissed by the Board of Directors.

### Permanent Fiscal Council

The council consists of three to five independent members (and the same number of alternate members), under Brazilian corporate law. It monitors Vale's management activities and reviews the company's financial statements, reporting its findings to the shareholders. It also performs the role of Audit Committee according to the terms of the Sarbanes-Oxley Act and the rules that regulate the listing of securities on the Hong Kong Stock Exchange. At the shareholders' Ordinary General Meeting of 2013, one member and one alternate member of the Fiscal Council were reappointed by the holders of preferred shares.

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**1** If a vacancy arises for a member or alternate member of the Board of Directors, a substitute may be appointed by the other members, to serve until the following General Meeting, when his/her election will be decided.

**2** Mr. José Mauro Mettrau Carneiro da Cunha was elected as a nominee of Valepar S.A., at the ordinary general meeting of April 17, 2013. The holders of Vale's common shares, individually or together, excluding the controlling shareholder, did not reach the necessary quorum, and holders of preferred shares, also excluding the controlling shareholder, did not nominate a candidate to represent themselves on the Board of Directors.

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None of the members of the Fiscal Council are a member of the Board of Directors or an executive officer, respecting the independence criteria determined by Brazilian legislation

**Advisory Committees**

To support the Board of Directors in conducting its activities, Vale has five advisory committees: Executive Development; Strategic; Finance; Accounting and Governance; and Sustainability. These committees are forums for discussion and their members share different views, allowing greater maturity and alignment of proposals before being submitted to the Board of Directors. The aim is to contribute to the fluidity of decision-making processes and the quality of decisions.

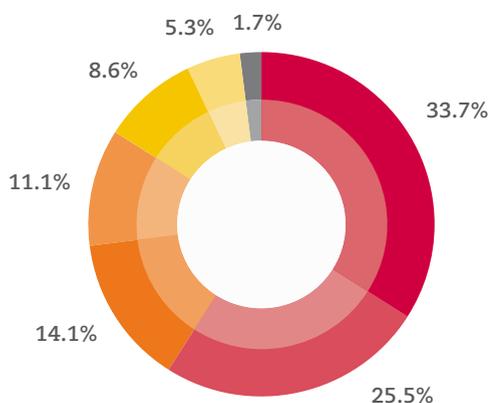
**Executive Board**

This body implements the business strategy determined by the Board of Directors, prepares plans and projects, and is responsible for the company’s operational and financial performance.

The members are appointed by the Chief Executive Officer and approved by the Board of Directors. In addition to fixed compensation, the executive officers and other company executives receive bonuses and incentive payments insofar as they meet individual and collective goals to meet the strategic results of the company, related to financial, technical/operational and sustainability indicators. These targets include health and safety and other sustainability indicators.

**Shareholding structure (April 2013)<sup>3</sup>**

**Total shares**



	%
<b>Valepar</b>	33.7%
<b>NYSE-ADR</b>	25.5%
<b>Bovespa</b>	14.1%
<b>Institutional</b>	11.1%
<b>Retail</b>	8.6%
<b>BNDESPar</b>	5.3%
<b>FMP-FGTS</b>	1.7%
<b>National Treasury</b>	12 shares <sup>1</sup>

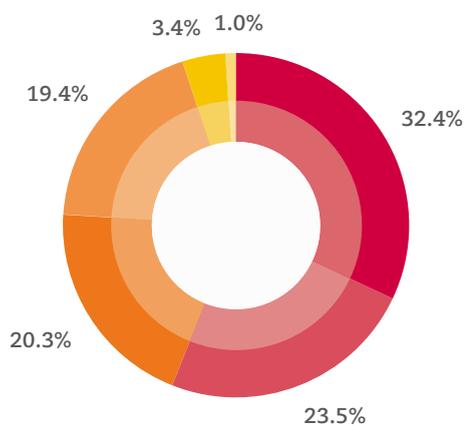
<sup>1</sup> The Brazilian government holds 12 Vale golden shares which gives it veto rights on some of the company actions.

<sup>3</sup> Does not include treasury shares. The custodian bank for the shares of the company is Banco Bradesco SA Valepar is Vale’s controlling shareholder. Valepar is a special purpose company organized in compliance with the Brazilian law, established with the sole purpose of having a stake in Vale. They are holders of common shares of Valepar: Litel Participações S.A., Eletron S.A., Bradespar S.A., Mitsui & Co., Ltd. e BNDESPar. For more information about Vale’s shareholding structure and Valepar, see the Form 20-F and the information available on the Investor section in [www.vale.com](http://www.vale.com).

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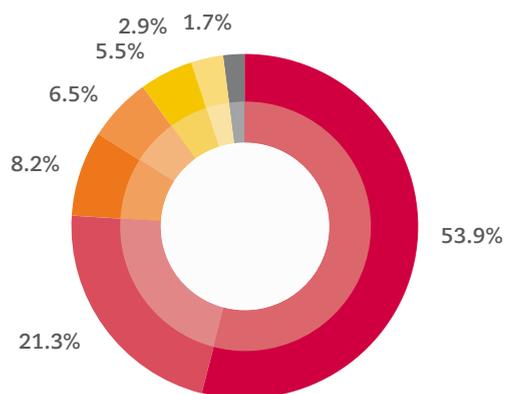
## Preferred shares



	%
<b>NYSE-ADR</b>	32.4%
<b>Bovespa</b>	23.5%
<b>Institutional</b>	20.3%
<b>Retail</b>	19.4%
<b>BNDESPar/FPS</b>	3.4%
<b>Valepar</b>	1.0%
<b>National Treasury</b>	12 shares <sup>1</sup>

<sup>1</sup> The Brazilian government holds 12 Vale golden shares which gives it veto rights on some of the company actions.

## Ordinary shares



	%
<b>Valepar</b>	53.9%
<b>NYSE-ADR</b>	21.3%
<b>Bovespa</b>	8.2%
<b>BNDESPar</b>	6.5%
<b>Institutional</b>	5.5%
<b>FMP - FGTS</b>	2.9%
<b>Retail</b>	1.7%

## [2.03] Research and innovation

### Vale research initiatives

#### Mineral Development Center (CDM)

With process laboratories, pilot plants, and chemical and mineralogical laboratories, the Mineral Development Center (CDM, in Portuguese) is considered the most sophisticated and complete laboratory complex for research and development in the mineral area in Latin America, and one of the most modern mineral technology development centers in the world. It was the first of its kind to receive the ISO 14001 environmental certification and the first Vale research center in Brazil to receive the ISO 17025 certification.

The activities related to the development of process routes for Vale's new mining projects generated through exploitation, have been conducted at the CDM for over 40 years.

#### Ferrous Metals Technology Centre

Vale is committed to creating solutions in iron ore and coal to the market and establishing with customers relationship based on trust through research and development (R&D) initiatives that result in innovative alternatives to needs that arise. The Ferrous Metals Technology Centre (CTF) has a key role in this strategy.

Located in an area rich in wildlife and vegetation in Nova Lima (Minas Gerais), the CTF (in Portuguese) has laboratories with the latest scientific and technological resources, which serve 30 researchers and 60 technicians and administrative professionals. The centre conducts studies to understand the essence of iron ore and coal, establish cause and effect relations in their different characteristics and performance of these products in the reactors of customer steel mills.

At the centre it is also possible to study the whole use chain of iron ore and coal, from the mine to steel, in order to add maximum value to Vale's products, an approach that aims at creating value propositions for Vale and its customers.

The CTF has eight buildings, which are situated in the administrative areas, pilot plants of Agglomeration, Coking and Ore Treatment and laboratories for Sample Preparation, Characterization of Materials, Properties at High Temperatures, Metallurgical Testing, Processing of Minerals, Coal and Coke, Chemical Analysis and Metrology. They have the latest equipment, such as softening and melting furnace, which verifies the behavior of the metallic charge in the inner region of the furnace.

Another rare equipment is the Mössbauer spectrometer, used to characterize the different types of iron ore in its composition. A portable prototype, similar to the one available on the CTF, was sent to Mars by NASA to study the planet's soil.

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## [2.04] Integrated risk management [PI1.2]

Vale's Corporate Risk Management Policy requires consolidated measurement and monitoring of risks, in order to guarantee that total risk levels remain aligned with the principles defined by the Board of Directors and the Executive Board.

The Risk Management Executive Committee is responsible for supporting the Executive Board in risk analysis and issuing risk assessments, as well as supervising and reviewing the principles and instruments for managing corporate risk. Vale's risk management procedures are guided by the principles of the ISO 31000 standard.

There is a routine for this monitoring. The main risks and their respective controls are analyzed and action plans are monitored quarterly by the Executive Risk Committee and are at least once a year presented to the board by the executive officers.

In 2012, 460 action plans were completed and other 756 are in progress. 467 major risk events were identified, analyzed and treated.

Vale's risk management is divided into two major groups. One of them is the analysis and evaluation of risks associated with business goals, a broad, multidisciplinary vision known as Enterprise Risk Management (ERM). In the other group, techniques for risk analysis are more specific, in order to be comprehensive and identify, in detail, potential risk situations.

In all cases, risk management should be based on information that periodically and systematically portrays risks and allows, through effective action, them to be minimized when possible or at least kept stable. For this reason, processes run seamlessly, with a clear definition of roles and responsibilities.

The company's approach to risk management is divided into four dimensions:

- **Market:** assessing the impact of the volatility of risk factors such as interest rates, exchange rates and commodity prices, on cash flow;
- **Credit:** reviews the possibility of default of obligations undertaken by counterparties (customers, financial institutions and suppliers, among others) with Vale;
- **Operational:** includes the evaluation of the risk of potential losses resulting from failures or shortcomings in internal processes, people, systems and/or external events. Events may occur in operations, projects and corporate processes and may result in damage to people, the environment, property, society and the company's reputation;

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- **Projects:** focused on the integrated analysis of the risks of capital projects, identifying, quantifying and managing the impact of risks on the investment, the length and security of the project, as well as assessing risks that could compromise the operational performance of new facilities.

### **Precautionary Principle**

The development and implementation of Vale's Global Sustainability Policy relies on the application of the Precautionary Principle when conducting risk management feasibility studies, seeking to address the issues relevant to all stakeholders, as well as business aspects, through the prior identification, analysis and minimization of corporate risks, including, not limited to, financial, health and safety risks for all employees, contractors, neighbouring communities and the environment.

Vale implements measures to prevent or mitigate risks. During annual strategic planning, the risks and opportunities of each business unit are identified, providing the basis for developing and updating the company's strategies in relation to corporate risks.



## [2.05] Legal compliance [508]

### Civil

Vale is cited in 69 lawsuits of no defined economic value, challenging the legality of the company's privatization process, which took place in 1997. All actions are awaiting the final judicial decision. Vale does not believe that such actions will affect the result of the privatization process or produce any negative effect for the company.

### Regulatory

In 2012, the lawsuit aimed at nullifying the legal authorization that allows Vale and other companies to operate at the coal and steel products terminals at Praia Mole, in the Brazilian state of Espírito Santo, obtained an initial decision favourable to Vale, which was confirmed at the Federal Regional Court of the 2<sup>nd</sup> Region. The final decision is pending confirmation due to special and extraordinary appeals.

### Tax

In 18 lawsuits and 6 administrative proceedings, Vale is contesting the incidence of corporate income tax and social contributions on profits earned by affiliates and subsidiaries abroad.

Vale is also contesting the collection of tax on the sales of goods and services (ICMS, in Portuguese) allegedly due in the state of Minas Gerais. The company disputes the calculation of the tax base for inter-state transfers of iron ore, through administrative proceedings filed in 2012. Due to legislative changes that significantly reduced the amounts assessed, Vale decided to settle the amounts and fines levied by the State of Minas Gerais and withdraw from administrative discussions. It should be noted that in 2012, the State of Pará filed three notices of violation, similar to the case presented in Minas Gerais. Defenses presented are awaiting trial.

The company is also contesting undue demands for CFEM (Financial Compensation for Mineral Exploration) in 135 administrative proceedings and 52 lawsuits. In 2012, Vale changed the likelihood of losing this case concerning the deduction of transportation costs from the CFEM calculation base to probable, and for this reason it decided to make the payment, including fines.

In December 2011, the Brazilian states of Minas Gerais and Pará introduced new taxes on mineral production (Mineral Resource Inspection Charge, or TRFM, in Portuguese). In 2012, these states implemented changes in legislation that resulted in a reduction in the amounts payable. Vale decided to pay the TRFM due in 2012, including fines. It is worth mentioning that the Brazilian Association of Industry (National Confederation of Industry, or CNI, in Portuguese) is at the moment contesting with the Supreme Court the constitutionality of the TRFM imposed by the states of Minas Gerais and Pará. If the claim by the CNI is successful, the company believes that the TRFM could be eliminated. In December 2012 a similar TRFM was introduced by the state of Mato Grosso do Sul, and Vale is currently evaluating the possibility of contesting it.

The dispute with the Swiss authorities in relation to granting a tax benefit to Vale's Swiss subsidiary, Vale International, was ended in 2012. Vale International will pay the additional federal taxes claimed by the Swiss federal authorities, without accrued fines.

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For more information on the cases reported above, see Vale's Form 20-F, at [www.vale.com](http://www.vale.com), in the Investors section.

### Labour

In Brazil, there are ongoing legal discussions regarding the collection of the Guarantee Fund for Length of Service (FGTS, in Portuguese) claimed by the federal government, charged on certain portions of the payroll for the period 1999 to 2003.

There are also ongoing legal discussions of fatal accidents arising from labour activities; work conditions (rest periods / temperatures) in the potash mine in Taquari Vassouras (Sergipe, Brazil); outsourcing of drilling, blasting and loading activities; and tailings dam monitoring at mines in Minas Gerais, questioned by the Justice Ministry's Labour Branch; and travel time in Carajás, discussed in a public civil proceeding filed by the Justice Ministry's Labour Branch. In the latter case, a decision has been reached and is being implemented.

The legal case involving adaptations to the Tubarão Complex in Vitória (Espírito Santo, Brazil) to comply with Regulation 10 of the Ministry of Labour and Employment, in terms of safety and electrical work, was permanently shelved cancelled.

In Australia, Broadlea coal mine was involved in a lawsuit initiated by the Department of Mines and Energy of Queensland (now the Department of Employment, Economic Development and Innovation) with regard to a work accident involving an employee. Although the result of the first trial was favourable to Vale, on appeal a retrial was ordered. However, the parties entered into an agreement to end the dispute without condemnation of the local executive manager. A small fine to cover for investigation costs was set. Fines against Vale's subsidiary were withdrawn. This agreement was approved by the Court on November 5, 2012 and the case is closed.

In another case, Integra Coal Operations and Glennies Creek Coal Management have been prosecuted over the fatality of an employee at the Integra mine in 2009. A coronial inquest was conducted in November 2012, in which no evidence against Integra Coal Operations and Glennies Creek Coal Management was found. The trial took three weeks in July and August 2013. Following the outcome of the investigation, an application was submitted to the Prosecution requesting the charges to be dropped against the companies. Such charges are still pending examination.

### Anti-competitive behaviour

There are two pending administrative cases involving logistics operations in which anti-competitive behaviour is alleged. One of these involves Companhia Portuária Baía de Sepetiba (CPBS), a Vale subsidiary, for an alleged refusal to ship third-party iron ore. The other case involves railway concessions granted directly to Vale (Vitória-Minas and Carajás railways) and to its subsidiary FCA, for alleged abusive price increases for users. Vale understands that the allegations in both cases are groundless.

### Fines on services and products

Vale seeks to comply with all standards and laws in force in the countries where it operates. In 2012, in terms of regulations, there were no reported cases of non-compliance or penalties related to Vale's products sponsorship, advertising and promotion, and there were no problems concerning the provision and use of products and services.



## [2.06] **Ethics** [PI4.8, SO2, SO3, SO4]

In its Code of Ethical Conduct, Vale states that its business activities are guided by a set of values that reflect high ethical and moral standards, seeking to ensure credibility and preserve the image of the company in the short and long term, in the markets where it regularly operates.

Ethical standards, expressed in fair and responsible actions from the social and environmental standpoint, form the basis of the business and the receptivity of the company in the market. Therefore, prioritizing an ethical management and correct behaviour patterns throughout its supply chain contribute to strengthening Vale's institutional image in the markets in which it operates.

Assessment for corruption risks is based on normative documents that include instructions and procedures governing Vale's Institutional Corporate Safety Policy. In 2012, Vale implemented a program to prevent anti-competitive acts, training managers in Brazil and abroad. In all the countries where it operates Vale has also implemented a program in compliance with the Foreign Corrupt Practices Act (FCPA) - anti-corruption legislation in the U.S.

The Corporate Security Department also seeks to develop actions in partnership with other departments, using data from these areas to identify opportunities for loss prevention and to address points detected in studies performed by the company's Internal Audit service.

### **Business units undergoing risk assessments in 2012**

- Biopalma
- Southeast Ferrous (mines/plants: Alegria, Fábrica Nova, Fazendão, Timpobepa and Cauê)
- Itabira Project
- Vargem Grande Project
- North Ferrous (Carajás: mines N4W, N4E, N5W, N5E, N5E-N and Azul)
- South Ferrous (Pico mine/plant)
- Centre-West Ferrous (Urucum mine)
- Vitória-Minas Railway
- Carajás Railway
- Ponta da Madeira Maritime Terminal
- Port of Tubarão (including General Cargo)
- Itaguaí Maritime Terminal
- Centro-Atlântica Railway
- Bayóvar (Peru)
- Vale Fertilizantes (Cajati mining and chemical complex)
- Rio Colorado Potash Project (Argentina)
- Salobo I Project
- Moatize (Mozambique)
- Nacala Project (Mozambique)
- Onça Puma
- Vale Canada (Long Harbour Project)



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## [2.07] **Human rights** [HR3]

Aimed at analyzing the process of managing social impacts and human rights in territories, the Sustainability Social Aspects Management Tool aims to evaluate annually the maturity of Vale's operation in relation to issues that are critical to mining. From the results obtained, the company develops action plans to continuously improve performance in each of these aspects.

Over 2012, Vale also supported the inclusion of the subject in different corporate areas, such as the introduction of risk management of social impacts and human rights violations in monitoring of capital projects and human rights risk assessments for suppliers.



## [2.08] Institutional partnerships [PI4.12]

### International Council on Mining and Metals (ICMM)

Vale has been a member of the ICMM since 2006 and its actions are aligned with this entity's 10 sustainability principles, as well as the commitment to reporting performance relating to these principles in line with GRI guidelines and external assurance by independent audit firms. Therefore, since the 2009 Sustainability Report, alignment with ICMM has been performed through this verification<sup>1</sup>.

Vale shares its best practices at ICMM events, permitting valuable exchange of information for the continuous improvement of its sustainability performance and management. Since October 2010, Vale participates on a working group dedicated to enhance the prevention of accidents and diseases. The initiative discusses indicators of health and safety, seeking alignment between companies in the mining sector.

Vale also contributes to discussions on climate change, with the company supporting the formulation of principles and the sector's initiatives concerning the issue, while the company's Social Responsibility Area also contributes to the ICMM's Community Development initiatives.

With regard to biodiversity, Vale adheres to the principles established by the ICMM with its participation in the Biodiversity Committee. The company follows the Good Practice Guidance for Mining and Biodiversity, published by the Council in 2006. The company reports its own case studies of best practices in documents distributed in Brazil and in international media.

In addition, since 2007 Vale has been an active member, along with other global mining companies, of a database that the ICMM manages to share best practices, called Safety, Health, Environment and Community Benchmarking (SHEC Benchmarking). This initiative facilitates and encourages the exchange of experiences in these areas using an online portal.

### United Nations Global Compact

Since 2007, Vale has based its actions on 10 core principles proposed by the United Nations Global Compact (UN), making a commitment to the International Labour Organisation (ILO)'s Declaration on Fundamental Principles and Rights at Work, the Rio Declaration on Environment and Development, and the UN Convention against Corruption<sup>2</sup>.

Since 2010, at the invitation of the UN, Vale has been a member of the group of companies making up the Global Compact LEAD platform. These companies were selected to lead in sustainability matters. The goals are to enhance the participants' commitment to leading work on the subject; achieve higher levels of performance in corporate sustainability through the implementation of the Blueprint for Corporate Sustainability Leadership; inspire other participants of the Global Compact; increase integration between the Global Compact's thematic areas; and improve collaboration between business and the UN system.

As part of this cooperation, since 2011 Vale has participated in task forces that are related to issues such as communications about corporate sustainability; defining targets and financial compensation associated with sustainability for the senior management; sustainable

<sup>1</sup> The remissive index in this report presents a correlation of Vale's performance in relation to the respective principles of the ICMM.

<sup>2</sup> The index presents a correlation between Vale's practices and performance and the Global Compact's respective principles.

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energy and engagement with indigenous populations. In these task forces, Vale discusses these topics with other participants and this collaborative approach helps companies as they look to enhance and continuously improve their practices.

In addition, Vale is also participating in the Global Compact's Brazilian Network, the Brazilian Global Compact Committee (CBPG), and the Environment Taskforce for issues related to the environment, climate change, the low carbon economy and actions to promote the green economy. Vale also forms part of "Caring for Climate," an initiative developed by the Global Compact and the United Nations Environment Program (UNEP).

### **World Economic Forum**

In 2012, Vale became a formal member of the World Economic Forum (WEF), having previously worked with the WEF in strategic forums on global challenges faced by the private sector that directly influence the sector's agenda.

As a global but also Brazilian company, Vale acknowledges its duty of transparency and participation in global dialogue to share best practices and knowledge on medium- and long-term thematic challenges. Within the context of the WEF, Vale supports the responsible mineral development initiative (RMDI) and has contributed to the expansion of this initiative. As a member of the WEF Global Agenda Council (GAC) on anti-corruption, the company also contributed to the work on anti-corruption and transparency.

### **World Business Council for Sustainable Development**

Vale is a member of the World Business Council for Sustainable Development (WBCSD), an institution founded at the 1992 Rio Earth Summit to promote sustainability issues between companies and guarantee them a participating role in discussions on the subject.

Currently, Vale participates in the new WBCSD project "From Vision 2050 to Action 2020," which aims to review the Vision 2050 document. This document, prepared by the WBCSD, aims to show ways for companies to exercise their role in the challenge for a sustainable planet, with suggestions on public policies to achieve this goal. The new document will prioritize between 15 and 20 "must haves" with which the private sector should work and develop concrete actions. Vale also interacts with the Brazilian Business Council for Sustainable Development (CEBDS, in Portuguese), the representative of the WBCSD in Brazil.

### **Vale Columbia Center on Sustainable International Investment (VCC)**

Vale is the founder and principal sponsor of Vale Columbia Center on Sustainable International Investment (VCC), a partnership between the Earth Institute and the School of Law at Columbia University, in the United States. The Vale Columbia Center on Sustainable International Investment (VCC) seeks to advance in sustainable development through partnerships with investors, governments and academia, reaffirming the essential role played by responsible investors. A forum that serves to gather actors from different spheres concerned with sustainability, the VCC acts as an "incubator" of ideas, models and projects that serve for decision making. By these means, the VCC collaborates with technical inputs and objectives in promoting policies and solutions among responsible investors, governments and civil society.

### **Rio+20**

Vale's sustainability vision was reflected in a series of practices and discussions on the topic at the United Nations Conference on Sustainable Development, Rio +20.

Vale was an official partner of the conference, encouraging discussions on the creation of a new green economy, poverty eradication and the institutional reforms necessary to review the foundations of sustainable development. The company also promoted and participated in forums and meetings, such as the Sustainable Development Forum – held by

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Vale Technology Institute, Business Action for Sustainable Development (Basd) and FIRJAN Humanity Project Forum.

At the time, events were held to engage attendees, including educational activities and a campaign, known as Environment Week, which encouraged discussions with employees about the main challenges of modern society. Another action by Vale in 2012 with regard to sustainability was investment in the recovery of mined areas and actions related to reductions in greenhouse gas emissions.

### Membership of organizations and associations

#### Global

- International Council on Mining and Metals (ICMM)
- Centre National de Recherche Technologique Nickel et Son Environnement (CNRT Nickel)
- Chambre de Commerce et d'Industrie (CCI)
- Global Business Coalition on HIV/AIDS, Tuberculosis and Malaria (GBC)
- International Emission Trading Association (IETA)
- United Nations Global Compact
- Reputation Institute
- The Nickel Institute
- World Business Council for Sustainable Development (WBCSD)
- BSR
- The World Economic Forum (WEF)

#### Regional

- Canada-Brazil CEOS Forum
- EUA-Brazil CEOS Forum
- European-Ferro Alloys Association (Euroalliages)
- European Association of Metals (Eurometaux)
- European Steel Association (Eurofer)
- Latin American Institute of Iron and Steel (Ilafa)

#### National

- Brazilian Academy of Science (ABC)
- Brazilian Association of Infrastructure and Base Industries (Abdib)
- Brazilian Port Terminals Association (ABTP)
- Brazilian Foreign Trade Association (AEB)
- Brazilian Studies Centre for International Relations (Cebri)
- National Confederation of Industry (CNI)
- Brazilian Business Council for Sustainable Development (CEBDS)
- Brazil-China Business Council (CEBC)
- Brazilian Mining Institute (Ibram)
- The Mining Association of Canada<sup>3</sup> (MAC)
- Brazilian Railway Transport Association (ANTF)
- Ethos Institute for Business and Social Responsibility
- Brazilian Foundation for Sustainable Development (FBDS)
- Minerals Council of Australia<sup>3</sup> (MCA)
- Australian Coal Association<sup>3</sup> (ACA)
- Australian Coal Association Research Program<sup>3</sup> (Acarp)

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<sup>3</sup> National Institutions in their respective countries.

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### Recognitions and awards

- One of the 100 most sustainable companies in the world, part of the Global 100 ranking produced by Canadian institution Corporate Knights. The requirements evaluated were energy use, CO2 emissions, innovation and health and safety;
- 2012 Henfil Trophy in the category Corporate Citizen, for the social initiatives developed by Vale. Through a blood donation campaign, the Rio de Janeiro Hematology State Institute (Hemorio) managed to collect a significant amount of blood bags;
- Winner of the Cannes Corporate Media & TV Awards in France with two institutional films: “Our History” and “Day to Reflect”;
- Listed on the Corporate Sustainability Index (Índice de Sustentabilidade Empresarial, or ISE) of the São Paulo Stock Exchange (Bovespa) for the third consecutive year, in 2013;
- Highest transparency score in the evaluation of a Carbon Disclosure Project (CDP) questionnaire taken by Latin American companies;
- Participant in the Efficient Carbon Index (ICO2), developed by the Bovespa and BNDES, the Brazilian development bank, which aims to attract investors who believe that companies with world-class management of the risks and opportunities associated with carbon will have the best financial performance in the future;
- One of the four most sustainable global mining companies, according to the Goldman Sachs GS-Sustain report, in accordance with aspects such as return on capital, industrial issues and sustainability;
- Brazil-United States Chamber of Commerce (AmCham) - Award Category: Greenhouse Gases;
- Sport Corporate Friend Award, granted by the Sports Ministry. First place in the national category as Best Friend of Sport and Elite Sport, and third place in the national category as Best Friend of Educational Sport. In the regional categories, the company won first place as Best Friend of Sport in the states of Espírito Santo, Maranhão and Pará, and second place in Minas Gerais and Rio de Janeiro;
- Winner of Award for Best Press Communication among Mining Companies in 2012, granted by the Negócios da Comunicação magazine;
- Transparency Trophy, awarded to the 20 most transparent Brazilian companies in 2012, in the category of public companies with revenues exceeding US\$2.6 billion. One of the items analyzed was clarity of financial statements;
- Best Metals and Mining Company and Best Company in Water Management during an event organized by the Sustainable Business Forum in Indonesia. The company has developed processes to enable better water use in operations such as the modernization of infrastructure systems, preventing losses and reducing the consumption of water and energy.
- Neide Castanha Award granted by the Brazilian Presidency Human rights Department, in the category Social Responsibility

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3 National Institutions in the respective countries.



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## [3.01] **Commitment to people** [PI4.17]

### **10 Structuring actions arising from the 2011 global employee survey**

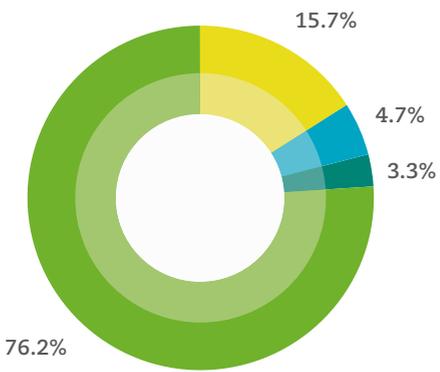
- Clear definition of policies and career and succession practices (including technical career);
- Management development focused on People Management;
- Cultural Transformation;
- Corporate planning and prioritization;
- Clarification of roles and responsibilities in areas and restructuring of support functions;
- Creation of mechanism for setting results-oriented cross-cutting targets;
- Establishment of standards of physical working conditions in operational areas;
- Creation of institutional guidelines and campaigns to encourage work-life balance;
- Publication of complaint channels and actions taken;
- Employee Recognition Program.



[3.02] **Vale's people – key figures** [LA1]

**Employees by category**

(2012)



Category	%
Operational technicians	76.2%
Specialists	15.7%
Supervisors	4.7%
Leadership <sup>1</sup>	3.3%

<sup>1</sup> Leadership category includes supervisors, general managers, directors and executive directors.

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## [3.03] **Health and safety** [LA7]

### **Systemic requirements of Vale's SGSS management system**

- Health and Safety Leadership
- Information in Health and Safety and Legal Requirements
- Analysis and Management of Risks and Changes
- Health and Safety Planning
- Health and Safety Behavioural Development and Training
- Management of Contractors
- Communication and Consultation
- Operational Control
- Design and Implementation of Facilities and Processes
- Maintaining the Integrity of Facilities and Equipment
- Emergency Preparation and Response
- Investigating Accidents and Treating Deviations
- Monitoring, Audits, Inspection and Reviews



[3.04] **Integrated health strategy** [PI4.17, LA8]

**Health and safety initiatives for employees, family members and communities**

Education/Training	Advice	Risk prevention /Control	Medical treatment
<b>Employees</b>			
<ul style="list-style-type: none"> <li>– Workshops for managers and employees on substance abuse and drug addiction;</li> <li>– Lectures and training on gender equity;</li> <li>– Cancer and diabetes prevention campaigns;</li> <li>– HIV/AIDS transmission prevention campaigns;</li> <li>– Support groups for people with Diabetes, hypertension and cardiovascular risks;</li> <li>– Lectures about quality of life and health promotion</li> <li>– Training on prevention of malaria, hearing loss due to noise; and various issues related to ergonomics.</li> </ul>	<ul style="list-style-type: none"> <li>– Employee Assistance Program offers guidance on many issues, including legal, financial, interpersonal advice, advice on use of medicines and psychosocial disorders and other diseases;</li> <li>– Travel advice for employees on international assignments.</li> </ul>	<ul style="list-style-type: none"> <li>– Controls primary, secondary and tertiary malaria;</li> <li>– Inspections to control dengue and yellow fever;</li> <li>– Actions aimed at health promotion (such as prevention and treatment of chemical dependency and fatigue and improved quality of life) and ergonomics;</li> <li>– Routine vaccinations, such as flu HPV and other recommended, according to the destination, while traveling.</li> </ul>	<ul style="list-style-type: none"> <li>– Clinics, first aid posts/stations and medical facilities.</li> </ul>
<b>Families</b>			
<ul style="list-style-type: none"> <li>– Campaigns to prevent cancer and diabetes; support group for diabetics, people with hypertension and cardiovascular risks;</li> <li>– Prevention campaigns for HIV/AIDS and malaria;</li> <li>– Lectures on substance abuse and addiction.</li> </ul>	<ul style="list-style-type: none"> <li>– Legal, financial and psychological advice on different health and family issues;</li> <li>– Monitoring social assistance to families of employees with psychiatric and substance users.</li> </ul>	<ul style="list-style-type: none"> <li>– Various vaccinations;</li> <li>– Inspections to prevent dengue, yellow fever and malaria.</li> </ul>	<ul style="list-style-type: none"> <li>– Medical facilities.</li> </ul>
<b>Communities</b>			
<ul style="list-style-type: none"> <li>– Malaria, dengue and yellow fever prevention campaigns;</li> <li>– Vale foundation has also a Healthcare Program in the state of Maranhão, Brazil, which is focusing on improving mothers' and infants' health by training health professionals (nurses, health workers, etc.) and related professionals like (educators and community leaders) in synergy with local public services and activities of organized civil society and higher education institutions;</li> <li>– Prevention campaigns against HIV/AIDS and other sexually transmitted.</li> </ul>	—	<ul style="list-style-type: none"> <li>– Sexual education program (Vale Youth - developed by Vale Foundation) focused on sexual guidance and actions to prevent STDs.</li> </ul>	—

**Global Safety and Health data collection**

In 2012, Vale implemented a tool for collecting global data on occupational disease epidemic surveillance. The company began monthly monitoring of new cases of occupational diseases and lost time caused by occupational diseases and welfare cares. This made it possible to identify rates of medical and occupational absenteeism at the company throughout the year.

Based on these data, it will be possible to identify areas that require more attention, provide support and adjust local conditions in order to improve health and employee performance.

In this first year of implementing the tool, the focus is on guaranteeing the scope and reliability of the reported data. The next step is to identify the main diseases affecting workers in order to take targeted actions to mitigate the problems.

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### Global technical groups

In 2012, Vale instituted Global Technical Work Groups with representatives of business operations worldwide. The objective is to discuss Health and Safety models in each country, respecting its laws while preserving Vale's standards, in addition to sharing the main incidents registered in different countries, lessons learned and best practices implemented.

### Revision of guidelines for capital projects

The sixth revised version of the Health and Safety Management Manual for Capital Projects was released in 2012. The manual aims to establish a health and safety management model for Vale's capital projects in compliance with Health and Safety Systemic Requirements. It is up to the areas involved to broaden the scope according to the reality and characteristics of each project, seeking to meet Vale's guidelines and policies on Health and Safety issues.

The manual applies to all of Vale's capital projects and sets out the conditions to be adopted in the projects where Vale is responsible for the entire life cycle, or those where, through shareholders' agreements, the company is responsible for managing health and safety. Service providers must meet all requirements set forth in this document.

Vale conducts audits in projects outside Brazil to make sure that new units are meeting all legal requirements. The ultimate goal is for all employees and contractors to fully incorporate the company's health and safety values.

### Global Workshop on Malaria Control

A total of 25 Vale representatives from five countries, including doctors and health and safety managers from Exploration, Capital Projects and Operation areas, met in June in Maputo, Mozambique, to develop a corporate strategy for malaria control and to validate guidelines on the subject.

Malaria is endemic in 104 countries, with an estimated 219 million cases and 660,000 deaths each year<sup>1</sup>. In 2012, there were 1,439 cases of malaria among Vale's employees and contractors.

Informative materials on the Malaria Prevention Campaign and Traveler's Passport were released and distributed in four languages during the event, besides a "Malaria Alert Card." A Malaria Prevention Manual and regulatory documents for the management of Malaria Control were developed from the material presented at the meeting by health and safety teams in endemic areas.

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<sup>1</sup> 2012 data from the World Health Organization (WHO).



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## [3.05] Health and safety initiatives receive award

The “Chemical Dependency Prevention and Treatment Program in Mining” implemented at Vale’s Itabira, Central Mines and Mariana mining complexes – , has structured actions and a focus on preventing and properly treating chemical dependency. In addition to preventive and communication actions, such as talks and guidance material, the initiative trained a multidisciplinary team and managers for the early identification of cases and to support the treatment of dependent people.

The “Travelers’ Health: Vale’s Journey” action is aimed at tailoring the company’s corporate standard on traveler’s health management to the different characteristics of the regions where Vale operates. In 2012 Vale published its Global Traveler’s Health Management Instructions. The document establishes a systematic practice to identify, assess, control, prevent and minimize hazards and risks related to travel, besides providing guidelines for the development and implementation of local travelers’ health management plans. The document was created due to the increasing number of employees traveling to high-risk areas for endemic diseases with high potential severity.

In the Occupational Hygiene category, Vale won first place for an initiative called “Biohazards in Occupational Health Units.” Qualitative and quantitative assessments were performed concerning the biological risks faced by Occupational Health outpatients at the company’s Central Mines Complex. The purpose of the study is to mitigate health workers’ exposure to these risks and support the decisions of the Occupational Health Medical Control Program (PCMSO in Portuguese).



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## [3.06] Emergency response plan

The three main tools used by Vale in responding to emergencies are the Environmental Management Standard, Health and Safety Management System and Health, Safety and Environmental Risk Analysis and Management Instructions.

Based on these tools, at least every three years (or whenever there is a significant process change), Vale reviews its Emergency Plans, its Mutual Aid Plans (in case the emergency involves neighbouring companies), and the Individual Assistance Plan (in case of spills in the sea). The goal is to define emergency scenarios and ranges of consequences/severity more accurately, allowing a rationalization of resource allocation and procedures specific to each location and scenario.

The company has a range of procedures for emergencies at its units, such as Emergency Plans, Railway Occurrence Response Regulations, a Crisis Management Manual and Basic Risk Guidelines and Environmental Management System Standard, with general guidelines and criteria for responses to environmental emergencies.

In 2012, Vale's South Ferrous Department was recognized by the US National Safety Council for its Emergency Medical System. The award, dedicated to companies that innovate in the area of workplace safety, was given for the results obtained in protecting employees.

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## [3.07] **Education** [PI4.17, HR8]

### **Corporate security**

In 2012, Vale advanced in the challenge of expanding training in safety and human rights to corporate security teams. Almost 5,000 corporate security contractors and more than 200 Vale security employees completed this training in 17 countries, among them Canada, Mozambique, China, Indonesia, Oman and Australia. This represents 85% of the company's global security workforce. In Brazil this percentage was of 95%.

Courses are part of Vale's Global Human Rights Policy, and are conducted annually since 2008, with the goal of updating corporate security professionals. Every two years the teams undergo a refresher course to improve their skills.

The main topics covered during the training were Basic Principles of Human Rights, Communities Relations, Use of Force, Ethics, Guidelines on Human Rights, and Vale's Human Rights Policy and Guide.

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## [3.08] Gender equity

### Gender Equity Project structuring actions

Actions of the Gender Equity Project were prioritized based on an analysis of effort versus impact, and grouped in four pillars:

- **Environment and Working Conditions:** ensure that the environment and working conditions accommodate the specific needs of women.  
**Example of action:** adjustment of Uniforms and PPE.
- **Education and Awareness:** educate employees and leaders on the relevance and rights associated with the topic and recognize women's capacity through positive female examples.  
**Example of action:** include the "Diversity" topic in the induction program for new employees and management training programs.
- **Empowerment:** facilitate the increase in numbers of women in Vale's workforce (in all positions) and contribute to this growth throughout the whole chain value.  
**Example of action:** review the Recruitment and Selection strategy.
- **Engagement:** monitor the evolution/maturity of the subject in the organization and in the external market, including participation in events, forums and certifications.  
**Example of action:** partnerships with organizations and participation in forums/events that promote gender equity.



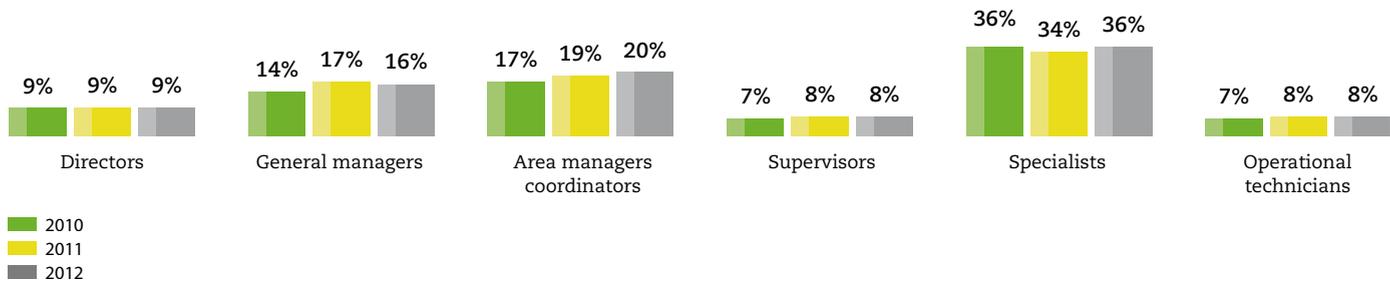
[3.09] **Women in the workforce** [LA13, LA14]

**Proportion of women's salary to men's, by functional category<sup>1</sup>**



<sup>1</sup> Employees covered by this indicator (LA14) correspond to 96% (2010), 98% (2011) and 96% (2012) of total reported employees (LA1). The chart shows the changes of women's salary compared to men's. The ratio of 1.00 means that the salary is the same.

**Proportion of women by functional category<sup>1</sup>**



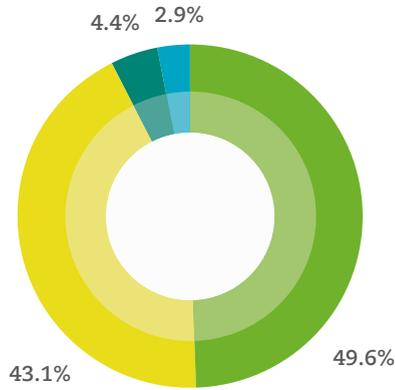
<sup>1</sup> Employees covered by this indicator (LA13) correspond to 99% (2010), 99% (2011) and 99% (2012) of total reported employees (LA1).

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## Distribution of women by functional category<sup>1</sup>

(2012)



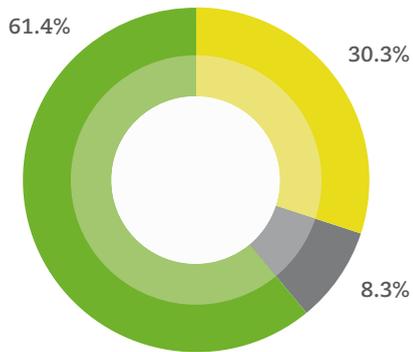
Category	%
Operational technicians	49.6%
Specialists	43.1%
Leadership	4.4%
Supervisors	2.9%

Leadership	5.3%
Directors	0.1%
General managers	0.8%
Area managers and coordinators	3.5%

<sup>1</sup> Employees covered by this indicator (LA13) correspond to 99% (2012) of total reported employees (LA1).

## Employees by age<sup>1</sup>

(2012)



Age bracket	%
Under 30 years	30.3%
Between 30 and 50 years	61.4%
More than 50 years	8.3%

<sup>1</sup> Employees covered by this indicator (LA13) correspond to a 99,7% (2012) of total reported employees (LA1).

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## [3.10] **Fighting discrimination** [HR4]

Following the results of investigations in cases of discrimination, top management takes actions aimed at regularizing any deviations. These include administrative measures (warning or dismissal), disciplinary actions and training for managers.

Examples of mechanisms used at Vale to fight discrimination include the Equal Employment Opportunity Procedure at Vale Australia and the Workplace Harassment and Discrimination Policy and Employee Handbook at Vale Canada. To mitigate cases of discrimination in Canada, Vale also follows the policies of the Canadian Human Rights Commission. In operations in the UK, in addition to the Employee Handbook, the company has issued an Equal Opportunities Declaration.



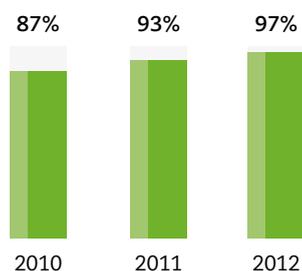
## [3.11] Remuneration and professional evaluation [EC5, LA12]

The main tools for administering the Remuneration and Performance Evaluation Policy are Management by Goals and the Global Performance Management System. Management by Goals consists of setting and implementing performance targets for all employees and ensuring that individual and team targets contribute to achieving the company's strategic objectives.

Each year, the Board of Directors establishes and approves targets for the Chief Executive Officer and Executive Directors. These targets are in turn reflected in the targets for all other employees. At the end of the cycle, in January, the results of the previous year are calculated.

The model used by Vale has three indicator blocks: Company, Collective and Individual/Team. The Company indicators measure shareholder returns and cash flow and apply to all employees worldwide. The Collective indicators are applied to one business unit, and reflect the unit's health and safety indicators, sustainability indicators and performance. Finally, the Individual/Team indicators include targets for each employee or their team. The sum of the results of the three groups of indicators determines the final result for each employee.

### Percentage of employees with performance evaluated<sup>1</sup>



<sup>1</sup> Employees and contractors shown in the chart account for 97% (2010), 100% (2011) and 100% (2012) of all reported employees (LA1).

Performance reviews are based on targets set at the beginning of each year. Using specific tools, each area creates an action plan to achieve them, including monitoring of intermediate results and corrective actions. Among the methods used, there is the VPS - Vale Production System. At the end of the year, each target end result is compared with the planned target and a score is assigned.

Young apprentices, trainees and graduates are not assessed within the Global Management System Performance due to labor laws and the collective work agreement. However, all employees are monitored by their respective managers, responsible for providing performance feedback regularly.



## [3.12] Open dialogue with unions [LA9]

The 5th Health and Safety Workshop with Brazilian Unions, held in Sergipe, brought innovations in the format of debates. In order to achieve greater integration between the company and unions, it was decided that the topic for these events would be set by mutual agreement as of 2013.

The initiative reflects Vale's positioning towards the parties with which it interacts. If a topic is a need or priority for the company and also the unions, the tendency is to establish mutual responsibility for paths to be followed, through the pursuit of improvements in relations and day-to-day operational work.

Besides direct contact with unions, Vale operates with institutions that also seek to discuss workers' rights, such as NGO Observatório Social, with which it holds meetings. The company also participates in events that discuss key issues on relations between employers and employees, such as seminars organized by the International Federation of Chemical, Energy, Mine and General Workers Unions (Icem), for which moral harassment is a central issue.

Vale's strategy in relations with unions is discussed and also enhanced through training and education of managers. In 2012, together with Dom Cabral Foundation, Vale created a postgraduate course on Labour Relations. The goal of the initiative is to increase professionals' knowledge so that they can be increasingly prepared to work with unions, employees and all the complex issues arising in the context of a company like Vale.

This customized course was open to the public and, within Vale, it was mainly taken by labour relations teams (who participated in 100% of its components) and human resources teams.

### Health and Safety Committees

Health and safety committees, known in Brazil as Internal Accident Prevention Committees (Cipa in Portuguese), are composed of representatives who are elected by employees and appointed by the company at each unit (including mines, factories, plants, offices, storage areas and laboratories), in accordance with the regulations of the Ministry of Work (NR5).

In 2012, Vale structured committees in areas that were lacking committees. The indicator performance in health and safety committees (LA6) increased slightly (0.4%) since Vale Fertilizantes incorporated into the 2012 report is in the process of constitution of committees. With the same scope of 2011, the ratio would reach 98%.

### Workforce representation through formal health and safety committees<sup>1</sup>



<sup>1</sup> In 2011/12, some units had less than 100% of employees represented by a committee. This was due to factors such as the following: fewer employees at the unit than the minimum number established in law for setting up a committee; a committee had not yet been created at a new project; and new employees at a site had just been hired.

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## [3.13] Benefits [LA3]

Vale provides medical insurance and life insurance to 100% of its employees. Benefits such as accident insurance, private pensions, transportation allowances, education and training, meals at work and/or food assistance, and the Employee Assistance Program are offered to a significant number of employees.

In Brazil, there are no part-time employees, and fixed-term contractors receive the same benefits as employees with indefinite contracts.

In Canada, there are contingent and temporary work contracts. For these workers, benefits vary by location. In 2012, a change in the country was that all companies adopted a consolidated single life insurance product. A Spouse Assistance Program was implemented in Mozambique and a pension fund was established in Malawi.

Employees of operations in Brazil enjoy benefits of the Supplementary Medical Assistance (AMS, in Portuguese), Apoiar Program and reimbursement of educational expenses. The private health care (AMS) is provided by the company to its employees is administered by Vale's Health Assistance Plan for Retired Workers (PASA). More than 210,000 people benefit from the AMS, which covers about 7,000 healthcare professionals and accredited institutions.

The Apoiar ("Support") program offers free confidential psychological support and assistance with financial and legal problems to all employees and their families.

In the education area, reimbursement is available for monthly school fees and registration or enrolment fees for employees' education. For all its female employees, Vale also provides financial support for the payment of kindergarten services, from the month in which they return to work following maternity leave. Vale pays 100% of fees for children up to three years old.

Vale also helps to reduce its employees' meal and commuting costs (using their own transport means or financing some of the costs of public transport) from their homes to the company and back, providing meal and food vouchers, in addition to transportation allowance. And At the end of the year the company also distributes presents and Christmas hampers to employees' children and families.

The first Training for Multiplier Agents on technical concepts of Benefits took place in 2012. Its goals were to train the Human Resources team on issues related to Vale's Benefits process and ensure excellence in service for business areas. The objective now is to extend this initiative globally.



## [3.14] Pension plans [EC3]

In Brazil, Vale's pension foundation — Fundação Vale do Rio Doce de Seguridade Social (Valia) — is responsible for managing the company's complementary pension plans. It is a non-profit closed entity with administrative and financial autonomy. In areas outside Brazil, Vale operates according to the laws of each country, and plans are administered individually.

As well as the Global Standard, the funds that are Vale's responsibility are also governed by a Global Pension Funds Committee. This committee must gain the approval of Vale's Executive Board for any decisions about the establishment or winding up of pension plans, as well as any changes to their design, contributions policy or governance structure. The committee also supervises the company's pension plans and establishes global principles and guidelines for managing the plans and for their performance.

Most participants in Valia are members of variable contribution<sup>1</sup> plans with a defined benefit component (payable specifically in cases of death and disability retirement) and defined contributions (for programmable benefits). In the case of defined benefits, the value is determined in advance through actuarial assessments regularly updated to ensure they can be provided. For defined contributions, the value is continually adjusted to the resources maintained on behalf of the members<sup>2</sup>

The defined contribution component of the variable contribution plans aims to ensure that the plan remains financially sustainable over time. The defined benefit component is designed to avoid a significant decrease in income in the case of retirement due to disability or the death of the family wage earner. For more information, visit [www.valia.com.br](http://www.valia.com.br) (available in Portuguese).

Valia administers the complementary pension plans of the companies within the scope of this report, such as Vale, Urucum Mineração, Vale Manganês, FCA and CPBS<sup>3</sup>. In 2012, the FCA Plan was incorporated into the ValiaPrev Plan, due to the similarity between them. FCA employees were transferred to that plan and became eligible for a minimum benefit in the event of disability or death. Vale's recently acquired Fertilizer companies joined Valia in 2011 and also sponsor a defined benefit plan that is administered by Petros and closed to new members, and the Bungeprev variable contribution plan.

Vale Canada sponsors pension plans that use both the defined benefit and defined contribution models, mainly for employees in Canada, the US, the UK and Indonesia. As a result of the September 2011 collective work agreement with the labour union representing Canadian nickel operations employees, all of the defined benefit plans are now closed to new employees, who will participate in defined contribution pension plans. In 2012, the value of additional pension benefits supplied by non-registered plans, where the liabilities are directly met by the company's general resources<sup>4</sup> was around US\$87 million.

More information about pension plans can be found in the 20-F Form, in the Investors section of [www.vale.com](http://www.vale.com).

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<sup>1</sup> This nomenclature follows Brazilian legislation.  
<sup>2</sup> Net result of investments, with values transferred by members and benefits paid by the plan.  
<sup>3</sup> Other companies that are not included in the scope of this report are also covered by Valia.  
<sup>4</sup> In these cases, the employee does not take part in paying towards the funds.

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## Plans offered by Vale in Brazil

(2012)

Plan	Type of plan	Participants (thousand) <sup>I</sup>	Coverage
Vale Mais Plan and ValiaPrev <sup>II</sup>	Variable contribution <sup>III</sup>	87.9	Exceeding 100% <sup>IV</sup>
Defined Benefit Plan <sup>V</sup>	Defined benefit	16.8	
Complementary Bonus <sup>VI</sup>	Defined benefit	1.9	87%, with monthly contribution
<b>Total</b>		<b>104.7<sup>VII</sup></b>	

<sup>I</sup> Includes active and assisted employees (retirees and pensioners).

<sup>II</sup> Employees contribute, on average, 4% of base salary (35% of the plans' cost) to pay the planned pension.

<sup>III</sup> Defined contribution scheme with a defined benefit component.

<sup>IV</sup> This level of coverage refers to the defined benefit amount paid by variable contribution plans and the defined benefit plan.

<sup>V</sup> The defined benefit plan was closed to new members on April 30, 2000, when the Vale Mais Plan was implemented.

<sup>VI</sup> Participants in this plan are retirees in the defined benefit plan who left the company as part of the retirement incentive plan. This plan is closed to new members. Regarding the level of coverage, the sponsor (Vale) has contributed monthly to the plan since December 2001 with the aim of reaching liability coverage of 100% by November 2014. Monthly installment values are readjusted when necessary and the amount was US\$6.6 million and 6.8 million in January 2013.

<sup>VII</sup> Not including recipients of the complementary allowance that is included in the defined benefit plan.

## Plans offered outside Brazil<sup>I</sup>

(2012)

Country	Operation	Plan type	Participants (thousand) <sup>II</sup>	Percentage of liabilities covered by assets
Canada	Newfoundland & Labrador	Defined contribution	0.1	NA
Canada	Ontario and Manitoba	Defined benefit	20.7	Between 91% and 93% <sup>III</sup>
Canada	Ontario and Manitoba	Defined contribution	1.7	NA
Indonesia	PT International Nickel Indonesia	Defined benefit	0.1	NA
UK	Clydach and Acton Refineries	Defined benefit	1.5	69%
Australia	Broadlea Carborough Downs and Integra Coal	Defined contribution	1	NA
<b>Total</b>			<b>25.1</b>	

<sup>I</sup> For these plans, in general employees do not pay towards the cost of the plan.

<sup>II</sup> Includes active and assisted employees (retirees and pensioners).

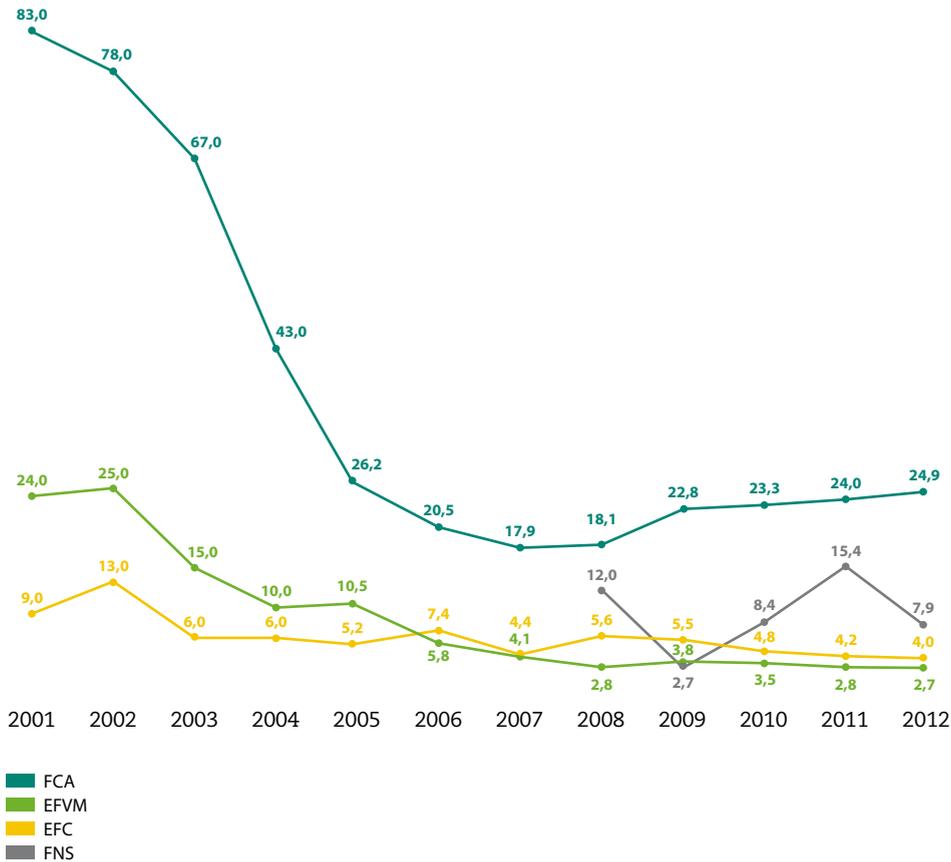
<sup>III</sup> The degree of coverage refers to data from the accounting valuation of December 31, 2012.



## [3.15] Railway incidents

### Railway incidents

Per million train/km (Mtkm)



Source: Unigofer – Railway incidents management system of Vale in Brazil, in equity with the records of the National Transportation Agency (ANTT). In 2008, the North-South Railway started to be operated by Vale. 723 km were built of which 563 km are in operation by the North-South Railway, between Açailândia (MA) and Guaratá (TO).

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## [3.16] Social dialogue [PI4.15, PI4.17]

### Channels used for dialogue with communities:

- Collaborative Social and economic diagnoses
- Pre-consultation meetings
- Interviews / Focus Groups / Stakeholders Observatory
- Visits to units
- Management Meeting Program
- Social dialogue meetings
- Railway hotline (Alô Ferrovia)
- Site (Contact Us)
- Reporting Channel (at Vale's website)
- External Publication - News
- Direct contacts with CR team (in person and by phone)

Vale has built a model of social dialogue in Great Vitória, (Espírito Santo, Brazil). Its purpose is to establish a constant and constructive dialogue between the company and the communities in this metropolitan area. The action started from broad internal dialogue, involving management of various operational and support areas (management and reference group for the dialogue). During the planning stage, Vale tried to deeply understand the local socio-economic context, the history of the company's relationship with the communities, the impacts, needs and critical issues. Pilot communities were defined and it was established a strategic approach to dialogue, which involves the participation of company managers in the life of the community, contributing collectively to reflect on issues important to the neighborhood and/or regions sustainability. This process enabled Vale to position itself as co-facilitator of local development in the communities in a broad participatory process.



[3.17] **Socioeconomic studies** [PI1.2, EC9, SO1]

**Potential Impacts**

**+ Positive**

**Direct**

- Job creation
- Professional qualification
- Purchase of local products and services
- Investments in infrastructure and services
- Increase in government revenues

**Indirect**

- Generation of indirect jobs
- Increased in salary payments
- Suppliers attracted to the area
- Development of local suppliers
- Investment attracted from various public and private sources
- Other economic sectors boosted
- Economic development
- Improvement of local infrastructure

**- Negative**

**Direct**

- Interference with land use
- Environmental impacts (emissions)
- Noise
- Risk of accidents

**Indirect**

- Real estate speculation in remote areas
- Pressure on infrastructure and public services
- Alteration of air quality
- Consequences for community wellbeing generated by environmental impacts

**Programs and practices per phases of the project**

	License/ Deployment	Operation	Closing
Environmental, social and economic impact assessment	●	●	●
Management of social, environmental and economic impact	●	●	●
Mine closure plan	●	●	●
Development of suppliers	●	●	●
Professional qualification (employees and communities)	●	●	●
Community relations (local and traditional)	●	●	●
Valorization of cultural heritage	●	●	●
Social Programs	●	●	●

- Intense occurrence
- Moderate occurrence



## [3.18] Vale Foundation

### Vale Foundation-Social spending<sup>I</sup>

(2012)

Actions	Total in millions of US\$	% of total
Human and Economic Development	21.2	57%
Impact Management	0.0	0%
Infrastructure	2.7	7%
Sponsorship	2.5	7%
Corporate Institutional Relations	0.0	0%
Socioeconomic Diagnosis/PGIS	0.1	0.4%
Public Sector Management	7.2	20%
Social Consulting	3.2	9%
<b>Total</b>	<b>36.9</b>	

<sup>I</sup> The difference in 2012 between the amount donated by Vale and the total invested by Vale Foundation, resulted in the creation of a financial reserve of the Foundation.

### Infrastructure spending

	Total in million of US\$	% of total
<b>By kind<sup>I</sup></b>		
Support to public services	0.33	12%
Implementation of building work	2.33	88%
<b>By format</b>		
Commercial engagement <sup>II</sup> (shared infrastructure)	—	0%
<i>Pro bono</i> <sup>III</sup>	—	0%
Services/Materials/Products <sup>IV</sup>	2.66	100%

<sup>I</sup> Support for public services, implemented by paying for services, such as the cost of hiring nurses and teachers, or paving work and the building of schools and hospitals.

<sup>II</sup> An activity that generates public benefits, but which primarily gives an economic or investment return to the company.

<sup>III</sup> Pro bono work to benefit the public, such as the allocation of people with specific functions to activities during the time scheduled for the work, using company resources.

<sup>IV</sup> Investment in infrastructure in kind, to provide services to deliver a product.

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### Public-Private Social Partnerships

The Foundation has formed a group to technically support its operations and investments, as well as disseminate the concept of Public-Private Social Partnerships. Among the participants are Accenture, the Inter-American Development Bank's Multilateral Investment Fund, the Brazilian Institute of Municipal Administration (IBAM), the Brazilian Institute of Administration for Development (Ibrad), and UNESCO. The structuring actions of the Public-Private Social Partnership contribute to:

- promoting quality of life and human development;
- strengthening cross-sector development and public policy;
- expanding democratic participation in inclusive citizenship;
- the effectiveness of private sector social investments;
- collective construction and the role of citizens as beneficiaries and co-participants in regional development.

### Areas of action

**Education** — The Vale Foundation seeks to contribute to the improvement of basic education in order to promote teaching practice based on the principles of cultural diversity and respect for differences.

In 2012, the main focus of activity was the continued training of elementary school teachers in Portuguese and Mathematics, the training of professionals working in Municipal Education Departments and teachers and administrators that work with young people and adults in municipalities. Within this scope, the Foundation carried out the following programs: Action in Education, Education Development Agreements, Vale School, Vale Youth, and Vale Network. These initiatives contributed to the training of more than 5,000 people: over 2,000 teachers and school managers, 400 municipal technicians, and 3,000 education, health and social workers. The program indirectly benefited almost 123,000 young people and students at municipal elementary and vocational schools.

**Sport** — The Vale's Foundation mission is to promote sport as a factor for social inclusion, encouraging human development, citizenship training and dissemination of sports culture in the communities. Activities in this area include educational actions for children and teenagers aged 6 to 17. The main sports program is Brazil Vale Ouro, which has 2,500 participants. The program aims to develop young people's potential through sport and to prepare elite athletes in judo, swimming, athletics and football. The program is implemented in at the following Knowledge Centres across Brazil: Serra in Espírito Santo, Arari in Maranhão, Brumadinho in Minas Gerais, Tucumã in Pará, and Engenhão Vila Militar in Rio de Janeiro.

In 2012, 47 Brazil Vale Ouro students participated in the 19th edition of the São Silvestrinha race, a youth version of the traditional São Silvestre International Race, held annually in São Paulo. Competing against 2,000 athletes, Brazil Vale Ouro participants won 14 medals – 4 gold, 5 silver and 5 bronze. In 2012, for the second consecutive year, Vale won the Entrepreneur Award in the Friend of Sports categories, for its social investments in this area.

**Culture** — The Vale Foundation seeks to promote social inclusion by expanding people's access to culture, strengthening regional identity, and respecting regional cultural heritage. This includes management of Vale's own resources, such as museums and cultural venues, and the realization of social and cultural programs, with a special focus on music education and popular cultural manifestations.

In 2013, the Vale Museum, located in Vila Velha, Espírito Santo, celebrated its 15th anniversary, having attracting a total of 1.6 million visitors and 38 national and international exhibitions. More than 76,000 people visited the museum and participated in its activities during

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the year, including around 24,440 students from schools in the region. Running since 2010, the Vale Minas Gerais Cultural Museum is a part of the rich architecture and landscaping of the Praça da Liberdade ("Liberty Plaza"), in Belo Horizonte, Minas Gerais. The museum was visited by 67,073 people, of which 15,432 were students from 505 educational institutions.

Elsewhere in Minas Gerais, the Vale Train program, which connects the towns of Ouro Preto and Mariana, benefited around 24,500 public school students and their teachers with activities such as cultural events, educational activities and use of libraries. The Community Circuit initiative for local residents held 209 actions for more than 9,500 train passengers.

In Belém (Pará) and Serra (Espírito Santo), Vale Music provides access to public school students to music education and creates opportunities for future professionalization, stimulating the formation of musical groups, choirs, bands and orchestras. In 2012, 249 students were benefited by this program, making 120 presentations in Belém to an estimated audience of 45,000 people. In Serra, where 250 students participate in the program, 25 presentations were given to an audience of 9,000.

The Parauapebas and Tucumã Cultural Program was launched in December 2012. This offers free courses, training and qualification in the performing arts – theatre, dance and circus, as well as workshops on audiovisual heritage education, reading, cultural management, digital culture and cultural networks. Initiation courses are open to the community, while training courses and qualifications are targeted at educators, producers and performers, in order to improve their professional skills.

**Urban Development** — The Vale Foundation seeks to assist municipal governments to enhance their capacity in order to strengthen public policies on social inclusion, improve planning tools and manage land with society's participation.

The focus is on enhancing public services for the population, through improvements to municipal management, expanding municipalities' capacities to plan integrated actions in the areas of social housing, sanitation and land regularization, and encouraging the involvement of communities in social control of municipal public policies. In 2012, the main themes discussed were Local Plans for Social Housing, land regularization and fighting child sexual exploitation.

The main initiatives were diagnosis actions in the Housing Sector in Parauapebas (Pará), an important step for the construction of Local Social Housing Plans, as well as actions supporting Canaã dos Carajás (Pará). In both municipalities, four workshops were held on Housing and Urban Policy, involving a total of 219 people, including government officials, councillors, community leaders and local associations.

Another initiative is the New Alliances program, which aims to strengthen public management by structuring councils dedicated to the Children's and Teenagers' Rights Assurance System, as well as collaborating with childhood policy management and connection between networks and organizations. In 2012, the program contributed to the training of 294 child and teenager councillors, indirectly benefiting 342,790 children and teenagers in Pará and Maranhão.

### Knowledge Centres

Created by the Vale Foundation, Knowledge Centres promote and share experiences and sport practices, complemented by educational, cultural, social and citizenship activities. Its viability arises from local partnerships between government, the community and third sector institutions. There are 11 units located in five Brazilian states: Espírito Santo, Maranhão, Minas Gerais, Pará and Rio de Janeiro. In 2012, more than 18,300 people benefited from Knowledge Centre initiatives.



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## [3.19] Professional qualification

**Professional Training Program** — for audiences between 18 and 28 years old, who completed High School or Technical School. This program is the main gateway for young people to take operational and technical positions at Vale. The program has an average duration of 15 months.

Participants, referred to as trainees, are divided into two categories: Operational Trainee (those that completed high school) and Technical operational trainee (Technical High School level). The purpose is to increase the supply of technical and operational professionals properly qualified in regional markets in which Vale operates, enabling them to act in the company's business. In 2012, 1,337 trainees enrolled in the Professional Training Program, which lasts 15 months. After this period, they become eligible for hiring. Last year, 394 trainees were eligible, and 299 (76%) were hired.

**Professional Specialization Program** — in Brazil and Mozambique Post-graduate courses were targeted to engineers and geologists in Mining, Railway and Port operational areas. 70 professionals participated in Brazil and 31 in Mozambique.

**Young Apprentice Program (Brazil)** — The program includes a set of Gateway initiatives, a chance of qualification for teens and young Brazilians. In partnership with the National Industrial Training Service (SENAI in Portuguese) technical and professional training is offered to young people between 14-24 years old. For safety reasons, 18 years old is the minimum age required to work in the company's operations. In 2012, 991 Young Apprentices joined Vale, distributed in all states where the company operates.

**Vocational Training Programs (Mozambique)** — To increase the supply of professionals and technicians able to work in railways and mines in Mozambique, Vale receives young Mozambicans at its Brazilian operations for practical training in various areas and equipment. After completing this qualification stage, they return to their home country to start their professional activities. In 2012, 27 professionals were trained in various locations of the Centro-Atlântica Railway (drivers). In mining area 56 young people are being trained to work in the maintenance of mining equipment - 30 in Carajás and 26 in Itabira, Brazil.



## [3.20] **Involuntary relocation** [MM8, MM9]

In Argentina, the resettlement program of families living in the mine area in Puesteros began in 2005. As part of policies for resettlement, Vale offers technical assistance aimed at diversifying their sources of income. In 2011, five families were relocated, and in 2012 another family was relocated to Rincon de Los Sauces. The land is in process of acquisition. In the meantime, a house was built and a production plan was designed to restore their economic activity.

The North Logistics Training (CLN) project in 2012 did not require new settlements. However, the negotiation plan to promote decommissioning<sup>1</sup> in the Railway Extension Project area, Southeastern Pará, was approved by the Executive Board, together with the National Institute of Colonization and Agrarian Reform (Incra) and the Landless Workers Movement (MST).

40 cases of decommissioning were reported in Marabá Agrarian Court and Civil Court of Parauapebas, as well as administrative process in the National Institute of Colonization and Agrarian Reform (INCRA), in order to obtain the protection of areas. Studies for compensation and demobilization of the right of way in Maraba are underway.

Vale has been acquiring properties since 2008 in the neighborhood Vila Paciência, municipality of Itabira (Minas Gerais). However, these negotiations/acquisitions are voluntary and are not characterized as expropriation or resettlement. In addition, the land acquired by the company will not be used for operating activities, but as a buffer zone. In 2012, negotiations continued, but there was no households' displacement.

### **Artisanal and small-scale mining**

Artisanal and small-scale mining plays an important role in social and economic development. The practice is especially widespread in gold and diamond extraction activities. However, Vale has also identified incidents in other mineral extraction activities, such as copper and cobalt, either inside company operations or adjacent to them.

The company believes that the large mining companies are important agents in the transfer of best practice technology, health and safety and recognizes the importance of proper treatment of the subject, a constant concern in assessments of risks and impacts of their activities. For this reason, the topic of artisanal and small scale mining is part of Vale employee training to raise awareness on Preventing human rights violations.

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<sup>1</sup> Decommissioning is the withdrawal of a property from public access, therefore allowing its sale.

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Vale follows the guidelines of international forums Community and Small-Scale Mining of the International Council of Mining and Metals (ICMM). The issue is addressed in the main tools in the area responsible for Communities Relationships.

In 2012, Vale has identified occurrences of artisanal and/or small-scale mining near its operations in Indonesia, Chile and Mariana (Minas Gerais)<sup>2</sup> Vale first confirms if these activities insider or near Vale's operations. In the case of illegal operations, Vale's Human Rights Guide states that the appropriate action to take is to notify government authorities to regulate and if necessary relocate the activity. The company believes that illegal artisanal mining may be damaging to the economic, social and environmental development of certain locations, in addition to increasing risks to the lives of those who practice it. When activity is legal, good relations are ensured as well as the identification of opportunities for establishing health and safety training for the miners

### Prevention and Monitoring

For three years Vale has maintained a monitoring program in Itabira (Minas Gerais) to inhibit the practice of illegal mining. When some illegal action is reported, the company notifies the Civil Police, who is responsible to take appropriate action.

Since 2010, Vale has run a program to detect illegal chromite extraction at a beach in Indonesia concession area. In 2012, the company began a negotiation process with local miners, together with the national and local governments to create a strategy for dealing with the bad practices of this type of mining, harmful for the environment and for the safety of workers.

When activity is legal, the identification of opportunities of group development is ensured, like establishing health and safety training for the miners. The company also continued its agreement with Salamanca Miners Association at the Tres Valles Project in Chile, to improve working conditions. When activity is legal, Vale is focused on ensuring good relations and identifying opportunities for establishing health and safety training for the miners.

Vale considers preventive action and continuous monitoring essential to avoid incidents in the areas where it operates. To provide technical support to artisanal mines, in partnership with the Federal University of Ouro Preto (Ufop), Vale supported the development of the Santa Iphigenia Quarry Workers Cooperative (Copersef) in Minas Gerais. The program includes Vale and Ufop's technical support to obtain licensing, technology transfer and structuring of the business plan. In 2012, the National Department of Mineral Production (DNPM) approved the Plan of Economic Exploitation of the region. The licensing process for obtaining the Environmental Authorisation for Operation (AAF) is underway at the Regional Environmental Superintendent's Office (Supram).

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<sup>2</sup> Vale does not calculate the percentage of units for artisanal mining activity, since there is no standard definition of the business units. In the 2011 Sustainability Report Itabira (MG) was erroneously informed as one of the areas with occurrence. The correct area is Mariana (MG).



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## [3.21] Indigenous peoples and traditional communities [MM5]

In 2011 Vale made the commitment to support institutional strengthening and management training for traditional communities. In the case of Krenak Community, a management training course is being conducted in meetings held fortnightly to monitor the dairy farm project developed together with the community. To advance with this objective, in 2012, the company conducted workshops on accountability, project development and developed a shared management model with the Tupiniquim Community in Espírito Santo. The goal was to stimulate organizational arrangements and community co-management in the villages, mainly focusing on the challenges and opportunities for the implementation of shared management agreements between the company and the community through indigenous association. The methodology implemented with the Tupiniquim community will serve as a model for future agreements.

Vale has an area dedicated to the treatment of Indigenous Affairs, to define guidelines and global orientation regarding operations and projects that interface with indigenous peoples. Altogether there were ten courses, workshops and hands-on training, totaling 457 hours of training for 1,596 Vale professionals in Brazil and Mozambique. Vale designed a program of dissemination of indigenous issues and traditional communities to train employees in various operational areas. In total 394 professionals were trained - 147 employees and 247 contractors.

In 2012, the Management of Community Relations has produced two guides: the Communities Relations for Capital Projects and the Community Relations. The first one establishes the processes and steps for Vale to operate in the communities (including traditional communities and indigenous people), and the second guide, establishes guidelines to guide the teams working with the communities with which there is interface. Indigenous Peoples and Traditional Communities Relationship Policy, revised in 2011, is to be validated in 2013-2014.

### Preservation of cultural and ethnic identity

In 2012, in partnership with the Environmental Department, Vale conducted a seminar on Indigenous Peoples and Traditional Communities open to all employees. The seminar was also held at Espírito Santo for employees who work in operational areas in relation with indigenous communities.

The Seminar on Social Dialogue and the I Vale Forum on Environmental Excellence, sponsored by the Department of Environment and of Energy, respectively also discussed the matter internally. Employees and contractors who work on projects in execution were trained on Dialog on Health and Safety and Behavioral Dialogue focused on best practices

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for coexistence with Indigenous Communities. There was also a cultural exchange between employees and the indigenous during the chestnut collection period.

Despite the area Salobo is within 63 kilometers of Indigenous and there is no impact on this community, the Xikrin do Cateté collect nuts in National Forest Tapirapé-Aquiri near the project area. In order to maintain a good relationship and respect the culture and traditions of indigenous people, in 2012 Vale provided infrastructure support to the camp, improving access to nuts, emergency medical care, phone calls, and meetings between employees and indigenous people as a way to promote cross-cultural dialogue and security.

The goal of these actions is to raise awareness among Vale employees and contractors on respect for diversity, and on the laws and rights of different communities, so that the company can develop its activities without generating new impacts to indigenous traditional communities neighboring Vale's operational areas.

One of the most significant changes achieved with the operational areas was the change in location of the construction site for the North Logistics Training (CLN). This was a shared decision between the Vale team and the service provider responsible for the work.

### Shared management

Shared management of the terms agreed between Vale and the traditional communities was a feasible alternative for the effective participation of community leaders, associations, schools and other community groups in the village. . This way of working has provided mechanisms that operate at different levels in the decision making process, providing means to properly deal with complex and changing aspects characteristic of this type of interaction while still giving people autonomy to manage community affairs.

As part of this initiative, there were training courses on how to development a financial schedule; accountability reports; village economy and the use of resources provided by private parties and the government (municipal, state and/or federal).



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## [3.22] **Monitoring lawsuits in 2012** [HR9, MM6]

In Pará, the Civil Action (GPA) filed by the Federal Public Ministry (MPF) to request non-renewal of the environmental license of the enterprise Ounce Puma. The claim is for alleged breach of studies of indigenous component with a request for compensation for moral and material damages to Xikrin and Kayapó Indigenous Communities.

In Maranhão, the State Human Rights Society has filed a public-interest civil action questioning the robustness of the study that permits the Carajás Railway's expansion project, alleging social impact and environmental damage to the local traditional communities, causing the interruption of the process. Vale has requested the suspension of the injunction in the Federal Court of the 1st Region, obtaining a judicial declaration as to the validity of the environmental study and permitting process of expansion. The works have already been resumed complying with all the issues relating to indigenous and quilombolas communities within the rigor of the process.

Finally, in Argentina, the Kvpán kvpalme Community prevented access to their territory for the construction of a 132 kV Transmission Line, as there was a disagreement with the route suggested. However, after dialogue and the fulfilling all the commitments made by the company, the construction of the line continued normally until the project was stopped.

### **Cases updated in 2012**

In Pará, the specific performance suit filed by Vale against quilombola communities' leaders of the Jumcaçu territory to allow the company to have access to easement areas of the ore pipeline and transmission line of the Bauxita de Paragominas project. The process is under inquiry for trial.

In Maranhão, the public civil action filed by the Federal Public Prosecution Service, representing the quilombola communities of Santa Rosa dos Pretos and Monge Belo, was settled in an agreement. The company also transferred a sum of money for the community.

In the same state, Vale awaits the lawsuit sentence for the Brazilian Institute of Environment and Renewable Natural Resources (Ibama) to refrain from conducting the environmental licensing of Estreito Hydroelectric Development, since the Term of Reference and the EIA/Rima were prepared without taking proper care of the indigenous component. The process is still awaiting sentencing in the first instance. This process's last progress was the presentation of closing arguments by the parties. At the time the magistrate was informed about the latest administrative progress with Funai and the signing of agreement, including the communities of Timbira, for the development of specific environmental program.

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Also in Maranhão, the jurisdiction of the court of Imperatriz was chosen for the trial of a lawsuit filed by the Federal Public Prosecution Service to prevent Ibama from granting operating license to the consortium responsible for the plant.

Finally, in Minas Gerais, the public-interest civil action filed by the Federal Public Prosecution Service and the National Indian Foundation (Funai) is closed after approval of the agreement between the parties. The civil action was brought against Vale with the purpose to compel the company, Centrais Elétricas de Minas Gerais (Cemig) and Aimorés Consortium to compensate the indigenous community of Krenak for any loss incurred with the construction of the Aimorés hydroelectric power plant. The agreement was partially fulfilled by Vale, who therefore proposed a Relationship Program with the Krenak community.

### Open lawsuits

In the state of Pará, there are two open lawsuits with the Xikrin do Catetê and Djudjêkô indigenous communities. One action is aimed at forcing Vale to conduct ethno-environmental verification of impacts resulting from Carajás Iron Mine activities on these communities. Vale filed a defense that declares the absence of impact and the suggested study to be unnecessary, since there is a distance of 80 km between the operations and the Indigenous territory. The other action is related to the maintenance of payments by Vale to these indigenous communities which had been suspended because of Carajás Iron Mine invasion was upheld. Decision is still under appeal.

Also in Pará, Vale was sued due to alleged incompliance with environmental licensing conditions of the ore pipeline and transmission line in the Bauxita de Paragominas project. That resulted in a preliminary decision for monthly payment of two minimum salaries to 58 identified families of the quilombolas associations of Jambuaçu, which will serve as a substitute for the financial compensation received. Vale has complied with the court's decision, making the required payments.



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## [4.01] **Biodiversity** [EN12]

Removal of vegetation causes losses of flora and results in fauna species moving to neighbouring areas. This relocation creates pressure on these neighbouring areas due to increased competition for habitats and resources with established faunal communities.

Alteration, reduction and/or loss of natural habitats available in a given area may cause changes in the composition and structure of plant and animal communities, which may also impact neighbouring areas. The significance of these changes is influenced by local environmental conditions and the degree of conservation of the habitat present in the areas directly affected and in neighbouring areas impacted by projects.



## [4.02] Biodiversity Management Plans [EN14]

In general, Biodiversity Management Plans are composed of actions related to managing the quality of aspects of the physical environment (water, air and soil, for example), which influence the biota (set of living organisms) present near an operation. They also consist of specific actions related to the management of plant and animal species: flora recovery (especially epiphytes – plants that use other plants as support, and rupicolous species – plants that grow on rocky substrates); rescue of fauna during vegetation removal activities; recovery of mining areas; and monitoring of flora and/or fauna in areas close to operations to monitor the effects of activities on local biota.

In operational units located in areas of particular importance for biodiversity (protected and/or high biodiversity areas), which represent sensitive and important areas for the conservation of endangered species, the Biodiversity Management Plan may be complemented with special programs organized by external environmental groups and/or by voluntary actions defined by the company itself.

Notable among the Special Biodiversity Management Plans so far implemented are the actions undertaken in the Carajás National Forest in southeast Pará, Brazil, featuring the following programs:

- Fauna Management and Monitoring Program – long-term investigations to fill knowledge gaps and standardize methodologies used in the studies to generate consistent scientific data, thus contributing to technical and regional development.
- Jaborandi (*Pilocarpus microphyllus*) Conservation Plan – a species with therapeutic properties collected by local communities for economic purposes.
- Harpy eagle (*Harpia harpyja*) Conservation Project.
- Plan for Collecting and Processing Native Seeds.
- Plan for Fire Prevention and Firefighting in Ecosystems in the Mosaic of Conservation Units in Carajás Mining Province, covering conservation areas surrounding Carajás National Forest.

In Minas Gerais, Vale is developing the following initiatives in the Iron Quadrangle region, which is home to a series of Vale operational units and protected areas owned by the company, in the transition zone between the Atlantic Forest and Cerrado biomes:

- Iron Quadrangle Biodiversity Conservation Plan, composed of actions related to the conservation and management of local flora and fauna, including the compilation and retrieval of information generated by the company and its partners.
- Technical and financial cooperation agreement with the objective of promoting actions to prevent and combat forest fires, covering Vale's own areas and the Conservation Units

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for Integral Protection and Sustainable Use under the responsibility of the state of Minas Gerais, located in the Iron Quadrangle.

- Iron Quadrangle Biodiversity Research and Conservation Centre (CeBio), which is especially dedicated to the development of research for the conservation and ecological restoration of the region's typical ecosystems.

In the state of Rio de Janeiro, associated with the operations of the Guaíba Island Maritime Terminal (TIG), Vale supports the following actions:

- Research project for the conservation of the Tucuxi dolphin (*Sotalia guianensis*) in Sepetiba Bay.
- Marine Farm Project, which breeds oysters and scallops to be sent to sea-farming communities in the region, and farms native shrimp species to restock Sepetiba Bay.

In New Caledonia, Vale is conducting the following initiatives:

- Special Biodiversity Management Plan, consisting of activities related to the establishment and funding of research projects aimed at improving the ecological restoration and conservation of flora and fauna species. Since 2006-2007, Vale has been monitoring the health of ecosystems in the Forêt Nord Nature Reserve and the Pic du Grand Kaori Reserve. In 2009, these actions were registered as part of the South Province Biodiversity Conservation Convention. Activities include annual monitoring of the diversity of plants, reptiles and birds in the two reserves, and monthly monitoring SO<sub>2</sub> levels in the vegetation near the refinery, and locations nearby.
- *Saribusjeanneyii* Palm Tree Conservation Project, in partnership with the National Parks section of the Southern Province, with the aim of creating an ex-situ<sup>1</sup> population of this species, read more information in the case Protection of reserves in New Caledonia.

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<sup>1</sup> Those who are preserved away from their place of origin.



## [4.03] Participation and engagement [PI4.17]

Vale participates in relevant strategic forums, such as the Brazilian Business and Ecosystem Services Partnership (PESE, in Portuguese). PESE is an initiative developed by the World Resources Institute (WRI), in partnership with the Getúlio Vargas Foundation (FGV) and the Brazilian Business Council for Sustainable Development (CEBDS), with support from the US-AID (United States Agency for International Development) to assist in developing business strategies related to improving the management of natural resources and biodiversity from the application of the Ecosystem Services Review (ESR) methodology developed by WRI. This methodology helps the private sector to map risks and opportunities arising from business impacts and dependencies on biodiversity and ecosystem services, with the purpose of developing strategies for the sustainable use of these aspects.

Vale has evaluated its tools for integrated biodiversity management.

As part of the process, in 2012 Vale began to analyze 13 impact measurement methodologies related to biodiversity and ecosystem services, considering their potential applicability to its activities, as well as the size and complexity of the company's businesses.

Vale also participated in planning and developing the management of the "Reflorestar" reforestation program. Created in 2012 by the state government of Espírito Santo with the support of Vale, this initiative intends to increase forest cover in the state by 30,000 hectares by 2014<sup>1</sup>, equivalent to 46,000 football fields. The project will use Payment for Ecosystem Services as a strategy for the maintenance of native vegetation. Vale contributed to the creation of the execution plan for the technical plans and the documentation of program support tools. The government and partners are supporting the remodelling of farms through the provision of inputs and stimuli, such as saplings, technical support and financial resources.

In 2012, Vale participated in both the Business for Environment event, organized by the B4E Global Summit, and the Workshop on Preparing the State Protection Biodiversity Plan in Minas Gerais, held by the State Forestry Institute (IEF, in Portuguese).

Vale also participated in the working group that contributed to the development of the Framework for Corporate Action on Biodiversity and Ecosystem Services, developed by the UN Global Compact and the International Union for Conservation of Nature (IUCN). Participation in these and other initiatives is a way to remain involved in current discussions and to contribute to actions developed by other parties.

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<sup>1</sup> Source: Reflorestar Program website.

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### **Economic assessment of ecosystem services**

In 2012, Vale entered into a partnership with Conservation International Brazil to develop an Integrated Management Plan for the 17 Private Reserves of Natural Heritage (RPPN, in Portuguese), maintained by the company in the Iron Quadrangle region of Minas Gerais, Brazil. This included assessing the ecosystem services provided by them. Services related to the maintenance of local ecosystems, human wellbeing and quality of life of the surrounding communities were selected, considering soil conservation (fertility management and erosion prevention), carbon stocks in vegetation and water resource management.

One of the areas studied was the Córrego Seco Reserve (a Conservation Unit in the process of being created/recognized) in the municipality of Itabirito, Minas Gerais, where an assessment was made of the value of water resource conservation and the annual monetary value of providing water to the municipality was estimated.

According to data from the Autonomous Water and Sewerage Service (Saae, in Portuguese), the Seco Stream, whose spring is located within Vale Private Reserves of Natural Heritage, as well as the water intake station, provide around 70% of the water consumed in the town of Itabirito. This resource has been estimated at around US\$2 million, based on its market price. Maintenance of soil fertility and erosion prevention were also valued at US\$12,000 and US\$3.4 million, respectively. As for carbon stocks, their estimated worth is US\$6 million.

Another notable action was conducted at the Vale Natural Reserve in Linhares, Espírito Santo. An ecosystem services assessment study, in partnership with the Lawrence Berkeley Laboratory (University of California) and researchers from national and international institutions, estimated direct and indirect use values considering aspects such as recreation, knowledge generation, bio-prospecting, pollination, carbon stocks in vegetation, carbon stocks related to sapling production and recovery of areas, soil regulation, regulation of air and water, and water supply. Among the values obtained, the most noteworthy are carbon stocks (around US\$47 million), water supply (US\$8.3 million), regulation of air and water (US\$886,000), pollination (US\$126,000) and soil regulation (US\$511,000). The value of the Linhares Reserve's existence was also estimated, considering the richness of its species and ecosystems, with special emphasis on rare and endangered groups.



## [4.04] Protected and operational areas [EN11]

In addition, Vale protects some areas that are not related to any of its operations (24.4% of the total area), on its own land or through partnerships – notably the Vale Natural Reserve, Sooretama Biological Reserve, both in Espírito Santo, and Ilha Grande State Park in Rio de Janeiro.

Of the total area that Vale protects or helps protect, 97.4% represents Conservation Units protected in partnership with local governments, and 2.6% is owned by the company. Of the protected area managed by Vale or through partnerships, 63.5% is in the Amazon biome and 27.4% is in the Atlantic Forest.

Operational areas totalling 4,700 km<sup>2</sup> are associated with mineral extraction, industrial production, processing, product transportation and operations related to industrial plantation. The area occupied by operations associated with plantations is nearly 62% of the total operational area, and around 50% of this area is designated for restoring and maintaining native vegetation<sup>1</sup>. Regardless of the initial state of conservation of an area, Vale's operations are planned and conducted so as to cause the least possible environmental impact, and environmental actions carried out in parallel to operations contribute positively to the maintenance and conservation of local biodiversity.

Of the total operational area, 87% is related to surface operations and 13% to underground operations. Over 90% of Vale's operational area is located within hotspots (13%) or wilderness areas (79%)<sup>2</sup> which are regions of high biological diversity assessed as internationally important for biodiversity conservation<sup>3</sup>.

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**1** According to Brazilian law, all rural properties must maintain representative areas of the natural environments of the region where they are located, called "Legal Reserves," to be designated for the sustainable use of natural resources, conservation and rehabilitation of ecological processes, biodiversity conservation, and to shelter and protect native flora and fauna. The size of the Legal Reserve is proportional to the total size of the property, varying according to the biome and, in the case of the Amazon, according to the region where the properties are located.

**2** Hotspots and wilderness areas are large geographical areas considered to be important for world flora and fauna conservation. They function as complementary categories of biodiversity importance, and are officially recognized by various international organizations. Hotspots are more endangered areas with high biological value for the planet and a large number of endemic vascular plants reduced to no more than 30% of their original vegetation coverage. Wilderness areas, in turn, are large areas of land (over 1 million hectares each) with representative biodiversity and currently little changed or unchanged (wild areas), with over 70% of their original coverage intact and human density lower than or equal to five people per km<sup>2</sup>.

**3** Examples of hotspots are the Cerrado (Brazil), East African Coastal Forests (Mozambique), the Forests of Guinea, the Valdivian Forests (Chile), the Atlantic Forest (Brazil) and Wallacea (Indonesia). Examples of wilderness areas are the Amazon Rainforest (Brazil), the Chaco/Patagonia (Argentina), the Arabian Desert (Oman), the Boreal Forest (Canada) and the Pantanal (Brazil).

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## Protected Areas owned by Vale or that the company helps protect <sup>[EN13]</sup>

Protected area	Biome	Property <sup>I</sup>	Area (km <sup>2</sup> )
<b>Brazil – Pará</b>			
Carajás National Forest	Amazon Rainforest	Partnership ICMBio	4,119.5
National Forest Tapirapé-Aquiri	Amazon Rainforest	Partnership ICMBio	1,900.0
National Forest Itacaiúnas	Amazon Rainforest	Partnership ICMBio	1,414.0
Tapirapé Biological Reserve	Amazon Rainforest	Partnership ICMBio	1,030.0
Environmental Protected Area Igarapé do Gelado	Amazon Rainforest	Partnership ICMBio	216.0
<b>Brazil – Maranhão</b>			
Botanical Park São Luís	Amazon Rainforest	Owned	1.1
<b>Brazil – Espírito Santo</b>			
Tubarão Botanical Park	Atlantic Forest	Owned	0.3
Vale Natural Reserve	Atlantic Forest	Owned	227.1
Sooretama biological reserve	Atlantic Forest	Partnership ICMBio	240.0
<b>Brazil – Minas Gerais</b>			
12 PRNP at the Iron Quadrangle of Minas Gerais	Atlantic Forest	Owned	70.4
PRNP associated to Fertilizers operations	Cerrado	Owned	1.6
32 State Conservation Units located in the Iron Quadrangle	Atlantic Forest and Cerrado	Partnership Semad/IEF <sup>II</sup>	3,090.8
Protection areas of four small hydropower (SHP)	Atlantic Forest	Owned	3.3
<b>Brazil – Rio de Janeiro</b>			
Ilha Grande State Park	Atlantic Forest	Partnership Inea <sup>III</sup>	120.5
<b>Canada</b>			
Canadian Boreal Forest	Boreal Forests	Owned	56.1
<b>Indonesia</b>			
Sorowako Tropical Forest	Wallacea	Partnership Indonesia Government	1,180.0
<b>New Caledonia</b>			
Forêt Nord Nature Reserve	Forest and Maquis Shrubland <sup>IV</sup>	Partnership New Caledonia Government	2.7
Pic du Grand Kaori Reserve	Forest and Maquis Shrubland <sup>V</sup>	Partnership New Caledonia Government	3.1
<b>Total</b>			<b>13,676.5</b>

<sup>I</sup> Data source: Partnership with Chico Mendes Institute for Biodiversity Conservation (ICMBio) (<http://www.icmbio.gov.br/brasil>) Ministry of Environment. Areas of conservation are under review by the Brazilian government, and the values shown may change during 2013.

<sup>II</sup> Source: State Department of Environment and Sustainable Development (Semad), State Forestry Institute (IEF), Government of Minas Gerais.

<sup>III</sup> Source: State Environmental Institute (INEA), Government of Rio de Janeiro.

<sup>IV</sup> Type of natural vegetation in the hotspot called New Caledonia.

<sup>V</sup> Type of natural vegetation in the hotspot called New Caledonia.



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## [4.05] Protected and operational areas (cont.)

Through the Research and Education Centre for Biodiversity Conservation (Cepeb, in Portuguese), Vale has strengthened its commitment to promoting research through courses organized by Cepeb itself. These courses feature technical or extension content on specific current topics at the Vale Natural Reserve that contribute to Atlantic Forest biodiversity conservation, or in partnership with education and research institutions. The latter courses are aimed at undergraduate and postgraduate students. In 2012, four postgraduate level academic courses were conducted.

In the area of education, Vale is working with engagement and a culture of sustainability in the communities around its projects. Through the Protected Areas Environmental Education Program, launched in 2011, high school students and the surrounding communities participated in activities to develop their environmental awareness, and thus promote a change in attitudes for sustainable development.

This action is based on UNESCO's pillars for the 21st century – to Know, to Be, to Do and to Live Together – and works on five main themes (biodiversity, water, air, energy and waste management) and three cross-cutting themes (culture, health and citizenship). Generally visitors have around 60 different activities, ranging from games to the teaching of techniques for growing mini-gardens. With schools, the themes are covered in content that includes lesson plans and partnerships with municipal education secretariats.

In 2012, the first year these actions were implemented, the program for schools was initiated at the Vale Natural Reserve in Linhares, Espírito Santo, and at the Vale Botanical Park in São Luís, Maranhão. In 2013, there are plans to implement the program at schools surrounding the Vale Botanical Park in Vitória, Espírito Santo, the Vale Zoo and Botanical Park in Carajás, Pará, and the Jambeiro Forest Environmental Education Centre in Minas Gerais.

Another action in the same year focused on environmental education in communities was the Inclusive Environmental Education Program, conducted at the Vale Botanical Park in Vitória, Espírito Santo. About 200 students from 10 institutions that serve people with disabilities learned more about biodiversity, natural resources and waste. The program also addresses cross-cutting themes such as culture, ethics, citizenship and health. There are three modules per cycle, providing participants with practice experiences based on building knowledge. The first module began in November 2012 and will last one year. At the end of the process, the participating institutions receive a certificate.

In 2012, the total number of visitors exceeded the previous year's figure by around 14%. To retain and attract new visitors, Vale is developing strategic actions to engage the com-

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community and employees, such as educational, cultural, social and environmental activities, including exhibitions and workshops, to help people reflect about the value of the Reserve's areas and to contribute to visitors' environmental engagement.

### Operational areas

Of the company's total operational area, 4% (around 190 km<sup>2</sup>) is located within legally protected areas (Conservation Units) and 39% (1,840 km<sup>2</sup>) is located in Areas of High Biodiversity Value (outside protected areas), as defined by the governments of each country. Considering operations located near sensitive areas, around 11% (520 Km<sup>2</sup>) of the operational units are close to legally protected areas and 22% (1,040 km<sup>2</sup>) are adjacent<sup>1</sup> to Areas of High Biodiversity Value.

Although Vale's operational units are located in regions classified as hotspots and wilderness areas, in many cases projects are implemented in locations that were already environmentally altered and biologically transformed due to previous human activities (logging and ranching, for example) or in areas that are exclusively designated for industrial activities (such as Municipal Industrial Districts), notably in the case of forest plantation areas.

This applies to all types of operations, especially forest plantations, which are entirely associated with previously altered areas.

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<sup>1</sup> To calculate the adjacent area a buffer of 10 km from the external boundaries of the Protected Areas was considered and from Areas of Intense Biodiversity (surroundings) and its overlap was assessed in respect to the area of the Operating Unit. When an operating unit was associated with more than one Protected Area or Area of Intense Biodiversity, the intersection of buffers in the stretches of overlap between areas was considered. The areas related to Indigenous lands were not considered in the analysis.



## [4.06] Endangered species [EN15]

### Number of species on the official IUCN list of internationally threatened species registered in Vale's areas of operations across the world

Thematic group	Low risk	Near threatened	Vulnerable	Endangered	Critically endangered	Extinct <sup>1</sup>	Total
Fungi	—	—	—	—	1	—	1
Plants	19	—	25	15	6	—	65
Molluscs	2	—	—	—	—	—	2
Arthropods	—	—	1	—	—	—	1
Fish	—	—	1	—	—	—	1
Amphibians	—	2	3	1	1	—	7
Reptiles	3	—	4	1	1	—	9
Birds	—	47	12	13	1	1	74
Mammals	—	18	12	7	3	—	40
<b>Total</b>	<b>24</b>	<b>67</b>	<b>58</b>	<b>37</b>	<b>13</b>	<b>1</b>	<b>200</b>

<sup>1</sup> Species with historical records in the region of Vale's operational units in Canada.

### Number of species on official national lists of endangered species registered in Vale's areas of operations across the world

Thematic group	Low risk	Near threatened	Vulnerable	Endangered	Critically endangered	Extinct <sup>1</sup>	Total	Total
Fungi	1	—	—	—	1	—	—	2
Plants	1	2	—	9	36	1	—	49
Molluscs	—	—	—	—	3	—	—	3
Arthropods	2	—	—	1	8	—	—	11
Fish	3	—	—	1	6	1	—	11
Amphibians	2	—	—	1	3	1	—	7
Reptiles	2	—	—	4	3	—	—	9
Birds	8	—	—	33	41	3	1	86
Mammals	3	—	1	28	8	2	—	42
<b>Total</b>	<b>22</b>	<b>2</b>	<b>1</b>	<b>77</b>	<b>109</b>	<b>8</b>	<b>1</b>	<b>220</b>

<sup>1</sup> Species with historical records in the region of Vale's operational units in Canada.



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## [4.07] **Impacted and restored areas** [MM1]

Vale's regulatory document about habitat restoration activities divides the recovery process into five distinct stages: diagnosis of impacted areas; preparation of restoration plan; implementation of the actions defined in the plan; execution of maintenance required to ensure restoration progress; and monitoring to verify the results achieved and optimize future actions.

In the second half of 2012, the document was implemented on an experimental basis at three operational units in Brazil. The intention is to evaluate the results of these tests in the first half of 2013, to make necessary adjustments and then to apply the document gradually, transforming it into a set of global instructions. Initially, three units, besides the three pilot areas will be included in this process during 2013.

Vale seeks best practices in environmental restoration, conducting research and development projects, often in partnership with education and research institutions. The focus is on cost reduction, selection of plant species for potential use in environmental restoration, improvements to techniques applied, and the development of indicators to show the quality of environmental restoration. The company also seeks greater knowledge of species ecology, in order to transform it into a positive legacy for scientific communities and internalize it in practices.



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## [4.08] **Restoration of degraded areas** [MM1]

In Espírito Santo, Vale is conducting a project to restore and maintain the forest cover around the Penha Convent, declared a protected historical and cultural monument in 1943. One of the oldest sanctuaries in Brazil, it is located on top of a cliff in the municipality of Vila Velha. Habitat restoration activities were initiated in 1986 and, since then, periodic maintenance work has been carried out on the vegetation (approximately 50 hectares), including the removal of trash and invasive plants and pest control.

Another project conducted in Espírito Santo and Minas Gerais, based on a partnership and cooperation agreement between Vale and the Terra Institute, is the restoration of 480 springs and stretches of riverbank vegetation located in the Doce River basin, totalling 415 hectares in the two states.

In Mato Grosso do Sul, Vale is restoring degraded areas within the Piraputangas Municipal Nature Park in the municipality of Corumbá. The park, around 25 km from the city of Corumbá, is administered by the Municipal Environmental Secretariat and is located in a region noted for its abundance of springs, making it an important area for the protection of water resources.

Another initiative has been the creation of a work forum composed of a group of professionals in Vale's business areas that work with the theme. The forum, which had its first meeting in July 2012, takes place every three months, promoting discussion about alternative ways of optimizing the company's habitat restoration activities. Also in 2012, a public tender was issued to fund specific research about the topic, attracting 107 proposals. Thirteen of these proposals were considered relevant and five of them were identified as high priority due to their focus on rocky land.

This research will result in innovations for the application of habitat restoration programs, as it will promote an expansion of knowledge of ecosystems and technologies related to the topic.

In 2012, the Brazilian Society for the Restoration of Degraded Areas (Sobrade) held the ninth National Symposium on the Restoration of Degraded Areas (Sinrad), an event sponsored by Vale. One of the papers presented by the company concerned a pioneering initiative to restore areas of rocky outcrops using native plant species. This technique permits maximum preservation of small plants rescued from areas of vegetation clearance and is based on the colonization of coconut fibre mats with native plant species, fixed in place using a natural technique. This model is more efficient and 60% cheaper than the conventional methodology, based on sapling production in wooden crates and plastic packages. The company has used this technique at iron ore mines in the Iron Quadrangle region of Minas Gerais, for example at Pico Mine, where it has restored an area of rocky land.

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### Operational areas

The biome with the largest area affected by Vale's operations in 2012 was Amazon Rainforest, followed by Atlantic Forest. The areas affected in the Amazon are related to the continuity of operations at Carajás Mine (Northern Hills) and, most notably, the expansion of the Carajás Railway. Interference in Atlantic Forest areas is associated with operations in the Iron Quadrangle region of Minas Gerais.

## Area impacted and being restored by Vale in 2012 according to the biome (km<sup>2</sup>) [EN13]

(2012)

Biome	Impacted area	Area being restored		
		Area undergoing permanent restoration	Area undergoing temporary restoration	Total area undergoing restoration
Amazon Rainforest	11,5	1,3	0,5	1,8
Cerrado	0,6	—	—	—
East African Coastal Forest	0,9	—	—	—
Boreal Forests	—	—	—	—
Valdivian Forests	0,9	—	—	—
Atlantic Forest	4,2	4,6	5,1	9,7
New Caledonia	0,3	0,2	—	0,2
Pantanal Wetland	0,1	—	—	—
Wallacea	1,2	—	—	—
Other	3,2	1,1	—	1,1
<b>Total</b>	<b>22,9</b>	<b>7,2</b>	<b>5,6</b>	<b>12,8</b>

In terms of areas undergoing restoration, the highest figures are associated with Atlantic Forest, followed by Amazon Rainforest. In the case of Atlantic Forest, one may highlight the existence of old operations and more recent ones in the state of Minas Gerais, resulting in a combination of areas undergoing permanent and temporary restoration.

The Amazon areas undergoing permanent restoration are primarily related to the commencement of actions for the restoration of areas that will no longer be used for operational activities at Carajás Mine.



## [4.09] Conflicts over land use [MM6, MM7]

Of the 12 lawsuits, eight involve Vale Fertilizantes and refer to demands to regain possession of a tract of land loaned to the Fósfétil Employees Association (AEF), which, in turn, leased the land to third parties.

The lawsuit filed by the Krenak indigenous people involved conducting a study to assess the impacts of the Aimores hydroelectric plant. Following completion of the study, the parties signed an agreement establishing a commitment to undertake a series of broadly structured actions. In 2012, a contract amendment was signed, valid for 15 months, in order for all the actions to be executed.

In Indonesia, there is a land dispute in the town of Mahalona, in an area alongside the Balonti-Petea mine. The communities are claiming compensation for the use of land in protected areas. The lawsuit has not yet been finalized, but Vale has already taken some steps to address the communities' complaints, including checking the documentation of the lands in question.

Also in Indonesia, the use of water from Lake Towuti for electric power generation led to a local community lawsuit, which resulted in an agreement in 2000 between the company, the local government and the community to establish 750 hectares of rice fields.

Regarding shutdowns or obstruction of access to projects, 15 in total, two occupations took place at Yara Farm in Cajati, São Paulo, in June and July 2012. Yara Farm is an Environmental Protection Area, loaned to Vale, and it is part of an environmental compensation action.

Vale's premises in the Morro da Mina neighbourhood of Conselheiro Lafaiete, Minas Gerais, were also invaded. The Military Police were called out to record this incident.

Recreio Farm, a property owned by Vale in the region of the S11D Project, which is designated for the resettlement of families from the Vila Mozartinópolis community, was occupied by a group of around twenty people from the Landless Workers' Movement (MST). The authorities were notified and the group decided to leave of their own accord.

In another action, around 200 people from the Vila Palmares Sul community of Pará blocked the Faruk Salmen Highway in order to occupy a subdivision by the side of the highway. The Military Police were called to evict the people and the leader of the movement was detained.

Subsequently, 300 people obstructed a roundabout on the same highway near the Paraupebas stockyard. The Military Police came to the site and arrested the group's leader. This

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blockage hindered the production process at the Sossego copper operation and the Parauapebas stockyard's activities.

Also in Pará, around 80 residents of the Racha Placa village and former owners of land now belonging to Vale obstructed the Brejeira Farm access road, where accommodation for the S11D Project is being built. An attempt to negotiate was made, but the blockade remained in place. A meeting took place later between INCRA and representatives of the protestors in the city of Marabá, Pará, but no agreement was reached.

Santo Antônio Farm, owned by Vale, was invaded in March 2012 and returned to the company's possession following a court order. Vale's Business Security area and the Military Police command went to the farm and spoke with the invaders, all of who left peacefully. A meeting was held with the leaders of the Boa Esperança Association's camp, and the community requested Vale's help to resolve some issues with the public authorities.

Another land invasion took place in the urban zone of Canãa dos Carajás, on land owned by Vale. The Military Police visited the location to negotiate the departure of the invaders. The community asked Vale for help to resolve a number of issues with the public authorities.

In Chile, in November 2012, the main access road to the Don Gabriel mine was blocked by a backhoe owned by a local resident who has a legal dispute with the company. Access to the underground mine was not affected and no damage to property damage was recorded.

In Colombia, residents of El Hatillo performed a blockade in protest against the relocation of the village and to demand the hiring of local labour, in February 2012. Three vehicles and three motorcycles were set on fire in the urban area of La Loma. The Mobile Police Squad, the Anti-Disorder Group and the Army also reinforced security at Vale's camp. The only area affected was the location of the chemical toilets at the entrance to the mine. In the Plan Bonito area, fires were started by rioters.

Vale's Port Operations Department led negotiations in four cases of land occupation in Santo Antônio, Praia Pequena, Praia de Tapera and Duas Irmãs, in Mangaratiba, Rio de Janeiro. In Sahy, in the same region, the main access road to the pier used to dispatch material and human resources to the port was blocked.



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## [4.10] Mine closure [MM10]

In 2012, Vale completed a preliminary version of its Global Regulatory Document on Mine Closure. It was prepared on the basis of legislation, technical standards and best practices in 10 countries with a mining tradition, including South Africa, Australia, Peru, Mozambique, New Zealand and Brazil. In line with the company's new strategic guidelines, a review of its Global Regulatory Document on Mine Closure is planned for 2013.

In order to continuously improve its management in the area, in 2012 Vale created a Mine Closure Sub-Committee, reporting to the Environmental Leadership Committee. This entity holds meetings every two months with professionals directly and indirectly involved with the area. The sub-committee proposes a series of measures, which are submitted to the Environmental Leadership Committee for approval. In addition, Vale has created a specific management area for the corporate development of activities related to mine decommissioning and closure.

Training events have contributed to promotion and discussion of the subject at Vale, such as annual training for the asset demobilization cost estimate review cycle, and the first Mine Closure Seminar, conducted by the Ferrous Metals Planning Department with the support of the Environment Department.

Since 2003, Vale has been making asset demobilization provisions, which are updated every year. In 2011, due to a revision of the procedure that guides the calculation of cost estimates, provisions began taking account of criteria for releasing financial disbursements. The first disbursement was effected in 2012, using planned 2013 resources.

This provision was requested by the Carajás unit, which will use a portion of the provisioned resources to demobilize the I West and Northwest waste rock piles, in line with the criteria established in the Procedure for Asset Demobilization and Release of Provisions for Financial Disbursement. In addition, Pico Mine will also use some of the resources to perform restoration and protection work at Itabirito Peak, an area mined by Vale, and legally declared a protected natural heritage area. All these actions are characterized as asset demobilization rather than complete closure of mining activities (mine closure).

In 2012, the total estimated value of provisions was US\$2.403 billion, as reported on page 104 of Vale's Form 20-F.



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## [4.11] Mining waste [MM3]

The initial goal was to develop an implementation methodology, based on an emergency action plan for each structure, taking into account the specific organizational chart features existing in operations, followed by the production of a report and training for geotechnical management areas of operational units. The pilot project occurred at the Itabiruçu Dam in Itabira. It is expected that the Dam Safety Plan will be implemented at all units in Brazil by 2014.

Vale has prepared a report specifying actions and a timetable for implementing the Safety Plan for all its dams governed by Federal Law 12,334, and submitted it for approval to the Brazilian entity that oversees its dams, the National Mineral Production Department (DNPM). The implementation of the Tailings Dam Safety Plan will follow the schedule proposed in the DNPM's Ordinance 416/2012.

According to the National Dam Safety Policy Law, 98% of Vale's tailings dams in Brazil are classified as "Low Risk," indicating excellent levels of safety management. Tailings dams may potentially generate physical, biotic, social and economic damage.

The management of dams and waste rock piles includes conducting a technical corporate safety audit every three years. In 2011, the fourth phase of corporate audits took place at Vale's Brazilian operations, and in 2012 the company's dams in Minas Gerais were audited. Besides technical audits, the management process is assessed periodically through specific audits, with regard to compliance with the control requirements specified in the Sarbanes-Oxley Act. These audits follow established international technical and scientific standards, and are applied where there are no specific regulations.



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## [4.12] **Non-mineral waste** [IP4.17]

Vale's global instructions on waste are based on the following pillars: adding value; control and traceability; segregation of materials; evaluation of recipients; and promoting the generation of jobs and income from waste recycling.

These instructions are an important tool for global waste management at Vale, considering the laws of the different locations where the company operates and based on best management practices in this field.

In 2012, the work of the Solid Waste Sub-Committee (created in 2011 and composed of representatives of Vale's corporate waste areas and operational units in Brazil) focused on sharing and disseminating best practices implemented at operational units, and developing procedures. The main products and projects to be developed were also evaluated, such as the implementation of reverse logistics with suppliers.



## [4.13] Hazardous and non-hazardous waste [EN22]

One reason for the increase in the amount of waste generated is the method of accounting for the 288,000 metric tons of sludge generated at the Uberaba sewage treatment plant, in the fertilizers area. This large volume was due to the distinctive characteristic of the effluent treatment process, which is specific to the fertilizer industry. This value was not reported in 2011, as the fertilizers area was then still in the reporting adaptation phase.

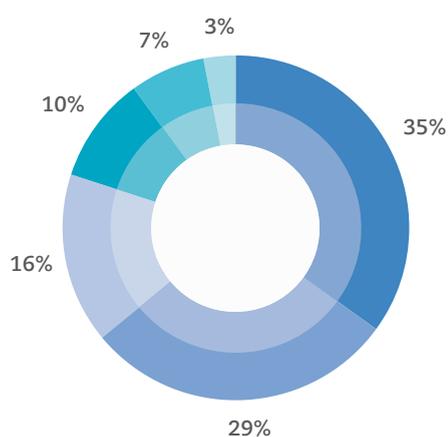
The increase in the generation of non-hazardous waste in 2012, compared to 2011, can be explained by construction work resulting from the expansion and remodelling of certain units, as well as the expansion of the Carajás Railway and expansions at the Ponta da Madeira Terminal in São Luís.

On the other hand, the amount of hazardous waste generated fell due to the sale in 2012 of Vale's two biggest manganese production units, in France and Norway, which were the largest producers of such waste.

In addition to these wastes, the fertilizers area generates phosphogypsum, which by its nature is considered a by-product rather than mining or mineral processing waste. Due to its scale – 5.7 million metric tons in 2012 – it was not incorporated into the figures for the generation of other kinds of waste. Of this total, approximately 86% was sold to cement or agricultural companies, and therefore reused.

### Hazardous waste generated [EN22]

(2012)



	%
<b>Iron ore</b>	35%
<b>Nickel</b>	29%
<b>Logistics</b>	16%
<b>Potassium/Nitrogen/Phosphate</b>	10%
<b>Coal</b>	7%
<b>Copper</b>	3%
<b>Manganese</b>	0%

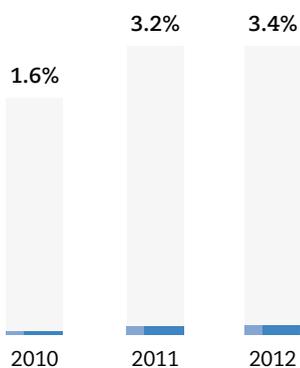
## [4.14] Hazardous and non-hazardous waste (cont.)

### Recycling of products and post-consumer packaging

Regarding the subject of post-consumer product recovery, Vale only considers the nickel chain, where there are opportunities for recycling, unlike in other mining chains. In 2012, the percentage of post-consumer materials reused was 3.4%, in line with performance in 2011.

### Post-consumption materials used as a percentage of sales<sup>1</sup> [EN27]

Thousand metric tons



	2010	2011	2012
Amount of product sold	32	39	39
Amount of post consumption recycled material	0.5	1.2	1.3
Amount of products and packages internally recycled	1.6%	3.2%	3.4%

<sup>1</sup> % (Material recycled post-consumption / product sold). The percentages do not include internal recycling in accordance to GRI methodology.

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The start of the process of decommissioning the smelter and refinery in Thompson, Canada, decreased the opportunities for post-use recycling of local nickel production. Vale will discuss with key nickel customers the possibility of reusing packaging, provided that appropriate cleaning procedures can be ensured.

To extend recycling efforts to the production of iron pellets, in 2012 the company carried out a Life Cycle Analysis of the iron ore pelletizing process at Tubarão Complex and a type of sinter feed produced in the company's South and Southeast Systems, but also shipped from the Port of Tubarão. These studies point to opportunities for mitigating the generation of waste and the possibility of post-sales recycling initiatives for certain applications.



[4.15] **Spills** [EN23]

**Spills**

Location	Spilled material	Spilled volume (m <sup>3</sup> )	Description of impact	Measures taken	Plan of action to prevent occurrences
<b>Logistics</b>					
Minas Gerais (Brazil) (Araxá, Ibiá, Lavras e Vianópolis) and São Paulo (Campinas)	Diesel Oil	18.2	Soil contamination	Soil removal, waste disposal	Rolling Stock and Permanent Road Maintenance Plan, and engine drivers training.
Patrocínio/ Minas Gerais (Brazil)	Diesel Oil	8.0	Soil and water course contamination	Soil removal, waste disposal	Rolling Stock and Permanent Road Maintenance Plan, and engine drivers training.
Marine Terminal - Central Silo loading station	Ammonium nitrate fertilizer	0.3	Impact on soil did not exceed the company's regulatory limits	Product recollection	Instruct the carrier on the verification of latches before, during and after loading in order to prevent spillage of product on the soil and the implications both on the terminal premises as on public roads.
Marine Terminal – Ponto da Madeira	Oil	0.05	Soil contamination	Absorption and collection of material	Implementation of the corresponding procedure.
	Hydraulic Oil	0.53			
	Motor oil	0.24			
Governador Valadares (MG)	Diesel oil	14.5	Contamination of railway track ballast	Assessment of location and periodic inspection	Structuring positioning procedure for replacement of rails along the track.  Plan for collection of rails along the railway.
<b>Potash, nitrogen and phosphate</b>					
Brine duct - Box of Suction 34 – Jatoba Beach	Brine containing NaCl	5.8	Change of Soil Quality	Scraping and leveling salinized soil	Review procedure for release of pig in brine duct and program replacement of critical sections of pipe.
Brine duct - Box suction 03 - BR-101 (Paty Farm)	Brine containing NaCl	4.5	Change of Soil Quality	Revolving impacted soil to add gypsum aiming to release free sodium as soluble sodium in the clay structure	Plan and implement a procedure to identify critical sections of wear on the pipeline and clear the line brine duct. Schedule changes of the critical sections and implement recommendations from the inspection report and evaluate the general conditions of the brine duct.



## [4.16] Atmospheric emissions and noise [EN20]

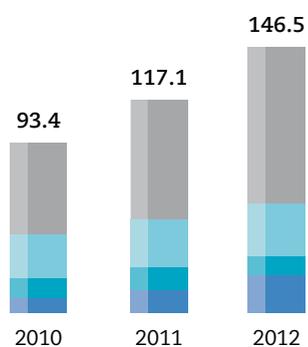
### Nitrogen oxides (NOx)

Combustion processes are mainly responsible for Vale’s emissions of nitrogen oxides (NOx), and the quantity of these gases is directly related to the volume of fuel consumed. Thus, emissions are calculated from emissions factors specific to the type of fuel and the equipment in which it is used. The NOx quantities for some emission sources were obtained through direct monitoring of exhaust gases discharged into the atmosphere.

Total emissions of nitrogen oxides in 2012 were 146,000 metric tons, up 20% from the previous year. The logistics area presented a significant increase due to the expansion of Vale’s own fleet of ships. The reduction in the nickel business’ emissions was due to the start up of the Karebbe Hydro Plant in Indonesia, which cut the unit’s fuel consumption to generate electricity. The Fertilizers area increased its production in 2012, as did the Coal area, which ramped up the Moatize operation in Mozambique.

### Emissions of nitrogen oxides (NOx) [EN20]

Thousand metric tons



	2010	2011	2012
<b>Logistics</b>	50.4	65.6	86.1
<b>Iron (mine)</b>	23.6	26.4	29.1
<b>Nickel</b>	11.3	12.1	10.2
<b>Others</b>	8.1	13.0	21.1
<b>Total</b>	<b>93.4</b>	<b>117.1</b>	<b>146.5</b>

Other businesses	2010	2011	2012
<b>Fertilizer</b>	—	5.4	8.1
<b>Copper</b>	2.4	2.4	2.9
<b>Pelletizing</b>	2.0	2.4	4.0
<b>Coal</b>	1.9	1.8	5.2
<b>Manganese</b>	1.3	0.7	0.7
<b>Others</b>	0.5	0.3	0.2
<b>Total</b>	<b>8.1</b>	<b>13.0</b>	<b>21.1</b>

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### Sulphur oxides (SOx)

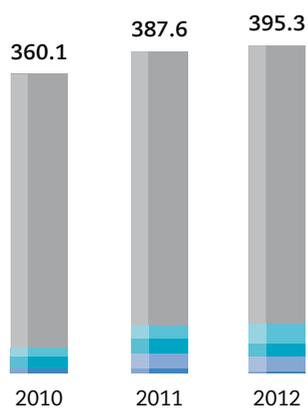
Emissions of sulphur oxides (SOx) are derived from burning fuels as well as some production processes. Emissions from burning fuels are calculated from the quantities consumed and the sulphur content. To calculate emissions from industrial processes, it is assumed that all of the sulphur added to processes and not present in the products or waste was released into the atmosphere in the form of SOx. In some specific processes, exhaust gases were directly monitored to determine the amount emitted.

In 2012, total emissions of sulphur oxides were similar to the previous year's figure, rising by 2% to 395,000 metric tons.

The increase in SOx emissions in logistics is due to the same reason as the rise in NOx emissions, as mentioned above. In the other business areas, the figures for sulphur oxide emissions remained stable when compared to the previous year.

### Emissions of sulfur oxide (SOx) [EN20]

In thousand tons



	2010	2011	2012
Nickel	329.7	329.6	335.4
Logistics	10.3	16.3	24.1
Pelletizing	14.6	17.2	16.1
Fertilizers	—	18.5	18.0
Other businesses	5.5	6.0	1.8
<b>Total</b>	<b>360.1</b>	<b>387.6</b>	<b>395.3</b>

Other businesses	2010	2011	2012
Manganese	3.5	4.0	1.0
Iron (mine)	1.3	1.5	0.4
Others	0.7	0.5	0.4
<b>Total</b>	<b>5.5</b>	<b>6.0</b>	<b>1.8</b>

## [4.17] Environmental management and compliance [EN26]

The Best Practices Guide to Environmental Licensing and the Environment was developed with the purpose of evaluating and improving the company's approach to the environmental licensing process, strengthening integration between design and environmental requirements. It addresses all project phases, indicating stages and governance in environmental processes, such as licensing and environmental management throughout the lifecycle of projects and operations. It also includes a number of tools to support the management and preparation of environmental studies.

"Licence to operate" is an important management tool in the development of Vale's capital projects. It enables the incorporation of environmental, social, economic and institutional variables throughout the lifecycle of a project. It supports decision-making processes and value generation for the business and stakeholders.

Licence to operate and environmental licensing processes are complementary and fundamental to achieving the goals of promoting sustainable management of projects in the short and long term.

In the management of environmental risks, another important procedure is Vale's Global Instructions on Classifying, Reporting, Analyzing and Treating Environmental Occurrences, which establish a methodology for classifying, reporting and treating (analyzing and investigating) environmental occurrences.

In its activities, Vale deals with the production, acquisition, storage, handling, use, transfer and disposal of a range of products, including chemical products, notably inorganic acids (nitric, sulphuric and phosphoric, for example), solvents, lubricant oils and fuels, among other potentially hazardous products.

In chemical processes, one can highlight the production of phosphate and nitrogen fertilizers, as well as the handling of raw materials, intermediate products and final products, which are subject to a continuous risk management process. Specific tools derived from the aforementioned procedures identify and evaluate major deviations and establish the management of maintenance actions, ensuring safety throughout the process.

In addition, each of Vale's operational units has specific Emergency Response Plans, appropriate resources and trained personnel, in order to minimize impacts and losses for people and the environment. All of these initiatives permit effective management of environmental risks in all of Vale's business lines, as well as standardization of concepts and tools, speeding up decision making by the responsible areas.

### Cases of environmental non-compliance recorded in 2012:

- The Chico Mendes Institute for Conservation (ICMbio) filed a notice of infraction due to a fire that occurred in Carajás National Forest, claiming that the company Salobo Metais S.A. was responsible. The company filed a defence and is awaiting a decision from the environmental agency. A technical statement was provided by an independent company, which found that the fire did not originate from a short circuit or any other cause related to the Salobo transmission line.
- Vale was summoned in several civil lawsuits together with the National Mineral Production Department (DNPM in Portuguese) and the Minas Gerais State Environment Foundation (FEAM). These lawsuits were filed by federal government prosecutors without hearing the company or being aware of its corporate dam control programs. All of these lawsuits were

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resolved through legal agreements signed by Vale and the federal prosecutors. The signatures of DNPM and FEAM officials are currently pending.

- The Maranhão Human Rights Society leads a group that filed a public civil lawsuit, questioning the environmental licensing procedure for work to expand the Carajás Railway (EFC). There are currently no legal restrictions for the development of this work.
- A fourth occurrence refers to the levying of a fine for a delay in fulfilling the obligations of a Conduct Adjustment Agreement (TAC in Portuguese), executed as a result of a public civil lawsuit involving the construction of an effluent treatment plant at Vale's Cajati site in São Paulo. In December 2012, a conciliation hearing was held, but no agreement was reached. The lawsuit is at the instruction stage.

#### Cases previously reported

- With regard to atmospheric emissions in Oman, the Vale Oman Pelletizing Company LLC, together with other defendants, was sued in court by a group of local residents who questioned particulate controls at the pelletizing plant. Vale is awaiting a definition for the realization of a technical appraisal.
- In Espírito Santo, a conciliation hearing was held in 2012 to address a collective lawsuit brought by the Ubu Fishermen's Association, which claimed alleged environmental damage and interference with fishing from drilling in the sea. No agreement was reached and the process remains at the instruction stage.
- Urucum Mineração S.A. presented its defence in a public civil lawsuit before the Court of Corumbá, in the state of Mato Grosso do Sul, calling for the rehabilitation of the Urucum Stream and rectification of other environmental damage. The lawsuit was suspended while environmental studies are conducted and evaluated by the Brazilian environmental regulator (Ibama) and the National Mineral Research Department (DNPM).
- Due to its acquisition of fertilizer assets, Vale became involved in a number of lawsuits. The first is related to alleged pollution in Uberaba, Minas Gerais; the second relates to the restoration of the Serra do Mar Park; the third questions the environmental licensing of the Anitápolis Project in Santa Catarina; and the fourth is investigating alleged irregular disposal of solid waste at the Ulianópolis unit in Pará. Vale is also conducting its defence in a series of lawsuits for damages in the community of Barreiro in Araxá, Minas Gerais.
- Regarding the administrative fine imposed by the municipality of Guapimirim in Rio de Janeiro, concerning a railway accident involving the Centro-Atlântica Railway (FCA), controlled by Vale, in the municipality of Itaboraí, the final sentence was issued in 2012, cancelling the fine. Two other environmental fines imposed by the State Environment Institute (Inea) have been suspended pending the fulfillment of a conduct adjustment agreement.
- Among significant lawsuits, there are also two involving the operations of Vale's iron ore mines in Itabira, Minas Gerais, with alleged environmental and social damage. There are also four cases associated with the licensing of the MBR Capão Xavier Mine in Belo Horizonte, also in Minas Gerais. In Vitória, Espírito Santo, a lawsuit claiming alleged atmospheric pollution is still ongoing. In the lawsuit involving railway ties on the Carajás Railway, Vale received an infraction notice from IBAMA regarding proof of their purchase. Vale presented its defence and subsequently brought an administrative appeal at CONAMA, currently awaiting judgment.

Vale regrets the need to address such issues in court, but trusts that the results will be most appropriate for the parties involved.



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## [4.18] Climate change strategy

Vale's strategy on the issue also includes monitoring the evolution of climate change regulations globally. In the absence of a global agreement to mitigate GHG emissions, several laws have been created in countries where Vale operates. As a promoter of mitigation actions, Vale monitors these laws and, whenever possible, contributes to building regulatory frameworks on climate change.

Data concerning Vale's GHG emissions are published annually in its Sustainability Report and the Brazilian GHG Protocol Program. For the third consecutive year, Vale's inventory was granted the program's gold seal for having a complete and externally verified inventory of its emissions.

In addition to the commitments of the Open Letter to Brazil, Vale has a strategic guideline to assess the risks and opportunities associated with climate change, to support the development of technologies to reduce GHG emissions and carbon sequestration, and to disseminate knowledge and best practices on climate change. Especially in 2012, Vale updated its protocol, which is used in mergers and acquisitions, reviewing the GHG emission management stage, and made efforts to define a proposed adaptation strategy.

To help spread knowledge of climate change and its impacts on the company among all employees, Vale has provided an online training course that presents the concept of climate change, emissions inventories and its main objectives in this area.



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## [4.19] Engagement [IP4.17]

In 2012, Vale participated in the Carbon Management in the Value Chain project, run by the Technical Energy and Climate Chamber of the Brazilian Business Council for Sustainable Development (CEBDS in Portuguese), which fostered training on GHG emissions management for various suppliers.

The company reiterates its support for mobilizing sector organizations, governments and companies to address issues related to climate change, and for this purpose, it participates in discussions at relevant forums and with trade associations, as shown below:

- In 2012, Vale led a work group on adapting mining to climate change at the International Council on Mining and Metals (ICMM). As a result of this work, a report on the subject was produced in 2012 with the aim of supporting specific plans and policies. The company has contributed to producing the second GHG emissions inventory for the Brazilian mining sector, which is being developed by the Brazilian Mining Institute (Ibram).
- The company has supported the Ethos Institute's Climate Forum initiative to develop a study to map state public policies and make a comparison with the National Climate Change Policy, in order to promote harmonization between these policies. A work group is being prepared together with the government to work on this theme and a website showing the results of the study has been provided (<http://forumempresarialpeloclima.org.br/observatorio-de-politicas-publicas-de-mudancas-climaticas/>).
- The company provides technical support to the Brazilian government in discussions of market measures taken by the International Maritime Organization (IMO) aimed at reducing GHG emissions in international shipping.



## [4.20] Energy [EN5, EN7]

In 2012, the company held its third Energy Efficiency Forum, which provide an opportunity to spread best practices and disclose efforts and initiatives already underway to optimize energy consumption at Vale. The event enabled meetings between community leaders and technicians and engineers from different business areas to discuss the topic. Another action for employee engagement was the holding of energy efficiency workshops at the Nitrogen, Phosphate and Potash Fertilizers departments to discuss the Energy Information System and steam generation and distribution.

To support new corporate duties and responsibilities, in 2012 Vale launched its Energy Manual for Capital Projects. Its goal is to guide teams for the joint development of energy processes, seeking more efficient energy solutions for projects during the planning and execution phases.

### Energy efficiency initiatives [EN5]

Energy conservation projects	Description	Project description		Expected results				
		Useful life [years]	Annual economy [MWh. L or Nm³]	Annual economy [US\$]	Project life economy [MWh. L or Nm³]	Project life economy [US\$]		
<b>Fábrica Nova</b>								
High Accuracy GPS in 6 large equipment of Fábrica Nova mine.	High accuracy GPS improves the accuracy of mining operations and transportation of ROM, and hence reduces rework and diesel consumption.	10	714,493 L	518,970	7,144,930 L	5,189,698		
Project "Caçamba Quente", in 19 dump trucks out of Fábrica Nova mine road.	Hot gases from the unloading of the trucks are diverted to the container and heat it, preventing the adhesion and unnecessary transport of ore.	10	438,400 L	325,158	4,384,000 L	3,251,577		
<b>Fábrica</b>								
Differential pressure measurement.	Installation of meters on process fans to optimize control of the gas flow.	15	484 MWh	53,708	7,266 MWh	805,628		
<b>Alegria</b>								
Expansion of Lokotrac square - place where the production is delivered to Samarco.	After the expansion, time on long queue of trucks was reduced by 40%, hence reducing diesel consumption.	10	441,253 L	370,158	4,412,530 L	3,701,579		
Automate the compressed air central unit of Alegria plant.	Installation of frequency inverter and Intelligent Central unit for optimization of energy consumption.	10	830 MWh	63,939	8,300 MWh	639,389		
<b>Fábrica Nova and Alegria</b>								
Implement high accuracy GPS in 19 large equipment from the mines of Fábrica Nova and Alegria.	High accuracy GPS improves the accuracy of mining operations and transportation of ROM, and hence reduces rework and diesel consumption.	10	1,673,446 L	2,141,173	16,734,460 L	21,411,731		
<b>Thompson</b>								
Sand Bin Modifications.	Modifications in the Thompson process to adapt to decommissioning of one of the production lines, with a consequent reduction in consumption.	3	22,764 MWh	846,240	68,293 MWh	2,538,719		
Spray System for Roaster.	Modifications in the Thompson process to adapt to decommissioning of one of the production lines, with a consequent reduction in consumption.	3	17,236 MWh	640,724	51,707 MWh	1,922,173		

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Energy conservation projects	Description	Project description		Expected results		
		Useful life [years]	Annual economy [MWh. L or Nm <sup>3</sup> ]	Annual economy [US\$]	Project life economy [MWh. L or Nm <sup>3</sup> ]	Project life economy [US\$]
<b>Carajás</b>						
Elimination of leaks in the compressed air system.	Leaks were identified and fixed in the distribution network of compressed air, valves and joints of Carajás plant.	1	3,669 MWh	266,390	3,669 MWh	266,390
<b>Cubatão CUB</b>						
Replacement of engine of the grinding system from acidulation area.	Replacement with high-efficiency engine.	10	1,948 MWh	136,558	19,480 MWh	1,365,585
<b>Araxá</b>						
Cogeneration - Improvements in the vacuum of condenser TG 601.	Operation performed in the cogeneration of Araxá-MG unit.	5	4,287 MWh	271,101	21,435 MWh	1,355,506
Cogeneration - Suspension of recirculation in boiler feed pump .	Operation performed in the cogeneration of Araxá-MG unit.	5	1,002 MWh	63,427	5,010 MWh	317,137
Cogeneration - Flash steam recovery from continuous blowdown - CMA.	Recovery of steam that otherwise would be lost, in order to improve its utilization in the process.	5	780 MWh	49,105	3,900 MWh	245,526
<b>Total</b>				<b>5,746,652</b>	<b>43,010,638</b>	

## Energy management project

Descriptions	Units
<b>Implementation of energy balance and management tool</b>	
The energy information tool was developed and implemented to allow monitoring energy indicators by process stage, which will assist in mapping opportunities to reduce consumption.	7 plants in Tubarão (Vitória) Cajati Bayóvar Patos de Minas Guará
<b>Smelter Meter improvement</b>	
Promote the management of energy consumed (in real time) in various areas involved in the production process. This project has an investment of US\$ 1,225,056.	Sudbury



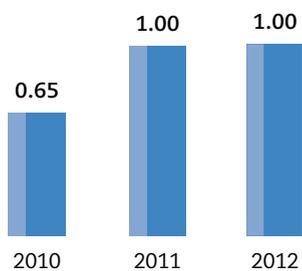
[4.21] **GHG Emissions** [EN19]

**Emissions of ozone-depleting substances**

In 2012, emissions of substances that ozone-depleting substances (ODS) remained constant compared with the previous year – around one metric ton of ODS. ODS emissions are relatively small and amounted to approximately 0.1% of Brazil’s total emissions. The chart below shows ODS emissions per year.

**Total emissions of ODS** [EN19]

(metric tons)



[4.22] **Risk management** [PI1.2, EC2, EN18]

**Risks and opportunities associated with climate change** [EN18]

Regulatory risks	Physical risks	Opportunities
<b>Revenue</b>		
<p><b>Reduction of economic activity in general.</b> Imposing regulations such as emission limits or carbon tax, can lead to decreased economic activity in general, reducing the demand for Vale's product. Countries where Vale operates, such as Brazil, Canada and Australia, have set targets for reducing the emission of greenhouse gases for its economies.</p> <p><b>Changes in consumption patterns.</b> The imposition of regulations may result in the adoption of new technologies (for our customers) that in the long run promote the substitution of more carbon intensive products for others less intensive, which may lead to reduced demand of Vale's products.</p>	<p><b>Physical changes that prevent production continuity Vale operates several plants in Brazil, Canada and Indonesia that have intensive energy use and depend mainly from hydroelectric energy.</b> Increased drought periods and less rainfall could affect power generation and decrease production levels!</p> <p><b>Impact on logistics services.</b> Changes in rainfall may negatively impact Vale's logistics services, both in the supply of inputs, as in the flow of raw materials and even the transportation of employees.</p>	<p><b>New products and services.</b> Vale has the opportunity to create new products, business and services in new markets created by climate change. Products covered in this opportunity include the development of new businesses in renewable energy and new forestry business.</p> <p><b>Changes in consumer attitudes.</b> Customers are more demanding, companies must be prepared to meet the demands on GHG emissions from production processes and product issue. Vale is well positioned to take advantage of these opportunities, the prospect of producing and using biodiesel in their operations, partially replacing fossil fuels.</p>
<b>Investment</b>		
<p><b>Adaptation of production processes.</b> Investment in new technologies for industrial processes, monitoring systems, abatement or new infrastructure to adapt to new regulations, such as the imposition of minimum standards related to emissions.</p>	<p><b>Investments in adapting operating or logistics structures.</b> Physical changes may require that Vale invests to adapt its assets to the new climatic scenario.</p>	<p><b>Research and development for sustainable projects.</b> Investment can lead to technological innovations, best practices and reduction of company costs. The Vale Technological Institute was created to develop future alternative, via scientific research and development of technologies to expand Vale's knowledge and the commercial limitations in a sustainable way.</p>
<b>Cost</b>		
<p><b>Increase of production costs</b> in general Regulatory impositions that increase existing costs or add new costs.</p> <p><b>Increased transportation costs, including taxes.</b> Measures that increase the existing cost of transportation or add new costs on logistics.</p>	<p><b>Limited resources.</b> Climate change may impact on the availability of natural resources necessary for Vale's operations.</p> <p><b>Insurance cost.</b> Vale's insurance against Vale typical risks in their business may not provide adequate coverage. Insurance against some risks may not be available at a reasonable cost or at all.</p>	<p><b>Energy efficiency projects and reducing GHG emissions.</b></p>

| In the long term this risk would also affect the cost.



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## [4.23] Water footprint

Proposed by the Water Footprint Network, this indicator began to be studied by Brazilian national and international standards organizations in order to regulate it and make it applicable to all sectors of society (industry, government, agriculture etc.)

The International Organization for Standardization (ISO) created the Water Footprint working group to develop ISO 14046, which concerns the topic. The draft standard was approved in June 2011, with a period of 36 months for completion. The topic is being discussed by the Brazilian National Standards Organization (ABNT in Portuguese) and the Brazilian Environmental Management Committee, CB-38, which operates with a structure similar to the ISO committee.

The draft version of ISO 14046 was approved in such a way that, in addition to a life cycle perspective, it also includes the quantification of the impacts associated with the use of water, which – unlike in the case of carbon – are local, thereby creating the need to incorporate this aspect into the standard.

The main challenges and difficulties for the consolidation of the standard include a lack of impact models adapted for Brazil, and a lack of data enabling the assessment of local impacts.



**[4.24] Effluents** [EN21]

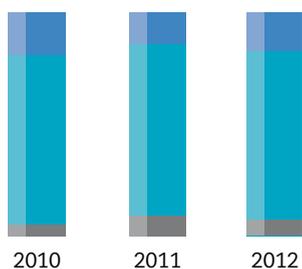
In 2012, Vale reduced the volume of effluents discharged by 14%, or 15.3 million cubic metres. This reduction was due to several factors such as asset sales and improvements to processes and management. Considering an analysis of the same scope<sup>1</sup>, Vale reduced its discharge of effluents by 9.8% as a result of initiatives to recycle and reuse water.

There was a 42% reduction in discharges of total suspended solids, mainly due to the sale of Cadam, which represented 40% of the total in 2011. Considering an analysis of the same scope, there was an increase of 2.8%.

The actions taken by the Water Resources subcommittee in 2012 included the development of Vale’s Effluent Treatment Standard. The purpose of this document is to establish guidelines for the definition of treatment methods for effluents generated at all Vale units in Brazil and in other locations. The document also aims to stimulate continuous improvement in environmental management, keep Vale integrated with the market’s best practices, and ensure compliance with prevailing laws.

<sup>1</sup> To assess actual indicator performance, the following areas were not considered: CADAM, VMN (Vale Manganese Norway A S), Cubatão Domenico Rangoni, Vale Colombia, Siderurgica Ferro Gusa and VMF (Vale Manganese France), sold in 2011; and Moatize Expansão, Vale Florestar, Biopalma and FNS (Railroad Norte Sul), incorporated in 2012.

**Total volume of liquid effluent by destination<sup>1</sup>** [EN21]



	2010	2011	2012
<b>Ocean</b>	19%	14%	17%
<b>Rivers, reservoirs and tailing dams</b>	76%	77%	76%
<b>Other<sup>II</sup></b>	5%	9%	7%

<sup>I</sup> “Liquid effluents without need for treatment” refers to water used in cooling and other processes that do not alter its qualitative characteristics to the extent that it requires treatment before disposal. Data on effluents generated by PT Vale Indonesia Tbk and the Thompson nickel operation in Canada were not reported in 2012, as the need to alter the data collection methodology used by these units was identified.

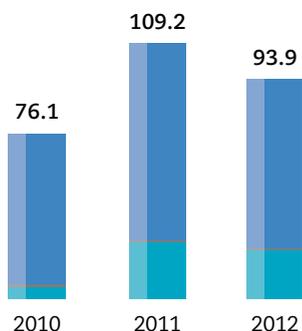
<sup>II</sup> Lakes, lagoons, wetlands, disposal in the ground and disposal to third parties.

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## Total discharge of liquid effluents generated by type [EN21]

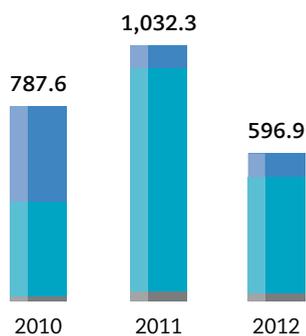
Million m<sup>3</sup>



	2010	2011	2012
Industrial liquid effluents	64.2	84.1	72.2
Oily liquid effluents	0.9	0.7	0.5
Liquid effluents without need for treatment	11.1	24.4	21.2
<b>Total</b>	<b>76.1</b>	<b>109.2</b>	<b>93.9</b>

## Total discharge of total suspended solids by destination [EN21]

Thousand kg



	2010	2011	2012
Ocean	383.6	90.4	96.3
Rivers, reservoirs and tailing ponds	386.3	903.2	468.7
Other <sup>1</sup>	17.7	38.7	32.0
<b>Total</b>	<b>787.6</b>	<b>1,032.3</b>	<b>596.9</b>

<sup>1</sup> Lakes, lagoons, wetlands, soil disposal and disposal to third parties.

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## [5.01] **Promotion of the sustainability agenda** [HR2]

In the process of elaborating contracts and amendments, Vale checks whether the companies it maintains business relations with have pending matters at the National Social Security Institute (INSS) and Government Severance Indemnity Fund for Employees (FGTS), among other entities. Companies with irregularities and that are not willing to resolve them can be removed from Vale's registry. The Risk Management area also monitors the development and growth of suppliers, as well as their financial health.



## [5.02] Suppliers

### Consumption of materials

Vale's strategic purchasing model aims to create competitive advantage through innovation, cost optimization and supply guarantees. This model focuses on actions supporting Vale's operations and prioritizes corporate sustainability, health and safety values in procurement strategies. It also seeks innovations for continuous improvement in energy efficiency, maximizing recycling and reducing consumption of natural resources and renewable sources.

In 2012, the highest growth in the amount of materials consumed by Vale was in railway tracks and explosives. With regard to railway tracks, the annual demand pattern was resumed. In the previous year, the purchase of railway tracks was reduced due to consumption of inventory acquired in 2010. Explosives consumption rose in 2012 in line with increased production at Vale's Australian mines and at Salobo, a copper mine that started up in the second half of 2012.

On the other hand, consumption of conveyor belts fell in 2012 due to activities implemented in 2011 to standardize safety inventories at operational sites and a new inventory practice, which keeps the equivalent of an extra month of consumption in stock.

Payment of fines, complementary invoices and additional demurrage<sup>1</sup> charges were not included in the data.

Rates for the use of recycled products reported by Vale's main suppliers varied between 0% and 10%<sup>2</sup>, except for mill balls, where the figure was 41.5%<sup>3</sup>.

<sup>1</sup> Demurrage refers to a delay in unloading a ship that ends up staying more than the period normally allowed at a port or when a company importing a container takes longer to unload a container than the period allowed.

<sup>2</sup> The methodology to quantify the amount of recycled material used in the production of railway tracks was reviewed, and using this new methodology the correct figure in 2011 is 24%.

<sup>3</sup> The percentage of materials reused was reported by the main supplier of mill balls.

### Materials used<sup>1</sup>

(2012)

Material category/group	Measuring unit	2011	2012
Mill balls	Thousand metric tons	42.9	36.0
Conveyor belts	Thousand metres	490.7	249.4
Railway ties	Million units	1.2	0.79
Explosives	Thousand metric tons	18.5	41.1
Ammonium nitrate	Thousand metric tons	0.2	1.0
Lubricant oil	Million litres	29.0	29.6
Off-highway truck tires	Thousand units	2.4	3.5
Railway tracks	Thousand metric tons	21.4	71.1

<sup>1</sup> Canadian business units' consumption data were not included because adjustments to the categorization methodology are still in progress.



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[5.03] **Customers** [PI 4.17, PR5]

In the passenger transportation segment in Brazil, Vale provides hotlines for complaints, suggestions, questions and information, as well as feedback forms when passengers board trains to freely record their opinion. The results of these mechanisms were complemented by satisfaction surveys conducted by an independent company. These evaluations will generate actions for infrastructure improvements and equipment acquisition.

Since 2008 the company has conducted annual satisfaction surveys covering the Vitória-Minas Railway (EFVM), the Carajás Railway (EFC), the Centro-Atlântica Railway (FCA) and the North-South Railway (FNS). Both surveys are conducted by customers of the Service Level Program and linked to the targets of the railway department and respective Maintenance and Operation units.

The results of customer evaluations serve as a reference for the development of specific action plans for each operating unit, in order to ensure the competitiveness of Vale's products in the various markets in which the company operates.



## [5.04] Customers (cont.) [EN26]

Some of Vale's operations have programs that allow safety, health and environmental risk management along their life cycles, according to the expected usage and efficiency of their materials and products. These programs take into account the stages of design, production, distribution and usage, and constantly seek to reduce possible indirect impacts on people's health and the environment.

Seeking to understand the main aspects and, consequently, the potential environmental impacts of its pellet production operations – encompassing mining, railway transportation, port operations and shipping to major customers – in 2010 Vale began studies on the life cycle analysis of its pelletizing plant in Vargem Grande, Minas Gerais.

In 2011, the work was extended to the pellet production process at the company's site in São Luís, Maranhão (Northern System), covering the entire chain, spanning mining at Carajás Iron Mine, ore transportation along the Carajás Railway and pelletizing, as well as pellet-related port activities and shipping to major customers in Europe and Asia.

In 2012, Vale focused on the mining process at its iron ore mines in the Southeast and South Ferrous Metals departments; ore transportation along the Vitória-Minas Railway; the pelletizing process at Tubarão Complex; port operations; and shipping to major customers in Europe and Asia. A type of sinter feed<sup>1</sup> produced at these mines was also incorporated in this process, including its railway transport, port handling and shipping to customers.

These operational units were selected because the initiative aimed to analyze the life cycle of pellets produced by Vale. This selection was also based on the future possibility of comparing the results of processes to identify the best internal practices that may become benchmarks for environmental issues and be extended to other units, as well as to add value to pellet and market competitiveness.

Vale's Base Metals area participated in a nickel life cycle analysis, focusing on pellets produced in Sudbury and Clydach. The impact categories evaluated were: energy consumption, GHG emissions, acidification, eutrophication and formation of photo-oxidizing agents. The aim of the work was to provide information and comparison conditions on main suppliers to major customers, in addition to more specific actions for internal management of significant environmental aspects.

In addition, in 2012, the Chemicals Management Plan (CMP) continued to be implemented in Canada. In this plan, information regarding the quantity of cobalt produced/sold in 2011 was submitted to the Canadian government. The next stages involve additional related information on risk management measures and quantities produced/sold for other categories of substances, notably in the nickel chain.

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<sup>1</sup> Iron ore fines with particles ranging from 0.15 to 6.35 mm in diameter.



[5.05] **Customers (cont.)** [PR3]

Convention 170 of the General Conference of the International Labour Organisation (ILO) establishes that labeling procedures are only required for hazardous chemicals. Since most of Vale's products are not classified as hazardous, labeling procedures in general are not required. One of the most used tools to report risks is the Chemical Products Safety Data Sheet (MSDS). Requirements for Safety Data Sheets are described under the United Nations Globally Harmonized System (UN GHS). Vale also has Safety Information Sheets with information on physicochemical properties of products, care during handling and use, transportation and final disposal, control measures necessary to maintain risks at tolerable levels, as well as procedures in case of emergencies.

Chemicals that are classified as hazardous must be kept in permanent or temporary tanks or packaging, with labels that include the name of the product, and its hazardous characteristics, in the national language and using the Hommel Diamond NFPA Classification System, in accordance with INS21.

For more information on iron ore shipping, see Form 20-F, at [www.vale.com](http://www.vale.com), in the Investors section. In 2012, the Chemical Product Management Regulation (REG-0004) was revised for Brazilian operations, to incorporate requirements on the acquisition and use of chemical products. A Global instruction is being elaborated by a specific Environmental Risks and Occurrences management unit, responsible for Chemical Products Management, among other issues.

New labeling procedures were also established in accordance with the United Nations Globally Harmonized System (UNGHS).

**Transportation of hazardous products**

Vale adopts responsible practices in the transportation of hazardous materials throughout its production process. Every operation involving this type of material is preceded by an assessment to identify significant risks and propose preventive and mitigation actions necessary to keep them at manageable levels.

This process is applied to hazardous materials, inputs, raw materials and final products and takes into account applicable legal requirements and all authorizations and permits necessary for the execution of the service stages. Analyses are redone whenever a new product is purchased or a new practice is applied.

The transportation of hazardous materials is part of Process Management and Safety, with the objective of working with all occurrences reported. Therefore, any event associated with the transportation of hazardous materials must be registered. The process of investigating the causes of the event starts from these records.

Cross-border transportation of hazardous goods, in compliance with the Brazilian Convention on the Control of Cross-border Transportation and Disposal of Hazardous Wastes, is not a practice adopted by Vale, so there are no occurrences to report.

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## [6.01] Index of indicators

### Report scope

The list of the companies covered by Vale's Sustainability Report is updated annually. The methodology for defining this report's scope (called Boundary by the Global Reporting Initiative) is the same as that used for Vale's previous sustainability reports and is explained in the "How to read this report" section.

Vale Fertilizantes S.A., acquired in 2010, has been increasing year by year the number of indicators reported, as has Biopalma, which became part of the report in 2011. Starting this year, the companies CADAM S.A., Vale Colombia CI, Vale Manganese France and Vale Manganese Norway AS are no longer included in the report. Information concerning newly acquired companies and/or new projects is integrated into Vale's Sustainability Report, as applicable, in a progressive manner, and historically adopted approach, presented in the "How to read this report" section.

In accordance with the GRI methodology, companies can be classified in the following three categories of sustainability information disclosure:

**Performance indicators:** In addition to Vale's own units, this classification includes companies controlled and/or operated by Vale. The scope of companies and projects included in each indicator reported may vary in line with the availability of information. The main exceptions, when applicable, are highlighted. For companies classified in this category, their sustainability performance is reported through performance indicators, as presented throughout the report<sup>1</sup>.

**Management approach:** This category includes companies or entities over which Vale has significant influence. It includes affiliates in which Vale owns 20% to 50% of the voting capital, either directly or indirectly, and companies or entities over which Vale exercises shared control. Vale has positions in the different governing bodies of these organizations, and may also participate in committees dealing with environmental, health and safety, human resources and finance issues, among other topics. Through these mechanisms<sup>2</sup>, Vale participates in strategic decision making and influences the development of rules and policies at these companies or entities, including in terms of sustainability issues<sup>3</sup>.

**Issues and dilemmas:** This classification includes companies over which Vale has influence, including affiliates in which Vale owns less than 20% of the voting capital, directly or indirectly. The material issues for companies classified in this category are presented as follows:

<sup>1</sup> Companies without productive activities, such as sales offices, are not included in this performance report as they have a limited impact on sustainability.

<sup>2</sup> Not applicable for companies in the Oil and Gas Consortium.

<sup>3</sup> In accordance with legislation in effect in the company's place of establishment.

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## Companies in which Vale has direct or indirect participation

Products and/or services	Vale's equity stake	Material issues
<b>Norte Energia S.A.</b>		
Belo Monte Hydroelectric Plant	9% stake in Norte Energia S.A.	Vale's growth strategy involves investments in energy generation projects such as its stake in the Belo Monte hydroelectric plant. <a href="#">Read more in Energy Generation on page 82.</a>
<b>ThyssenKrupp-CSA – Siderúrgica do Atlântico Ltda.<sup>I</sup></b>		
Steel plate	26.87% of the joint venture's share capital as of December 2009	<a href="#">Read more in Reduction of emissions in the steel sector on page 73.</a>
<b>Consórcio Machadinho<sup>II</sup></b>		
Electricity generation	8.29% stake via Valesul	Use of water resources to generate electricity.
<b>Consórcios BM-ES-27 e BM-S-48<sup>III</sup></b>		
Oil and gas exploration	BM-ES-27: 17.5%; BM-S-48: 12.5%	Offshore oil and gas exploration activities that cause exposure to environmental risks.
<b>MRS Logística S.A.<sup>IV</sup></b>		
Railway transportation	Direct and indirect interest (46.8% of voting capital and 47.6% of total capital)	Traffic through urban communities.

**I** Although Vale had a 26.87% stake in the company, it was classified in this category because, through a shareholders' agreement, Vale is not a member of TKCSA's sustainability committees.

**II** Vale S.A. has a direct and indirect stake of 100% in Valesul.

**III** In the last two reports, the oil and gas activities (considered in previous years as Vale Oil and Gas) were made available by the consortium as a function of different equity stakes and Vale's influence over these assets.

**IV** Vale waived its voting rights and the right to veto concerning MRS shares, in accordance with the ANTT resolution number 1.394, of April, 11 th, 2006.

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The following table shows how Vale's main companies, written here in their official legal names, are classified in terms of sustainability in this report.

## Report Scope

(2012)

Performance indicators	Management approach	Issues and dilemmas
<b>Iron Ore and pellets</b>		
<ul style="list-style-type: none"> <li>- Vale S.A.<sup>I</sup></li> <li>- Companhia Italo-Brasileira de Pelotização (Itabrasco)<sup>II</sup></li> <li>- Companhia Coreano-Brasileira de Pelotização (Kobrasco)<sup>III</sup></li> <li>- Companhia Nipo-Brasileira de Pelotização (Nibrasco)<sup>III</sup></li> <li>- Companhia Hispano-Brasileira de Pelotização (Hispanobras)<sup>III</sup></li> <li>- Vale Oman Pelletizing Company LLC</li> <li>- Mineração Corumbaense Reunida (MCR)</li> <li>- Vale BSGR Limited (Projeto Simandou)</li> </ul>	<ul style="list-style-type: none"> <li>- Samarco Mineração S.A.</li> <li>- Zhuhai YPM Pellet Co. Ltd.</li> <li>- Anyang Yu Vale Yongtong Pellet Co. Ltd.</li> </ul>	—
<b>Manganese and ferroalloys</b>		
<ul style="list-style-type: none"> <li>- Vale Manganês S.A.</li> <li>- Vale Mina do Azul S.A.</li> </ul>	—	—
<b>Copper</b>		
<ul style="list-style-type: none"> <li>- Vale S.A.</li> <li>- Vale Canada Limited</li> <li>- Sociedad Contractual Minera Tres Valles</li> </ul>	—	—
<b>Logistics</b>		
<ul style="list-style-type: none"> <li>- Vale S.A.<sup>III</sup></li> <li>- Ferrovia Centro-Atlântica S.A. (FCA)</li> <li>- Ferrovia Norte-Sul S.A.</li> <li>- Companhia Portuária Baía de Sepetiba (CPBS)</li> <li>- Seamar Shipping</li> <li>- Transbarge Navegación (TBN)</li> <li>- Mineração Corumbaense Reunida (Porto Gregório Curvo)</li> <li>- Vale Logística Argentina S.A. (Porto San Nicolás)</li> <li>- Corredor Logístico Integrado de Nacala (Clin) (Projeto Nacala Ferrovia e Porto)</li> <li>- PT Vale Indonesia Tbk (Balintang Special Port e Porto Especial Harapan Tanjung Mangkasa)</li> </ul>	<ul style="list-style-type: none"> <li>- Log-in Logística Intermodal S.A.</li> <li>- Barra dos Coqueiros Tugboat Consortium</li> <li>- São Marcos Bay Tugboat Consortium</li> </ul>	<ul style="list-style-type: none"> <li>- MRS Logística S.A.<sup>IV</sup></li> </ul>
<b>Fertilizers</b>		
<ul style="list-style-type: none"> <li>- Compañía Minera Miski Mayo S.A.C.</li> <li>- Vale Fertilizantes S.A.<sup>V</sup></li> <li>- Potasio Río Colorado S.A.</li> <li>- Vale Potássio Nordeste S.A.</li> </ul>	—	—
<b>Steel</b>		
—	<ul style="list-style-type: none"> <li>- California Steel Industries (CSI)</li> </ul>	<ul style="list-style-type: none"> <li>- ThyssenKrupp Companhia Siderúrgica do Atlântico<sup>VI</sup></li> </ul>
<b>Aluminum</b>		
—	<ul style="list-style-type: none"> <li>- Mineração Rio do Norte S.A. (MRN) (Bauxita)</li> <li>- Norsk Hydro ASA (Hydro)</li> <li>- Mineração Paragominas S.A.</li> </ul>	—
<b>Coal</b>		
<ul style="list-style-type: none"> <li>- Vale Moçambique S.A. (Moatize)</li> <li>- Vale Australia Holds Pty Ltd.</li> </ul>	<ul style="list-style-type: none"> <li>- Shandong Yankuang Int. Coking Co. Ltd.</li> <li>- Henan Longyu Energy Resources Co. Ltd.</li> <li>- Vale Austrália (Isaac Plains)</li> </ul>	—

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Performance indicators	Management approach	Issues and dilemmas
<b>Energy</b>		
<ul style="list-style-type: none"> <li>- Biopalma da Amazônia S.A.</li> </ul>	<ul style="list-style-type: none"> <li>- Vale Soluções em Energia S.A. (VSE)<sup>VII</sup></li> <li>- Energy consortia: Igarapava, Porto Estrela, Candonga, Capim Branco, Funil, Aimorés, Estreito (Ceste- Estreito Energia Consortium), Geração Santa Isabel (Gesai), Paraíso Azul Aeolian Consortium and Paraíso Farol Aeolian Consortium</li> <li>- Santo Inácio Aeolian Project Consortium companies (Central Eólica Garrote Ltda., Central Eólica Santo Inácio IV Ltda., Central Eólica Santo Inácio III Ltda., Central Eólica Santo Inácio V Ltda., Central Eólica Santo Inácio VI Ltda. e Central Eólica São Raimundo Ltda.)</li> <li>- Oil and Gas Consortium companies (BM-PAMA-10 Consortium, BM-PAMA-11 Consortium, BM-PAMA-12 Consortium, BT-PN-2 Consortium, BT-PN-3 Consortium, SF-T-80 Consortium, SF-T-81 Consortium, SF-T-82 Consortium, SF-T-83 Consortium, SF-T-93 Consortium)</li> </ul>	<ul style="list-style-type: none"> <li>- Machadinho consortium<sup>VIII</sup></li> <li>- Norte Energia S.A. (Belo Monte hydroelectric plant)</li> <li>- BM-ES-27 and BMS-48 consortia<sup>X</sup></li> </ul>
<b>Forestry production</b>		
<ul style="list-style-type: none"> <li>- Vale Florestar S.A.<sup>X</sup></li> </ul>	—	—
<b>Nickel</b>		
<ul style="list-style-type: none"> <li>- Vale S.A. (Onça Puma)</li> <li>- Vale Canada Limited</li> <li>- Vale Newfoundland &amp; Labrador Ltd.</li> <li>- Vale Europe Limited (Clydach Refinery e Acton Refinery)</li> <li>- PT Vale Indonesia Tbk</li> <li>- Vale Nouvelle-Calédonie S.A.S.</li> <li>- Vale Nickel (Dalian) Co. Ltd.</li> <li>- Vale Japan Limited</li> <li>- Vale Taiwan Limited</li> </ul>	<ul style="list-style-type: none"> <li>- Korea Nickel Corporation</li> </ul>	—

**I** Including operations of Minerações Brasileiras Reunidas S.A. (MBR), Minas da Serra Geral S.A. (MSG) and Baovale Mineração S.A. (Baovale).  
**II** Assets operated by Vale.  
**III** Includes operations of the Carajás Railway (EFC) and Vitória-Minas Railway (EFVM).  
**IV** Vale has waived its rights to vote and veto regarding the MRS' shares, in accordance with ANTT Resolution No. 1,394, of April 11, 2006.  
**V** Vale Fertilizantes S.A. includes the performance of Vale Cubatão Fertilizantes Ltda.  
**VI** Although Vale had a 26.87% stake in the company, it was classified in this category because, through a shareholders' agreement, Vale is not a member of TKCSA's sustainability committees.  
**VII** Although Vale has the majority of votes in equity accounted entities, they are

not consolidated due to the veto right held by non-controlling shareholders in the shareholders' agreement.  
**VIII** Vale S.A. has a direct and indirect stake of 100% in Valesul.  
**IX** Company belonging to the Vale Florestar equity investment fund, whose partners are Vale S.A., Petros (Fundo Petrobras de Seguridade Social), Funcef (Fundação dos Economizadores Federais) and BNDES (Banco Nacional de Desenvolvimento Econômico e Social).  
**X** In the last two reports, the oil and gas activities (considered in previous years as Vale Oil and Gas) were considered by consortium as a function of the different equity stakes and influence of Vale in these assets.

**Principles followed**

Vale's 2012 Sustainability Report was prepared in accordance with GRI guidelines and the principles of the United Nations Global Compact and ICMM. It also provides information required by the São Paulo Stock Exchange (Bovespa) Corporate Sustainability

**Global Compact Principles**

Human Rights

- 1 Business should support and respect the protection of internationally proclaimed human rights.
- 2 Make sure that they are not complicit in human rights abuses.

Labor Standards

- 3 Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining.

Continues on next page ▶



- 4 Uphold the elimination of all forms of forced and compulsory labor.
- 5 Uphold the effective abolition of child labor.
- 6 Uphold the elimination of discrimination in respect of employment and occupation.

Environment

- 7 Businesses should support a precautionary approach to environmental challenges.
- 8 Undertake initiatives to promote greater environmental responsibility.
- 9 Encourage the development and diffusion of environmentally friendly technologies.

Anti-Corruption

- 10 Businesses should work against corruption in all its forms, including extortion and bribery.

**ICMM Principles**

- 1 Implement and maintain ethical business practices and sound systems of corporate governance.
- 2 Integrate sustainable development considerations within the corporate decision making process.
- 3 Uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by our activities.
- 4 Implement risk management strategies based on valid data and sound science.
- 5 Seek continual improvement of our health and safety performance.
- 6 Seek continual improvement of our environmental performance.
- 7 Contribute to conservation of biodiversity and integrated approaches to land use planning.
- 8 Facilitate and encourage responsible product design, use, re-use, recycling and disposal of our products.
- 9 Contribute to the social, economic and institutional development of the communities in which we operate.
- 10 Implement effective and transparent engagement, communication and independently verified reporting arrangements with our stakeholders.

**ISE's Dimensions**

Dimension	Criterion
1 General	Commitments established by the company, alignment, transparency and anti-corruption measures.
2 Nature of the Product	Personal and diffuse impacts of using the product and complying with legal requirements.
3 Corporate Governance	Quality of management, covering aspects such as transparent audits and inspections, the company's conduct and its conflicts of interest.
4 Economic-Financial	The company's policy, management, planning, economic performance and compliance with legal requirements.
5 Unified Environmental — Group B <sup>1</sup>	Responsible and planned management of environmental issues, company performance, the establishment of global commitments and legal compliance with sector standards.
6 Social	The company's policy, management, legal compliance and performance in social issues, such as labor relations, participation in public policies, and relationships with impacted communities, supplies, customers and consumers.
7 Climate Change	Environmental policy and responsibility, risk management, performance in the field, reporting of results and emissions inventories, and dialog with stakeholders.

<sup>1</sup> Group B concerns critical environmental issues for natural and non-renewable resources. Products that fit in this group are: copper, iron and steel items; fertilizers; metallic minerals; oil and gas (exploration and refining); and petrochemicals and steel.

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Index of indicators

Indicators reported only in the Index

Indicator	Report
EC4	Refer to Form 20F, page 193 (F-21)

Detail of non-reported information

Index	Explanation
<b>Management Approach:</b> Anti-competitive behavior, Compliance, Customer Health and Safety, Product and Service Labelling, Marketing Communications	Non-material - Although not material, the topic is covered in this Report.
<b>Management Approach:</b> Customer Privacy	Non-material - According to the analysis of materiality.
<b>EN6</b> Initiatives to mitigate environmental impacts of products and services and extent of impact mitigation	Non-material - According to the analysis of materiality and the nature of the business, this indicator is not material.
<b>PR4</b> Non-compliance with regulations and labelling	Non-material - Not material Information, because it is not applicable to business.
<b>PR6</b> Adherence to laws	Non-material - According to the analysis of materiality and the nature of the business, this indicator is not material.
<b>PR8</b> Claims for breach of privacy and losses of customer data	Non-material - Although not material, the topic is covered in the Information Security Policy.

Breakdown of partial indicators

Index	Explanation
<b>EC5</b> Standard entry level wage compared to local minimum wage	Vale complies with the minimum wage in each location. Vale does not disclose salary values in different localities as this information is confidential.
<b>EN5</b> Energy saved due to conservation and efficiency improvements	Exact number of reduction in electricity in the year is not available, only information related to initiatives aimed at energy efficiency and reduction estimates.
<b>EN7</b> Initiatives to reduce indirect energy consumption and reductions achieved	Exact number of reduction in indirect electricity is not available, only information related to initiatives aimed at such reduction.
<b>EN9</b> Water sources significantly affected by withdrawal of water	Partial information. Water withdrawal at Vale's operational units follows each country's legal requirements (e.g. licenses, water body standards), which already protect water resources.
<b>EN25</b> Identity, size, protected status, and biodiversity value of water bodies and related habitats significantly affected by the reporting organization's discharges of water and runoff	Vale operating units discharge the effluent generated, which are not reused in the operation activities, in accordance with applicable legislation in force and other requirements of local environmental agencies. The level of current monitoring programs and environmental impact studies developed during the project and licensing stages ensures the knowledge of local biodiversity and corresponding protection status, as well as the characteristics of the effluent generated and further identification of technologies relevant for the treatment and discharge of effluents into receiving water bodies.
<b>PR2</b> Total number of incidents of noncompliance with regulations and voluntary codes concerning health and safety impacts of products and services during their life cycle, by type of outcomes	The number of cases of non-compliance for the whole chain is not reported. Information related to the correct supply and use of products and services is answered by indicator PR9.

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## Statement GRI Application Level Check

GRI hereby states that **Vale S.A.** has presented its report "2012 Sustainability Report" to GRI's Report Services which have concluded that the report fulfills the requirement of Application Level A+.

GRI Application Levels communicate the extent to which the content of the G3 Guidelines has been used in the submitted sustainability reporting. The Check confirms that the required set and number of disclosures for that Application Level have been addressed in the reporting and that the GRI Content Index demonstrates a valid representation of the required disclosures, as described in the GRI G3 Guidelines. For methodology, see [www.globalreporting.org/SiteCollectionDocuments/ALC-Methodology.pdf](http://www.globalreporting.org/SiteCollectionDocuments/ALC-Methodology.pdf)

Application Levels do not provide an opinion on the sustainability performance of the reporter nor the quality of the information in the report.

Amsterdam, 28 May 2013

A handwritten signature in blue ink, appearing to read "Nelmara Arbex", is written over a faint, large watermark of the GRI logo in the background.

Nelmara Arbex  
Deputy Chief Executive  
Global Reporting Initiative



The "+" has been added to this Application Level because Vale S.A. has submitted (part of) this report for external assurance. GRI accepts the reporter's own criteria for choosing the relevant assurance provider.

*The Global Reporting Initiative (GRI) is a network-based organization that has pioneered the development of the world's most widely used sustainability reporting framework and is committed to its continuous improvement and application worldwide. The GRI Guidelines set out the principles and indicators that organizations can use to measure and report their economic, environmental, and social performance. [www.globalreporting.org](http://www.globalreporting.org)*

**Disclaimer:** Where the relevant sustainability reporting includes external links, including to audio visual material, this statement only concerns material submitted to GRI at the time of the Check on 22 May 2013. GRI explicitly excludes the statement being applied to any later changes to such material.

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## Independent Auditors' Limited Assurance Report

To  
The Board of Directors and Other Interested Parties of  
Vale S.A.  
Rio de Janeiro – RJ

### Introduction

We have been contracted to apply limited assurance procedure on the sustainability information disclosed on the Sustainability Report of Vale S.A. ("Vale"), related to the year ended December 31<sup>st</sup>, 2012, as well as its commitment to the 5 (five) Subject Matters proposed by ICMM – International Council on Mining and Metals, including its ten sustainable development principles and five Position Statements.

### Responsibilities of Vale Management

The management of Vale is responsible for preparing and adequately presenting the sustainability information on the Sustainability Report in accordance with the Guidelines for Sustainability Reports of the Global Reporting Initiative – GRI (GRI-G3) and with the Sector Supplement "Mining & Metals Sector Supplement– RG Version 3.0/MMSS Final Version" and by the internal controls determined as necessary to ensure this information is free from material misstatement, even though it was resulted by fraud or error.

### Independent auditors' responsibility

Our responsibility is to express a conclusion about the sustainability information disclosed on the Sustainability Report and its commitment to the 5 (five) Subject Matters of ICMM, including its ten sustainable development principles and five Position Statements based on the limited assurance engagement conducted in accordance with Technical Notice (CT) 07/2012 approved by the Federal Accounting Council and prepared in accordance with NBC TO 3000 (Assurance Engagements Other Than Audits and Reviews), issued by the Federal Accounting Council - CFC, which is the equivalent to international standard ISAE 3000 issued by the International Federation of Accountants applicable to Non-Historical Information, and in accordance with the ICMM Assurance Procedures. These standards require compliance with ethical requirements, including independence ones and also that the engagement is conducted in order to provide a limited assurance that the information in Sustainability Report and its commitment to the 5 (five) Subject Matters of ICMM, taken as a whole, is free from material misstatement.

A limited assurance engagement conducted in accordance with NBC TO 3000 (ISAE 3000) consists mainly of questioning to the management of Vale and other professionals of the Company involved in the preparation of the information disclosed in the Sustainability Report and also applying analytical procedures to obtain evidence that allows us to make a limited assurance conclusion about the information taken as a whole. A limited assurance engagement also requires additional procedures when the independent auditor learns of issues which lead them to believe that the information in the Sustainability Report taken as a whole could present material misstatement.

The selected procedures were based on our understanding of the issues related to the compilation and presentation of the information in the Sustainability Report and other engagement circumstances and considerations about areas where material misstatement could exist. The procedures consisted of:

(a) the planning of the work, considering the relevance, the coherence, the amount of quantitative and qualitative information and the operational systems and internal controls that served as a basis for preparation of the information disclosed in the Sustainability Report of Vale.

(b) the understanding of the calculation methodology and the consolidation procedures used to of the indicators through interviews with the personnel in charge of the preparation of the information.

(c) the application of analytical procedures to the quantitative information and enquiries about the qualitative information and its relation to the indicators disclosed in the information disclosed in the Sustainability Report.

(d) visits to operation units in order to apply procedures (c) and (d), as well as to verify the corporate policies implementation and management practices related to ICMM sustainable development principles.

(e) the understanding of the policies and practices implemented, or in process of implementation, to manage the company's critical issues and the ones related to ICMM sustainable development principles, through interviews with high management personnel and analysis of the available documentation.

(f) the comparison of the financial indicators with the financial statements and/or accounting records.

(g) verify if the organizational and operational boundaries defined by Vale SA ("Vale") for the preparation of the Sustainability Report are aligned with the criteria established by the Global Reporting Initiative – GRI.

(h) the adherence analysis to the Guidelines for Sustainability Reports of the Global Reporting Initiative – GRI (GRI-G3) applicable in the preparation of the information disclosed in the Sustainability Report (full version available on the website - [www.vale.com/rs2012](http://www.vale.com/rs2012)).

The business areas and according operation units visited comprised:

**Iron Ore:**

- 07 Pelletizing Plants in Tubarão Complex (Espírito Santo, Brazil)
- Vargem Grande Complex (Minas Gerais, Brazil)

**Logistic:**

- Vitória Minas Railroad (EFVM)
- Tubarão Port (Espírito Santo, Brazil)

**Nickel:**

- Sudbury unit (Sudbury, Canada)

**Fertilizar:**

- Uberaba Complex – CIU
- Cubatão Industrial Complex - CCB
- Cubatão – Fosfatados Industrial Complex– CUB
- Piaçaguera Industrial Complex – CPG

We believe that the evidence we have obtained is sufficient and appropriate to provide a basis for our limited conclusion.

**Scope and limitations**

The procedures applied in a limited assurance engagement are substantially less extensive than those applied in an assurance engagement aiming to express an opinion about the information in the Sustainability Report. Due to this, it does not ensure us that we are aware of all the issues that would be identified during an assurance engagement which aim to express an opinion.

The nonfinancial data is subject to more inherent limitations than the financial data, due to the nature and diversity of the methods used to determine, calculate or estimate this data. Qualitative interpretations of the data's materiality and accuracy are subjected to individual presumptions and judgments. Additionally, we did not examine data informed for prior periods or future projections and targets either.

### **Application Level**

According to the GRI-G3 guidelines, Vale declares an Application Level A+ to its Sustainability Report, related to the year ended December 31 2012.

Vale reported all required information related to its profile, core and sectoral (Mining & Metals Sector Supplement – RG Version 3.0/MMSS Final Version) performance indicators, the management approach related to each indicator category and the additional performance indicators rated as material by its stakeholders. To the partially or not reported indicators, the reason for omission was presented in line with GRI recommendations. In this sense, we have considered that the applied procedures were sufficient to agree with the application level declared by Vale in compliance with the GRI-G3 guidelines.

### **Conclusion**

Based on the applied procedures, described in this report, we have not identified any relevant information that leads us to believe that the sustainability information disclosed in the Sustainability Report of Vale, related to the year ended December 31<sup>st</sup> 2012, was not compiled, in all material respects, in accordance with the Guidelines for Sustainability Reports of the Global Reporting Initiative – GRI (GRI-G3) and with the Sector Supplement “Mining & Metals Sector Supplement– RG Version 3.0/MMSS Final Version, and with the records and files that subsidized its elaboration, as well as on Vale's policies, procedures and practices to be aligned, or in alignment process, with the ICMM five Subject Matters, which include its ten sustainable development principles and five Position Statements, emphasizing that the policies, practices and procedures analyzed relate mainly to Vale's reality in Brazil. Their globalization process is already in progress and the international units are adjusting themselves to the procedures already in place at Brazilian operations, revealing progress in this internationalization process in 2012 in comparison to the previous year.

São Paulo, June 28<sup>th</sup> , 2013



KPMG Risk Advisory Services Ltda.  
CRC 2SP023233/O-4

Eduardo V. Cipullo  
Contador CRC 1SP135597/O-6