



Sustainability Report

2017

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Sustainability Report 2017

vale.com/rs2017



COMMUNICATION ON PROGRESS

This is our **Communication on Progress** in implementing the principles of the **United Nations Global Compact** and supporting broader UN goals.

We welcome feedback on its contents.





Vale works day
after day to build
a world with more
growth opportunities

Message from the Board of Directors

Vale wants to be recognized as the reference in sustainability, generating value for the surrounding communities. For this, Vale works tirelessly on your Mission to transform natural resources into prosperity and sustainable development without losing focus on management towards performance, return on investment, implementation of the strategy and transparency. We know there is a long way to go.

If, on the one hand, we know that the positive performance is crucial for any company to survive, on the other hand, we note that this is not enough in itself. For that reason, Vale carried out a recent restructuring in the sustainability department, to strengthen its License to Operate, and it was based on two fundamental capitals: the Social Capital, which aims to build a positive legacy in the communities where it is present; and the Natural Capital, which seeks to foster, in an expanded way, actions of environmental conservation, in order to generate positive externalities.

We have already collected good results in this regard, presented throughout the report through on the Sustainable Development Goals (SDG) defined by the UN, which govern, along with the 2030 Agenda, the company's restless search for the development in the territories, caring for the people and the environment. Regarding the Vale's transparency with a society and its shareholders, 2017

marked the migration of Vale's shares to Novo Mercado of B3 S.A., which represents the company's commitment to the highest standards of corporate governance, management and transparency. In practical terms, Vale becomes a company without a defined controlling shareholder. Its shareholding structure and its capital become pulverized and diffuse.

This change brings more transparency to minority shareholders, and consequently more representative of them, who now have full right to vote in the Board of Directors' elections and may participate in Vale's main management decisions. We believe that this movement balances the political and economic power of all shareholders, extending its alignment. Moreover, our belief is that this alignment reduces uncertainty, increases confidence and generates value not only for investors, but for all stakeholders.

Additionally, with the conversion of shares, Vale opened the Board of Directors for two more independent members. Therefore, I take this opportunity to thank Sandra Guerra and Isabella Saboya for having accepted the challenge and the responsibility of becoming parts of the most recent chapter in the company's history.

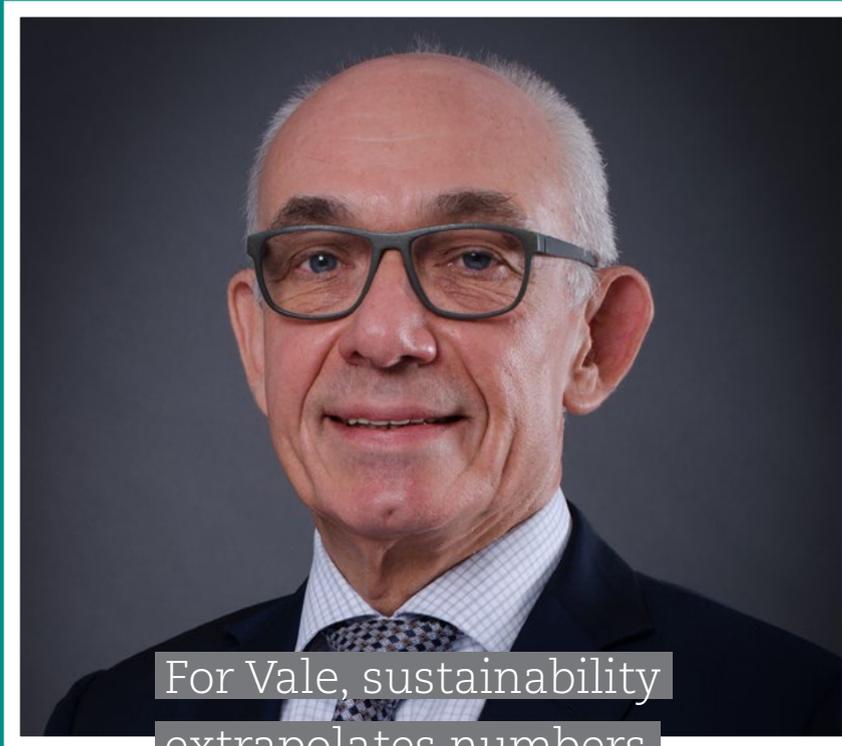
We have clarity that, as the largest mining company in the Americas and one of the largest in the world, our commitment to society goes beyond the scope of operations. Thus, Vale works day after day to build a world with more growth opportunities, which we all, citizens long for.

This report presents the progress of Vale and reaffirms the commitment to the principles of the United Nations Global Compact and the International Council on Mining and Metals (ICMM).

On behalf of the Board of directors and our shareholders, we appreciate the effort of those who contributed to the results presented, especially our directors, employees and partners. We invite everyone to know in more detail the management of a company committed to create trust relationships with the communities and support the development of the regions in which it operates, with respect to its characteristics, cultural aspects and the environment.

Gueitiro Matsuo Genso

Chairman of the Board of Directors



For Vale, sustainability extrapolates numbers and figures. It permeates our decision-making process so that we can contribute effectively to society

Message from the CEO

The year 2017 was extraordinary for Vale. We reaffirm our ability to reinvent ourselves in new market contexts, while we are confident that we will be able to pursue a more sustainable future.

Our goal is to continue on a path of success, but not to restrict economic-financial results. We want to be reference in sustainability of mining sector. For this, we will focus on the planning and systematic execution of programs and actions, working beyond the limits of our sites.

For us, sustainability is, above all, a matter of posture, a different way of operating. We invest in the continuous improvement of our processes and practices, and we engage our partners to ensure that our performance is aligned with the challenge of producing in harmony with the planet, respecting the needs of the people and the environment.

We are aware that we have an important role as drivers for the development of the regions where we are present. Therefore, we adopt a responsible attitude and dialogue with society, so that the advances obtained are a joint conquest and thus can become permanent.

This focus on creating shared value has led us to define four pillars as the basis of our activities.

First, the **Improvement of Performance**, which translated into more integration among teams, investment in technology, and especially the price realization and rigorous capital allocation. The second pillar is related to maintaining a **Clear Strategy** focused on building a solid balance.

The third pillar, **Governance Evolution**, had its highlight with Vale entry in Novo Mercado, on December 22, 2017. Now, we are a part of the select group of companies with governance standards that exceed the market standards and the legal requirements.

The fourth pillar, we reaffirm the purpose of becoming a **Sustainability Reference**, consolidating our License to Operate the legitimacy of Vale's performance by society, especially local communities.

We undertake efforts and resources to fulfill this premise. In 2017, invest US\$ 612 million in the social and environmental area. However, for Vale, sustainability extrapolates numbers and figures. It permeates our decision-making process so that we can contribute effectively to society, rewarded the right we have been granted to prosper through mining.

In 2017, this notion materialized into a series of initiatives, in and out of Vale. Internally, we carried out a deep review of our structure, implementing several changes, among which we highlight the creation of the Sustainability and Institutional Relations Executive Office, giving focus, priority and character to the subject.

Externally, the year was marked by relevant partnerships, such as Vale's return to the International Council on Mining and Metals (ICMM), main engagement forum for leading companies in this market. We have also become members of the Task

Force on Climate-related Financial Disclosures (TCFD) because we believe that Climate Change is a core issue in our activities.

Vale's participation in forums related to subjects such as human rights, fight against corruption, gender equality and environmental protection, among others, evidences our commitment to the principles of the UN Global Compact and reinforces our intention to contribute for society's well-being.

I am proud of how much we advanced in 2017, and I am sure we can go even further, but there are big and important challenges ahead. Despite our efforts, we are sorry for the five deaths in our operations, and we are solidary to these families. Zero Harm is a priority for Vale. In this sense, we have strengthened our commitment to continue the actions to mitigate the consequences of the breakup of the Fundão dam, Mariana, in the state of Minas Gerais.

In 2018, our challenge will be to increase the efficiency in our processes, optimizing costs and working together to find new and better ways for mining. Reaching the operational plenitude of the Eliezer Batista S11D Complex and elevating the production parameters under the value over volume strategy are some of the results we hope to achieve.

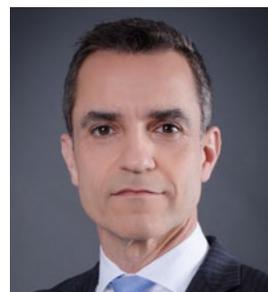
Oriented by the Act Right Value, we will work hard in favor of the planet and people. This is what is expected of a partnership company. This is our commitment.

Fabio Schvartsman
Chief Executive Officer

Executive office



Fabio Schvartsman
Chief Executive Officer (CEO)



Alexandre Pereira
Executive Officer, Business Support



Alexandre S. D'Ambrosio
General Counsel



Eduardo Bartolomeo
Executive Officer, Base Metals



Juarez Saliba
Director of Strategy, Exploration and New Business



Luciano Siani Pires
Chief Financial Officer and Executive Officer, Investor Relations



Luiz Eduardo Osorio
Executive Officer, Sustainability and Institutional Relations



Marina Quental
People Director



Peter Poppinga
Executive Officer, Ferrous Minerals and Coal

About this Report

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The Sustainability Report 2017 presents Vale's main actions and results in the period, including financial and non-financial information related to the company's economic, environmental and social performance.¹ This 11th edition of the Sustainability Report was prepared in accordance to Global Reporting Initiative (GRI) Standards: Comprehensive Option and its Mining and Metals Sector Supplement. The content also covers the guidelines and commitments related to the United Nations Global Compact, the International Council of Mining and Metals (ICMM), and the Sustainable Development Goals (SDG) in conjunction with 2030 Agenda, a United Nations document that presents concrete measures to promote sustainable development using the year 2030 as a horizon.

And it is the Sustainable Development Goals that inspired the foreword of this publication. The reports of our achievements, difficulties, challenges and advancements were divided into five main areas that guide the organization of the SDG and 2030 Agenda: People, Planet, Prosperity, Peace, and Partnership. To those, we have added a sixth chapter: Purpose, which opens our report and presents the way Vale organizes itself to play its role in those matters.

Each of the chapters is divided into three lines of content to facilitate understanding. In Our Commitment, we present

the values and strategic definitions that guide our approach to material subjects relevant to Vale and its stakeholders. In Our Perspective, we indicate the main concepts that lead Vale's strategy and practice relative to the subject. Finally, in Our Work, we report our activities, achievements, accomplishments, challenges and difficulties during 2017 and comparing, whenever applicable, our performance in 2017 with previous years. Throughout the report, we indicate which Sustainable Development Goal each subject relates to.

In total, in this edition, we present disclosure items (equivalent to previous editions), among them the founding principles of methodology (GRI 101 2016), general content (GRI 102 2016) management approaches (GRI 103 2016) specific disclosure topics (GRI 200, 300 e 400 2016), and the Mining and Metals Sector Supplement.

This year, the report was subject to external verification by the audit company SGS ICS Certificadora Ltda, which was selected through service providers and whose declaration can be found on page 162. The results of the report are analyzed and evaluated by the Sustainability Committee, which, in turn, advises the Board of Directors. No relevant need of change was verified in regard to data published in previous editions.



The Sustainability Report serves as a Communication on Progress (COP) of the Global Compact

¹ Occasional differences in the data and percentages in the graphs and tables must be attributed to the rounding of values. Throughout the report, the figures in Reals were converted to American Dollars, using the rate of BRL 3,19. Due to the complexity of activities, there is not a unique reporting criterion per business unit. Therefore, some disclosure items are not presented as a percentage of the business unit.

This document includes statements that present Vale's expectations about future events or results. All statements based on future expectations involve risks and uncertainties. Therefore, Vale cannot guarantee that such statements will become real. The risks and uncertainties include factors related to:

- (a) countries where the company has operations, mainly Brazil and Canada;*
- (b) the global economy;*
- (c) the stock market;*
- (d) operational accidents or incidents;*
- (e) the ores and metals business, and its dependency on the global industrial production, which is cyclic in nature; and*
- (f) the high level of global competition in markets where Vale operates.*

For further information on factors capable of producing results different from those estimated by Vale, the reports filed with the Brazilian Securities and Exchange Commission (CVM, in Portuguese) and the US Securities and Exchange Commission (SEC) are available for consultation, in particular the factors discussed in sections "Estimates and projections" and "Risk factors" in Vale's Annual Report - Form 20F, available at www.vale.com.



“Where do you connect with nature?”

As part of the actions of the 2017 Environmental Week, Vale promoted a photography contest among its employees. In all, 461 images had been uploaded and the winners illustrate this page.

Photo 1: Sensorial Garden - 1st place. Reinaldo Walmir de Jesus (Espírito Santo, Brazil).
 Photo 2: Blue Amazon - 2nd place. Cristiano Zuba (Pará, Brazil).
 Photo 3: Flore endémique du maquis minier calédonien 3rd place. Anne-Laure Meunier (New Caledonia).

Materiality

102-9 | 102-40 | 102-42 | 102-43 | 102-44

In 2017, Vale promoted a new cycle of the review of its material themes as one of the bases for its Sustainability Report, aligned with the GRI Standards, taking into account the four principles that guide the definition of its content: the context of sustainability and the inclusion of stakeholders, materiality and completeness.

The conduct of this study of materiality was based on a review of the Vale's production chain, including economic, social and environmental impacts, as well as an analysis of sustainability risks and opportunities, with the objective of prioritizing the most relevant themes for the success of the business and accountability to its stakeholders. The applied methodology considered the analysis of the Impact and Influence axes. The assessment of the impacts and externalities of the company's value chain was one of the inputs that guided the collection of the perception of material themes by its stakeholders.

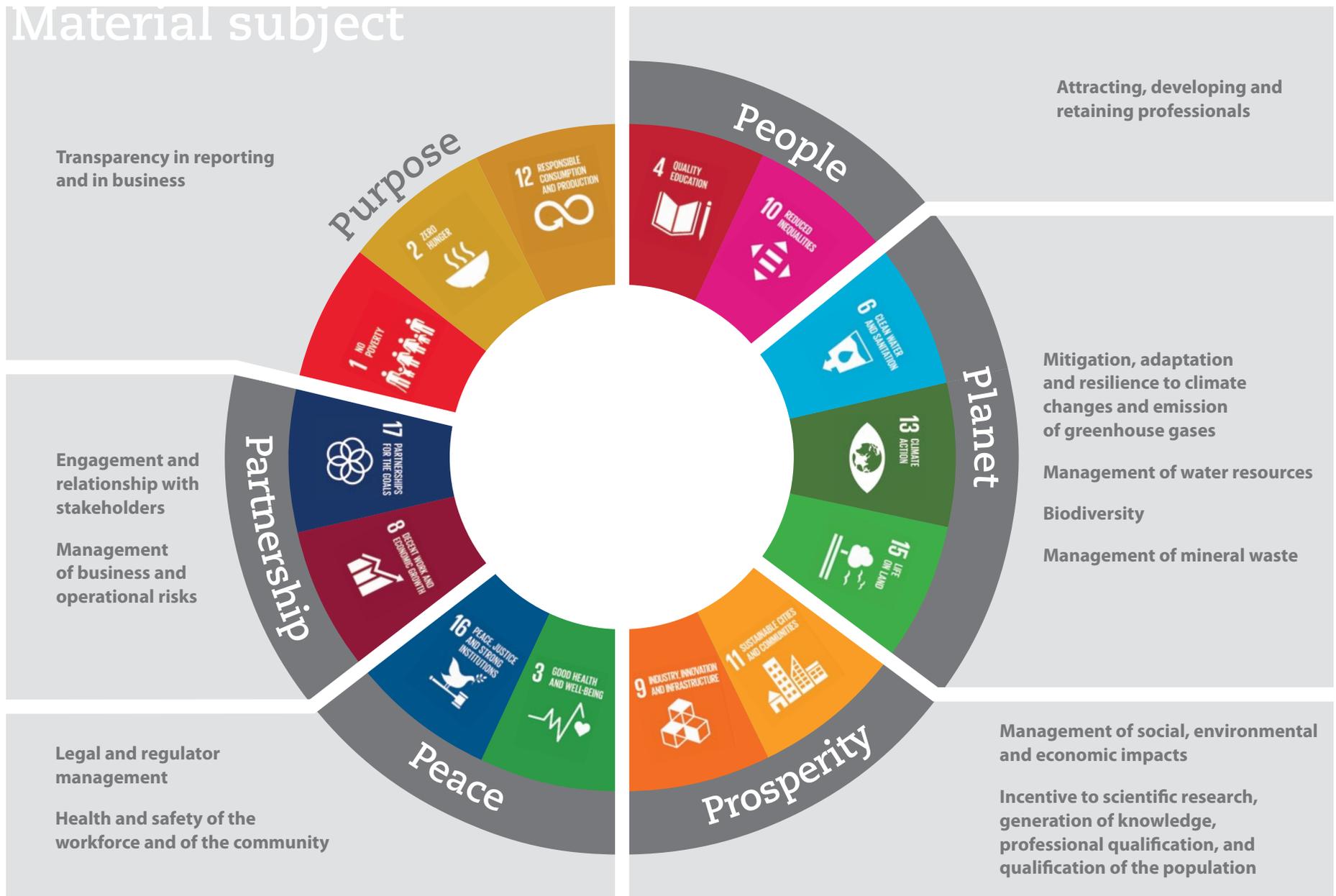
External consultants, investors, international organizations and leaders of strategic areas of the company were consulted, who were selected for their notorious degree of understanding and influence on sustainability issues, or for their performance, involvement and experience in related matters.

As a result of this review, 11 priority topics for Vale in this cycle were highlighted in the materiality matrix.

In the Impact axis, we evaluated the degree of relevance of the material themes related to the success of the business, considering topics and aspects associated, with five main criteria: a) revenue generation; b) efficiency of operations; c) regulatory risks; d) brand or reputation; and e) the company's overall business context. To arrive at the result of this axis, we consulted with the Directors and Managers of Vale through individual interviews and questionnaires, and analyzed internal documents and external references.

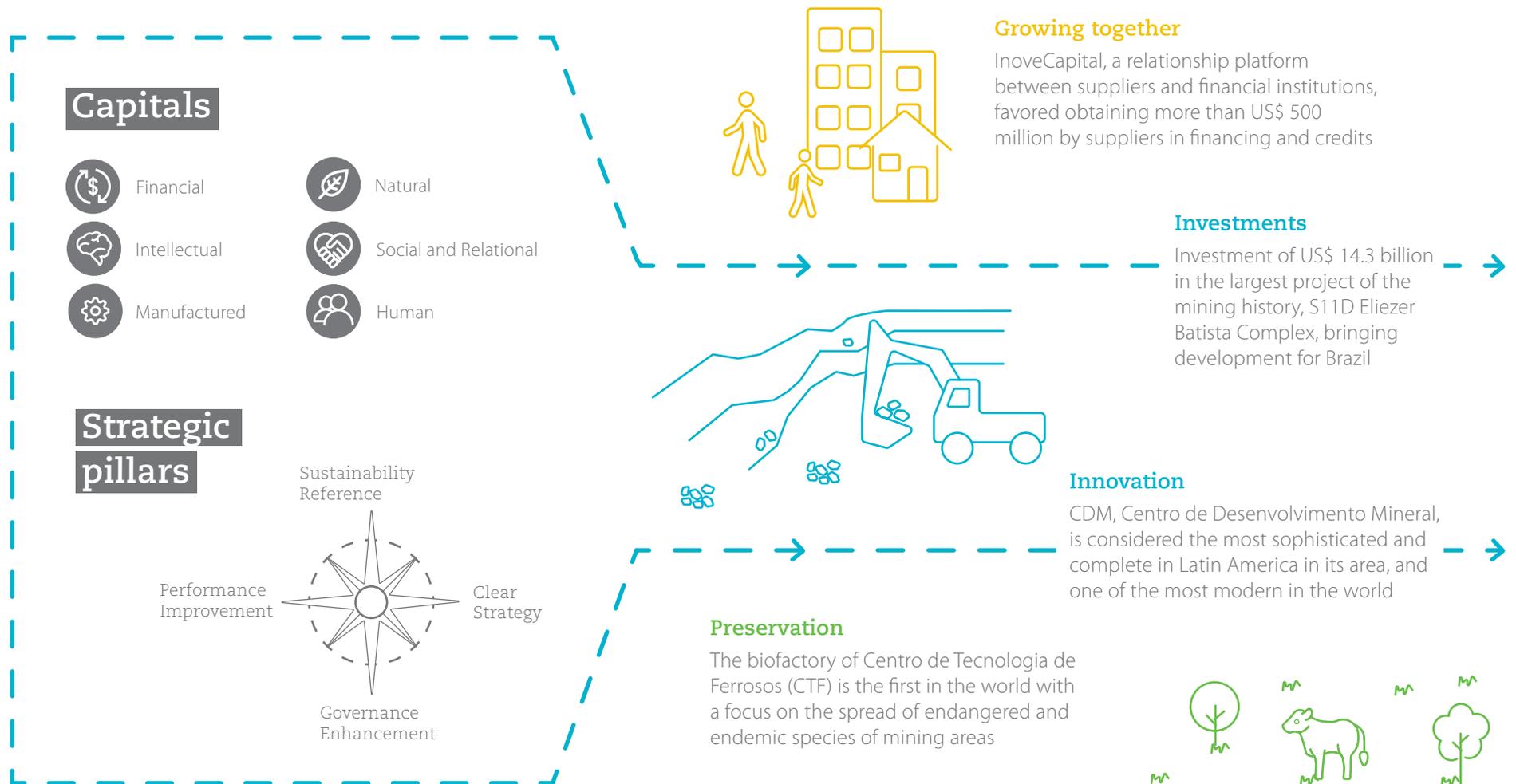
The Influence axis considered the degree of relevance of the material issues, as well as the perceptions and expectations of stakeholders and shareholders regarding the possible impacts (positive or negative), including the company's action and the responsiveness of mitigation. In determining this axis, individual interviews were conducted with specialists in sustainability, mining, national and international markets and shareholders. As well, media studies and analysis of the sustainability practices of competing companies were performed.

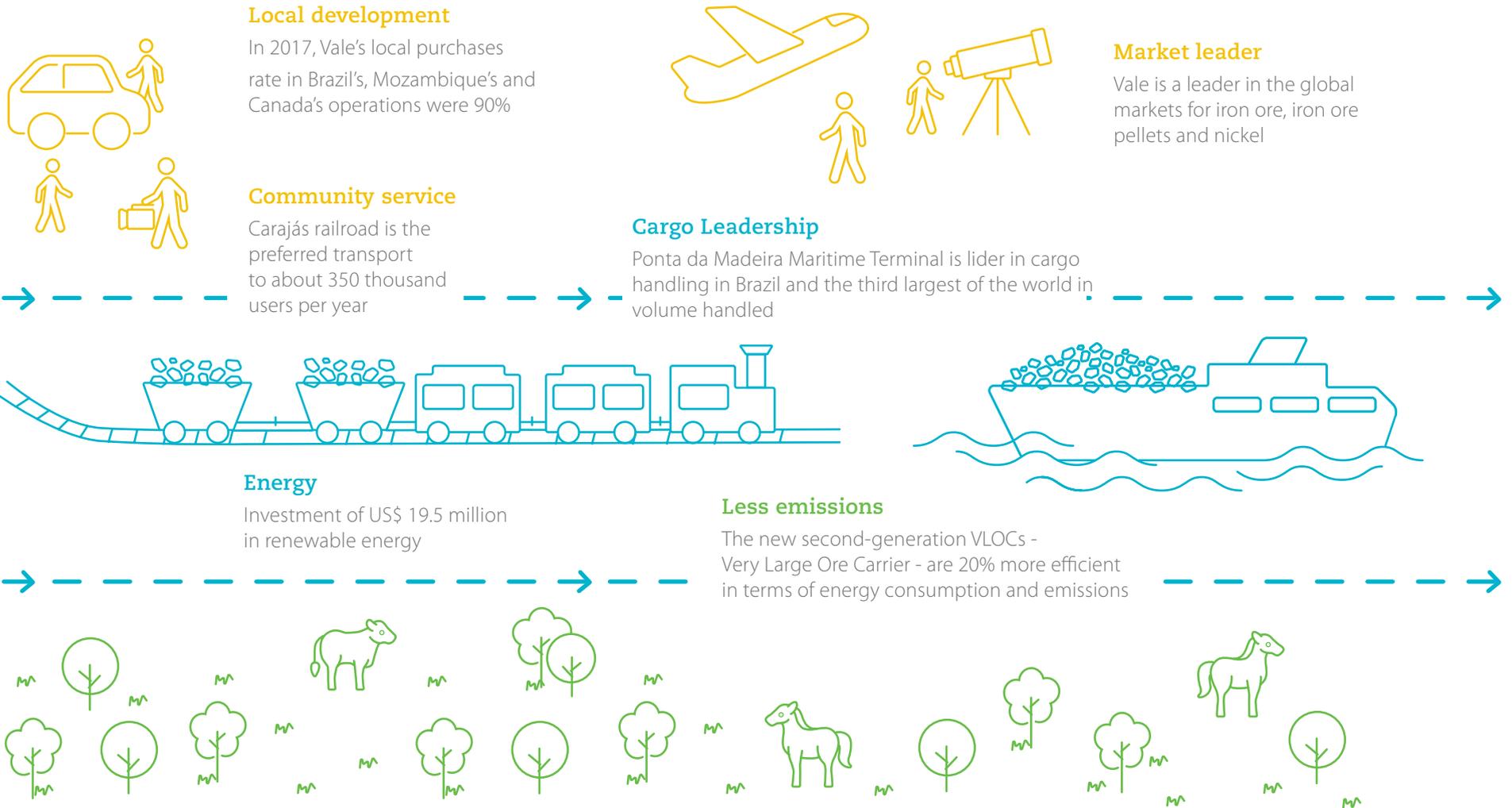
For 2017, Vale further strengthened its commitment to the principles of the United Nations Global Compact, reflected in 2030 Agenda, through a consistent evaluation of the most relevant themes related to the Sustainable Development Goals (SDGs). This procedure helps to prioritize the 17 SDGs to be implemented next year. As a result of this materiality review study, considering 2030 Agenda and the critical issues mapped, were prioritized 11 SDGs, out of 17, distributed in the chapters People, Planet, Prosperity, Peace and Partnership.



Vale's value chain

The company transforms natural resources and other capitals into shared wealth with society





Highlights



Purpose

Presence in **25** countries
of **5** continents.

Return to the International Council on Mining and Metals (ICMM), which gathers **23 global companies** of the sector and required its members to commit to the best operational principles and practices.

Migration of Vale's shares to **Novo Mercado** of the stock exchange of São Paulo (B3).



People

130.6
thousand
employees in 2017,
101.6 thousand
of them in Brazil.

Active relationship with **20 traditional communities** and **27 indigenous peoples**, in addition to **21 agreements** signed with these populations, including the mandatory impact mitigation programs established by the legislation of each country.



Planet

8.5 thousand km²

of protected areas, which is equivalent to **5.6 times** the total area occupied by the operating units.

Vale's **reuse of water** for industrial processes reached

82%.

Highlights



Prosperity

In profit
US\$ 5.5 billion

An increase of **more than 38.3%** in comparison with 2016.

243
companies in Brasil qualified

by the Suppliers' Development Programs.



Peace

68.3 thousand people mobilized in 19 countries for **The Reflection Day.**

2.1% global rate of **medical absenteeism,** with 2.6% in Brazil.



Partnership

67% of the operations have engagement plans with stakeholders and **74%** count with committees or groups of social dialogue.

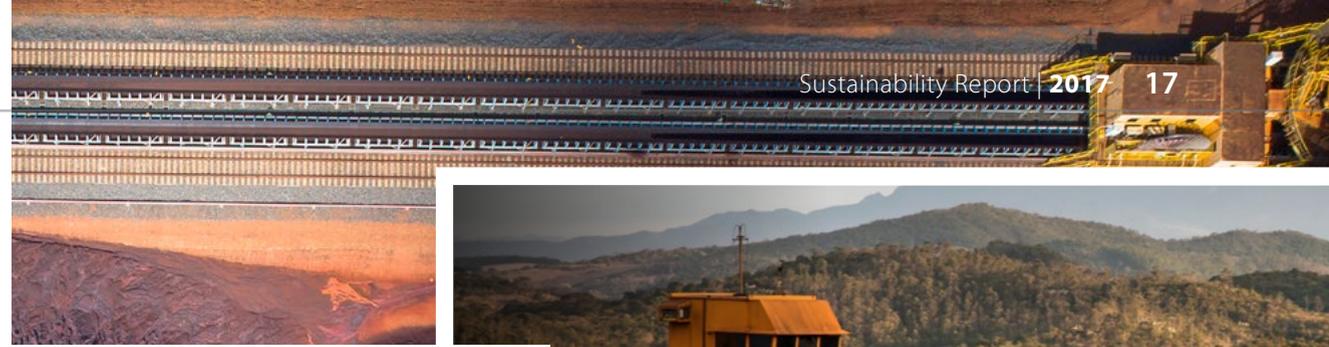
US\$ 69.3 million were invested in urban infrastructure and **US\$ 35.6 million in services.**

Purpose

Vale and society, a sustainable partnership

Photos: Pedro Rubens and
Ricardo Teles

The largest mining company in the Americas and one of the largest in the world, Vale's purpose is transforming natural resources into prosperity and sustainable development through mining. This means working with the goal of generating economic return for shareholders and, at the same time, adopting best practices to protect the environment and of social action.



Piles of ore at the Brucutu mine in São Gonçalo do Rio Abaixo (MG)



Aerial view of S11D Eliezer Batista Complex storage yard in Canaã dos Carajás (PA)





► Purpose and SDGs

The purpose of Vale is linked to its mission, vision and values. The Sustainable Development Goals (SDGs) related to this axis, and covered in this chapter, are SDG 1, 2 and 12, which respectively deal with the eradication of poverty, fighting hunger and consumption and sustainable production. These SDGs connect to Vale's purpose of being a company that promotes the prosperity of territories, people's quality of life and the conscious use of natural resources.

Our commitment

Vale wants to be responsible for a socio-environmental and positive role for society, as expressed in its vision: "to be the number one global natural resources company in creating long term value through excellence and passion for people and the planet."

An important element in this journey is understanding "value" as something that goes far beyond the financial element, and translates into benefits that the businesses are capable of generating. This happens, for example, when Vale's activities generate raw materials for products used in our day-to-day lives. Iron ore, copper, nickel, cobalt and coal are present in utensils, processes and technologies that define the way we live, and they have a direct impact on people's quality of life.

Crossing the borders of the operation, Vale's environmental activity is responsible for conserving 8.5 thousand km² of natural areas. The company also protects more than 5 thousand species of plants

and animals, including more than 160 endangered species, and 64 endemic species only in one of its protected areas, Vale Natural Reserve, located in Linhares, in Brazil's state of Espírito Santo.

As for the social aspect, Vale invests in developing territories where it is present, including the promotion of human rights in its value chain, through initiatives to recognize and appreciate traditional communities and indigenous peoples, and by creating shared wealth with suppliers, employees and society by means of its joint work with governments, civil society organizations and foundations it helps to maintain. In 2017, Vale invested US\$39.2 million in voluntary social expenditures.

This social responsibility is also reflected in the adoption of a responsible, transparent and proactive attitude in relationship with the community and in the remediation of impacts that occur at operations and value chain.

Storage yard of the Vale unit in Itaguaí (RJ).
Photo: Ricardo Teles



Vale's Mission, Vision and Values

102-16

Mission:

To transform natural resources into prosperity and sustainable development.

Vision:

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

Values:

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

Our perspective

For Vale, fulfilling its purpose depends on its capacity to dialogue and work with stakeholders. For that reason, the company tries to adapt its operation and governance in order to be closer to and in alignment with these demands.

Our work

102-16 | 103-1 | 103-2

The paths Vale follows to implement its vision are mapped out by its values, which fall under strategic pillars that guide the management of subjects in the company's materiality matrix.

These pillars shape the policies, define our goals, allocate our resources, divide our responsibilities, refer and resolve stakeholders' demands, and evaluate the results obtained and the continuous improvement of processes.

To sustain and guide its operation, Vale designed a governance model based on three guiding principles: clarity of roles, transparency and stability.

The adherence of company management to these principles has resulted Vale's entrance on the Novo Mercado, at December, 2017.

Strategic Pillars

Improvement of Performance:

achieve better performance through optimization of capital allocation, cost efficiency and price realization.

Clear Strategy:

focus on financial strength, leveraging asset performance and stimulating EBITDA growth.

Governance Evolution:

transforming the company into a True Corporation, following best governance practices.

Sustainability Reference:

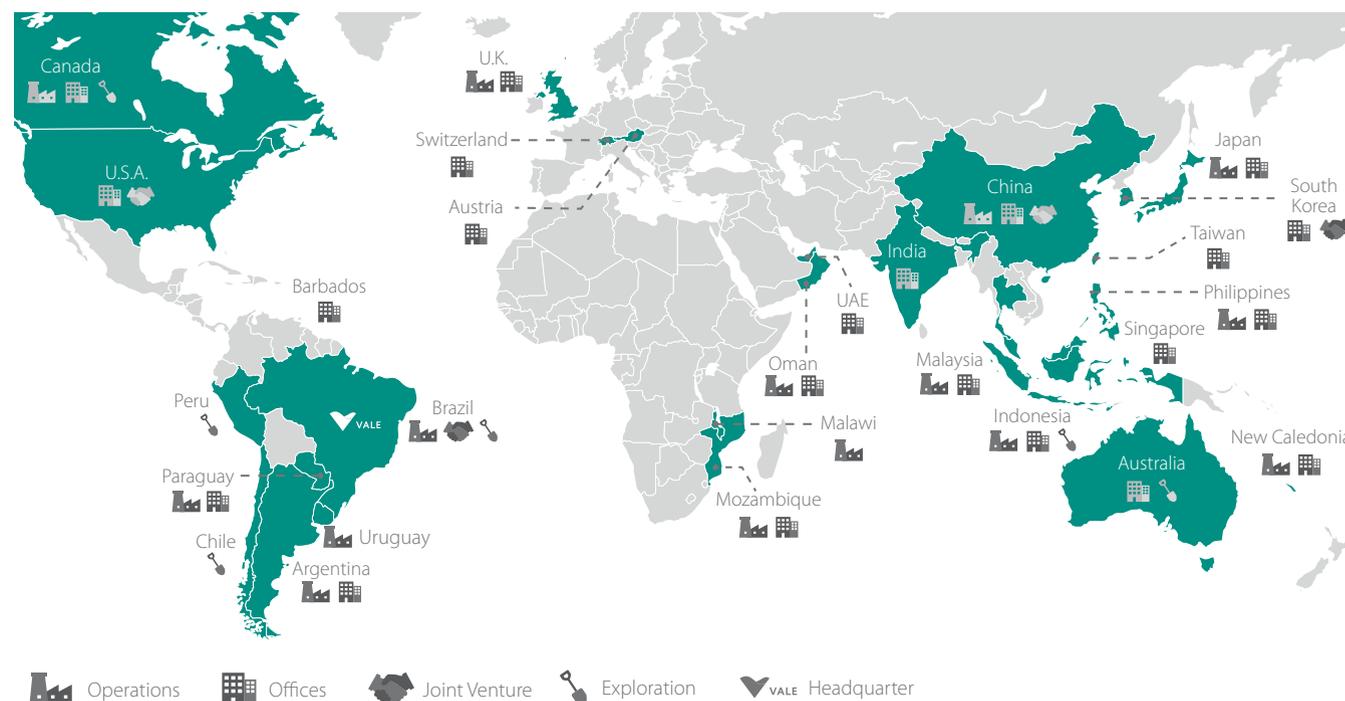
be recognized as the most sustainable mining company in the industry, generating value for the surrounding communities.

Organizational profile

102-1 | 102-2 | 102-3 | 102-4 | 102-5 | 102-6 | 102-7

VALE S.A is a leader in global markets of iron ore, iron ore pellets and nickel. Its activities also include the production of manganese ore, ferroalloys, copper, platinum group metals (PGMs), gold, silver, cobalt, metallurgical and thermal coal, potash, phosphates and other fertilizers.¹

To operate this broad portfolio, it is present in 25 countries, on five continents, where it has administrative offices and operational units connected by modern integrated logistics systems that comprise railroads, maritime terminals and ports.



¹ Vale Fertilizantes assets, which include potash and phosphates, had their sale confirmed in January 2018, except for the Cubatão (SP) operation, which continues to produce phosphates and nitrogen.

In addition to this logistics infrastructure, Vale also has maritime chartering services, floating transfer stations (FTSs)² and distribution centers (DCs) that support the transportation of ores produced, from their extraction from mines to their delivery to clients. Vale also holds interest in relevant assets in the energy and ferrous metallurgy segments through its affiliated companies, joint ventures or direct participation.

Incorporated as a publicly-held private corporation, the company's corporate headquarters are located in the city of Rio de Janeiro (Brazil), and its shares are traded on the Novo Mercado of the São Paulo Stock Exchange (B3). It is also present in the financial markets of New York (NYSE), Paris (Euronext) and Madrid (Bolsa de Madrid).

In 2017, Vale ended the year with 130.6 thousand employees, of which 101.6 thousand are located in Brazil, totaling US\$32.7 billion in distributed economic value. The numbers reinforce its calling to turn natural resources into wealth, by generating value for its stakeholders.

² The Vale's last floating transfer station was sold in January 2018.



Vale's corporate
governance model follows
the structure of principles
based on clarity of roles,
transparency and stability

Industrial Complex of Carajás,
in Parauapebas (PA)
Photo: Ricardo Teles

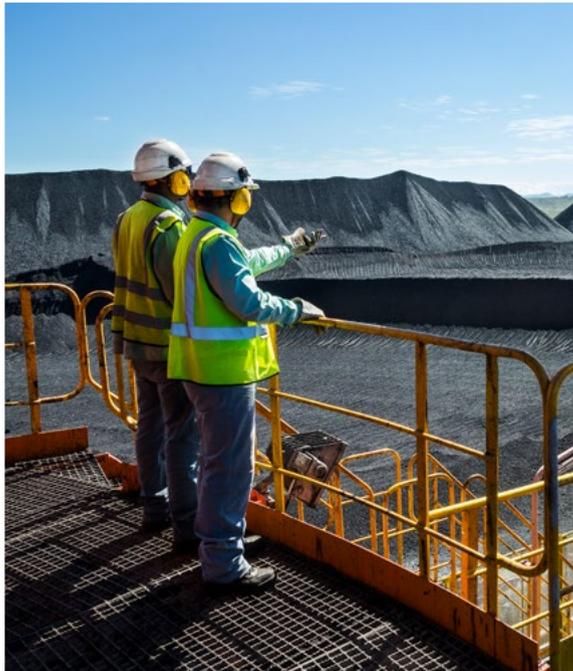
Corporate governance

102-18 | 102-19

Clarity of roles, transparency and stability. Vale's new corporate governance model was based on these three principles to ensure a trajectory of growth for the company as it generates sustainable value.

In 2017, Vale underwent a significant restructuring in its senior management, with a change in its presidency and some Executive Offices. In this report we highlight the creation of the Sustainability and Institutional Relations Executive Department and the Sustainability Committee, now more dedicated to the sustainability subject, demonstrating the company's concern with the issue.

This concern is inherent in the activities of the company's areas and units, and it is achieved through several internal rules and guidelines, such as the Sustainability Policy, Mitigation of and Adaptation to Climate Change Policy, the Human Rights Policy, and the Global Anti-Corruption Policy. These procedures also reflect the commitments with multilateral organizations and professional associations, according to international standards and certifications.



Moatize Coal Mine in Mozambique.
Photo: Marcelo Coelho

Based on these parameters, Vale established transparency as a fundamental principle in its role as a Global Sustainability Agent, through which it contributes to the sustainability discussion and fights sustainable development challenges in the regions and countries where it is present.

Structure

At Vale, the general guidelines and policies that guide our business are defined by the Board of Directors, which monitors their enforcement through executive officers' reports. The Board receives advice from technical and consulting committees.

Board of Directors

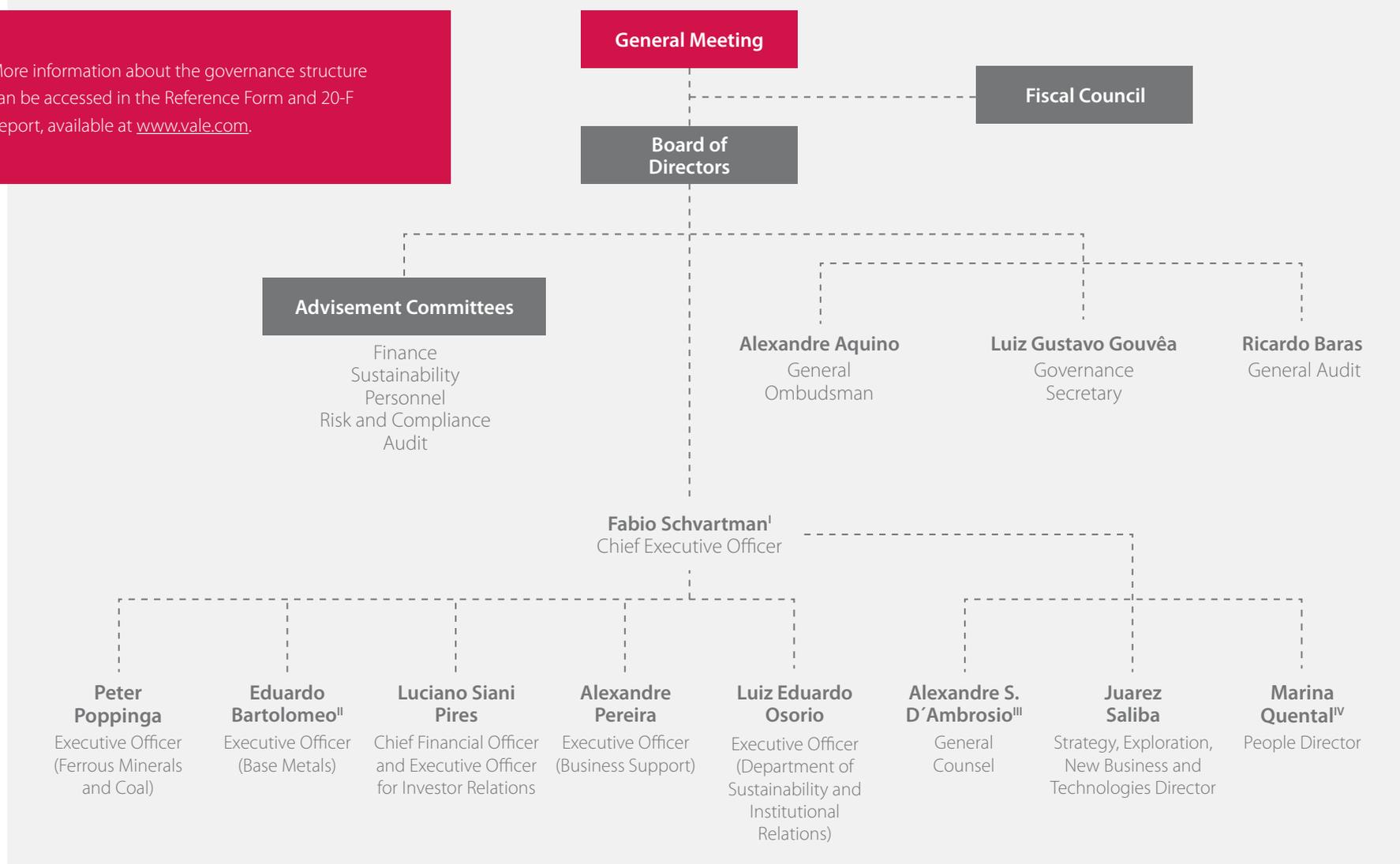
102-22 | 102-23 | 102-24 | 102-25 | 102-26 | 102-27 | 102-28 | 102-29 | 102-30 | 102-31 | 102-35 | 102-36 | 102-37

The Board of Directors decides Vale's general policies and guidelines, evaluates plans and policies proposed by the Executive Office, and assesses the results achieved. The members of the Board meet every month, and may be called for special meetings by its Chairman or Vice-Chairman, or by any two Board members together. In 2017, 21 meetings were held.

The directors' term is two years, and their compensation follows the criteria of other managers and employees of Vale, which is set based on market research prepared by independent consulting companies. The Board of Directors is responsible for electing the executive officers for two-year terms and can remove them from office at any time.

Among the Board's attributions is to approve, update and assess the company's compliance with its Mission, Vision and Values, under advisement by the Advisement Committees.

More information about the governance structure can be accessed in the Reference Form and 20-F Report, available at www.vale.com.



^IOn May 22, 2017, Fabio Schvartman assumed the position of Chief Executive Officer. To the date, Murilo Ferreira has held the position.

^{II}Eduardo Bartolomeo assumed the Base Metals Executive Officer position on January 1, 2018. During 2017, the position was held by Jennifer Maki.

^{III}Alexandre S. D'Ambrosio assumed the position on March, 19, 2018. Until January 7, 2018 Clovis Torres was responsible for the scope in the chair of General Advisor.

^{IV} Marina Qental assumed this position on November 27, 2017.

Executive Office

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This office is responsible for carrying out the business strategy defined by the Board of Directors, for drafting plans and projects, and for overseeing Vale's operational and financial performance. The CEO acts as an interface between the Executive Office and the Board of Directors.

Vale's executive officers are the company's legal representatives, and they are responsible for the operations day-to-day and implementing the policies and goals set by the Board of Directors. According to the Articles of Incorporation, the Executive Office is formed by at least six and up to nine members.

It is currently formed by one CEO and five executive officers: Financial and Investor Relations, Ferrous Minerals and Coal, Base Metals, Sustainability and Institutional Relations, and Business Support. In addition, there are three non-statutory directors who report directly to the CEO: People Director, Strategy, Exploration, New Business and Technologies Director and General Counsel.

Fiscal Council

This council is responsible for supervising management's activities and the financial statements, reporting directly to the shareholders. Vale has established a permanent Fiscal Council that may have from three to five members. Holders

of Preferred Shares, including special class shares or golden shares, may elect and dismiss a member of the Fiscal Council and their respective substitute.

Advisement Committees

102-21 | 102-32 | 102-33

The committees support the Board of Directors during the decision-making process. They are currently divided into five areas: Personnel, Risk and Compliance, Finance, Audit, and Sustainability.

The committees represent discussion forums and share the different views of their members, which enables greater maturity and alignment of the proposals before they are sent to the Board of Directors. The goal is to contribute to the fluidity and quality of the decision-making processes.

The Sustainability Committee evaluates Vale's sustainability strategy, ensuring that sustainability and human rights aspects are considered in defining the company's overall strategy and performance, in addition to advising the Board of Directors regarding the approval of improvements based on a long-term strategic view.

Sustainability and Institutional Relations Executive Department

To contribute to Vale's sustainable performance and expand its dialogue with its stakeholders, the company created the Sustainability and Institutional Relations Executive Department, led by Executive Director Luiz Eduardo Osorio. In February 2018, the area passed a motion to initiate a redesign to strengthen the search for licenses to operate, as well as to strengthen company's relationship with society.

Among the main changes implemented was the adoption of a new governance, which reinforces local work and the work integrated with the business. In the new model, the Sustainability areas become regional: the idea is to meet the socio-environmental demands of localities with greater agility and ensure alignment with Vale's Sustainability Policy. The new governance of the Sustainability and Institutional Relations Executive Department also oversees:

- The alignment of foundations regarding Vale's social and cultural investments and actions;
- The integration of the Instituto Tecnológico Vale;
- Our Intellectual Property and Partnerships and Resources areas, which become part of the Board of Directors due to the growing focus on sustainability issues such as soil and climate change research; and
- The coordination of negotiations for the renewal of rail concessions.

Global Sustainability Goals

In line with the guidelines and horizon of 2030 Agenda and the respective Sustainable Development Goals (SDGs), Vale has established sustainability targets for the coming years.

Regarding the environment, on the Carbon theme, the multi-year target proposes the reduction of 5% in direct greenhouse gas emissions in 2020, as well as the definition of a new post-2020 challenge. In 2018, Vale will continue to work towards the definition of a new goal of water resource utilization, which consists of a global reduction of its new water catchment by 2030. In addition, Vale established a Recovery of Degraded Areas (RDA) target for 2018, which involves the recovery of approximately 2 thousand hectares of areas.

In addition to the long-term environmental goals, targets were set for the construction of a positive legacy in the communities and the social license to operate. Programs to increase community income, strengthen basic education and access to health, community health and safety, and human rights issues are among the company's focus on strengthening social capital.



Rotary lane forklift and conveyor belt (blue, foreground) of the S11D Eliezer Batista Complex, in Carajás (PA). Alongside, are the employees in the railway branch, also in this project.
Photos: Ricardo Teles

Novo Mercado: Vale joins Brazil's pantheon of most transparent companies

In December 22, 2017, Vale announced the migration of its shares to Novo Mercado on the São Paulo Stock Exchange (B3 S.A. – Brazil, Bolsa, Balcão), the highest listing segment in terms of corporate governance, management and transparency. Completing this phase marked the end of a corporate restructuring process that enables Vale to comply with the most modern market practices adopted by big global companies.

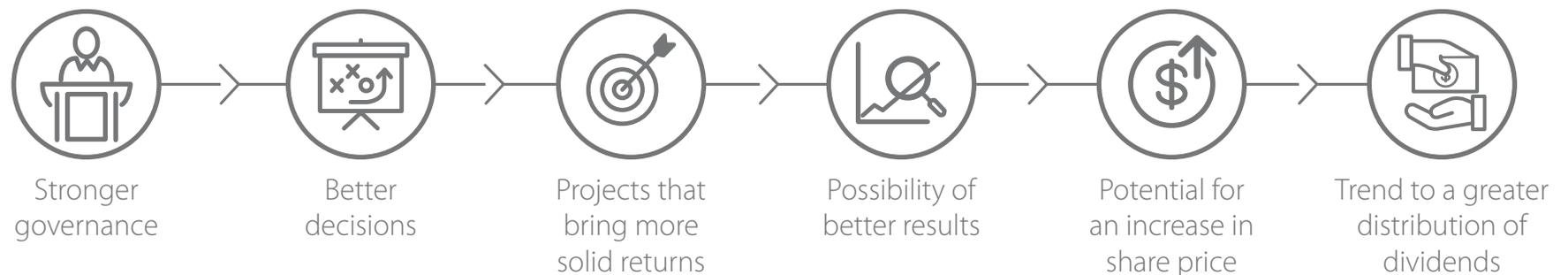
In practical terms, minority shareholders gained more representativeness, with full voting rights and participation in the company's major decisions. The conversion into single class shares created more liquidity for the minority shareholder, which translates to a higher daily volume traded. Furthermore, minority shareholders will now receive the same treatment as controlling shareholders if the company's control is sold, with full payment of the price of each share (a 100% tag-along).

The operation was approved by 99.9% of the preferential shares represented during the Preferred Shareholders Special Meeting, held in October 18, 2017. Vale reached the qualified quorum required by the Corporations Law for this type of

meeting, which is more than half of the shares. At that moment, the conversion of the remaining Class A Preferred Shares (PNA) into common shares was approved by the holders of these shares.

As soon as the share conversion process was announced, Vale began a campaign among its shareholders to inform them, in a transparent and unbiased way, about the process and the importance of making a mindful decision whether to participate in the conversion or not. The campaign involved informative action in printed and digital media, including social media. A page providing additional information and contacts for further clarification was also created on the company's website.

According to a study published by Associação de Investidores no Mercado de Capitais (AMEC) and the CFA Society Brazil, there is a correlation between the level of corporate governance and market performance. As evidence of that, according to the study, the average performance of companies listed in Novo Mercado has been better than the performance of companies in São Paulo's traditional stock exchange and in levels 1 and 2 of B3, since 2012.





“It is a huge pleasure to get to the end of this year concluding the migration to the highest level of governance of B3, within a shorter period than initially expected”

Fabio Schvartsman, Vale’s CEO, during Vale Day, in December 2017, when Vale’s entry into the Novo Mercado was announced.
Photo: Alyssa Ringler

What is Novo Mercado?

Novo Mercado is a listing of companies maintained by B3 – Brazil’s official stock exchange (B3 S.A. Brasil, Bolsa, Balcão), which resulted from the merger of Bolsa de Valores, Mercadorias e Futuros de São Paulo (BM&FBOVESPA) and Central de Custódia e de Liquidação Financeira de Títulos (Cetip). Since its inception in 2000, Novo Mercado has become the standard for transparency and governance expected by investors and the main resource for publicly-held companies that voluntarily adopt corporate governance practices over and above those required by Brazilian legislation.

Acceptance into this listing means that a company adopts a set of corporate rules that increase shareholders’ rights, discloses its policies and implements inspection and control structures.

Fundação Renova: Dialogue and transparency to remedy impacts

Vale, jointly with BHP Billiton and Samarco Mineração, maintains The Renova Foundation, which was created to manage and execute programs to repair and remediate areas and communities affected by the collapse of the Fundão Dam, owned by Samarco Mineração, in Mariana, Minas Gerais, on November 5, 2015.

Reflecting one year of activities, in August 2017 the Foundation presented tangible results in relation to the commitments undertaken under the Settlement and Consent Decree (TTAC, acronym in Portuguese) signed by Samarco and its shareholders (Vale and BHP Billiton Brasil), the Federal Government, the government of the states of Minas Gerais and Espírito Santo, and other Brazilian governmental authorities.

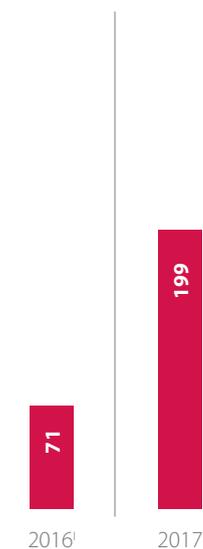
Since the rupture of the Fundão Dam, approximately US\$858 million has already been dedicated to the recovery process, US\$160 million paid as damages, 101 streams recovered, more than 500 headwaters fenced, 2.3 thousand sacred fragments rescued and conserved, 47 thousand hectares treated through a forest restoration process, more than 23 thousand registered people affected, and approximately 700 infrastructure projects completed, among other relevant accomplishments.

The Foundation operates programs fully funded by its funding entities. Vale, as a subsidiary funding entity, has currently appointed three members to the Trustee Council and their respective alternates.

In 2017, Vale invested US\$199 million in Fundação Renova's activities to repair and compensate for the impacts caused by the collapse of the Fundão Dam in Doce river.

Fundação Renova's activities comply with principles of transparency and responsible and effective performance of the programs, which include public participation and constant government surveillance.

Vale's investment in Fundação Renova
(US\$ million)



¹ August, when the Foundation began its activities, until December

Vale has already invested **us\$ 270 million** in **Fundação Renova** to **repair and compensate** for the impacts caused by the collapse of the Fundão Dam.

us\$ 160 million
paid in
indemnities

47
thousands
hectares
undergoing
forest
restoration

101
affected
streams
recovered

us\$ 858 million
destined to
the **recovery**
process

More than
500
headwaters
fenced

2.3
thousands
sacred fragments
retrieved
and conserved

Legal Settlement

Fundação Renova was established with the Settlement and Consent Decree (TTAC) signed by Samarco and its shareholders, Vale and BHP Billiton Brasil Ltda., with the plaintiffs of the public civil action, in the amount of US\$5.8 billion, represented by the Federal Government, the states of Espírito Santo and Minas Gerais, and other Brazilian governmental authorities. The funds will be dedicated to implementing programs to repair and compensate areas and communities affected by the collapse of the Fundão Dam, operated by Samarco, in the city of Mariana, Minas Gerais, on November 5, 2015. The accident caused 19 deaths and about 300 unsheltered families

Programs

Remediation and compensation are the two main aspects of programs carried out by Fundação Renova. The entity ended 2017 with all 42 programs set forth in the TTAC in motion (socio-environmental and socioeconomic). The initiatives are organized into three themes: People and Communities, Land and Water, and Reconstruction and Infrastructure. They all share a main focus upon recovery from and compensation for the impacts caused by the dam's collapse.

Fundação Renova's projects and initiatives are developed according to a study that assessed the social, environmental and economic impacts. Its purpose is to ensure that the actions and measures defined by the programs have scientific grounds, whenever applicable, and are proportional and effective.

For detailed information on the actions developed so far and future plans, see **Fundação Renova's** website at (<http://www.fundacaorenova.org>).



Learn more about Vale's dams management practices in the chapter Planet, under Management of Dams and Mineral Residues.

Restoration of banks of Rio do Carmo and Rio Gualaxo, Barra Longa (MG, Brazil)
Photos: propagation Fundação Renova



The Renova Foundation ended 2017 with the 42 ongoing programs



People

Respect and dialogue

Photos: Pedro Rubens
and Ricardo Teles

Respect for people is fundamental to building strong and lasting relationships with the public with which Vale is related. It is required to create collaborative environments, internally and externally, and for daily activities success. As one of the company's principles, respect for people is demonstrated in the relationships that Vale builds with its employees, communities and stakeholders.



Training workshop in Corumbá (MS)



Moatize Coal Mine, Mozambique



► People and SDGs

Under the subject of People, the 2030 Agenda commits to putting an end to poverty and hunger in all its forms and dimensions, and to ensuring that all human beings can realize their potential with dignity and equality in a healthy environment. The primarily related Sustainable Development Goals (SDGs) are 1, 4 and 5, which address poverty eradication, quality education and gender equality. Vale understands that all these aspects are essential to people and seeks to collaborate so that they are reflected in its employees' lives and in the communities in which it operates.

Respect for people is a
fundamental condition for
building strong and lasting ties
with the public with which Vale
has a relationship

Our commitment

To be a sustainable company, Vale understands that its relationship with people must result in a consistent social legacy. This means creating value for internal and external audiences, so that advances become permanent and reflected in the communities.

This objective guides the company's strategy, both for its employees and for people that live where the company operates. Each of these groups has specific needs, which, therefore converge at several points, such as attention to human rights, the importance of diversity and the demand for more opportunities.

Policies and commitments

Caring for people is a commitment that is present in Vale's values and internally means taking actions to eliminate accidents, supporting the development of employees, being a great company to work for, and creating an environment that is suitable for professional growth and safe.

Respecting diversity and promoting inclusion are ethical and essential requirements for a sustainable enterprise. Vale's Code of Ethical Conduct and Human Rights Policy guide actions and initiatives related to promoting diversity and inclusion and reinforce non-tolerance of discrimination of any kind, including moral and sexual harassment.

Vale invests in attracting, retaining and encouraging an increasingly diverse workforce, seeking to create inclusive and meritocratic environments in which everyone, regardless of their singularities, has the same opportunities.

The company is also committed to promoting gender equality, seeking to eliminate all forms of discrimination in access, compensation, promotion and permanence in employment. Vale has been a signatory since 2014 of the UN's Women's Empowerment Principles and the Global Compact. The company's actions seeks to recognize and promote women's talent and capacity to reduce the historical and cultural discrepancy between men and women in the mining industry.

In addition to the actions carried out by Vale through the Human Resources area, the Fundação Vale also works to reduce gender inequalities by strengthening public policies and projects in the areas of Work and Income Generation, Education and Health.

As part of the ongoing process of updating its guidelines, in 2018 Vale will complete its revision of its Code of Ethics and Conduct, which will be called the Code of Ethical Conduct. The purpose of the upgrade is to simplify the Code's language, making it more accessible to all employees, and to increase the level of detail about the behaviors that are expected of anyone acting on behalf of the company. The full version of the document can be accessed at www.vale.com, clicking on About Vale, it is available in the area of Corporate Governance.



From left to right, Bárbara Braga, Ademilton Freire and Amanda Gabriel, equipment and facilities operators, in the area of the car dumper of the Guaíba Island Terminal, in Mangaratiba (RJ)
Photo: Ricardo Teles

Human rights

Vale is a global company that is attentive to respect and promotion human rights principles, not only in its activities but also in its value chain. As a signatory of global instruments that appreciate and act in support of human rights, Vale illustrates its commitment to operate with the highest international standards for human rights, labor relations, the environment and the fight against corruption.

In line with the Business and Human Rights Matrix of the United Nations (UN), Vale developed its Human Rights Policy in 2009, revised in 2013 according to the UN's Guiding Principles for Business and Human Rights of 2011.

To monitor its progress in this field, the company has established a management – system-which is continuously improved and focuses mainly on processes – normative (policies and norms), evaluation, integration, monitoring and reporting, as well as complaint and grievance mechanisms.

Indigenous peoples and traditional communities

The company values culture and respects indigenous peoples and traditional communities. It acts in order to guarantee free, prior and informed consultation and permanent dialogue. Guided by its Sustainability Policy and of the International Council on Mining and Metals (ICMM) on Indigenous Peoples and Mining position, it establishes voluntary agreements focused on ethnodevelopment and strong impact management, with the objective of guaranteeing the rights of these communities and peoples, and generate shared earnings.

Aiming at the continuous improvement of internal management on the subject, it also has other internal regulations such as the Sustainability Norm, which provides guidelines on the leaders' duties, and the Social Action Guide, which includes chapters on "Manage Relationships with Indigenous Peoples and Traditional Communities" and "Manage Themes of Human Rights".

We value traditional communities and are open to ongoing dialogue, maintaining voluntary agreements for ethnodevelopment

"A Look at Sustainability" Global Photography Contest, organized by Vale in partnership with National Geographic Magazine. Fisherman by boat on the Amazon River, near the town of Ourives. Photo: Diego Pinheiro



Public policies

Citizenship rights are made possible by public policies, and the direct and indirect participation of companies in this agenda has been further strengthened by the definition of SGD. There is a tendency to direct private social investment to broaden the reach of these public policies, creating new opportunities for improving the living conditions of communities. But, in addition to contributing to communities' access to these policies through their social investments, Vale is directly affected by changes in legislation.

As Vale's main activities are regulated by the public sector, the company is directly affected by the legislation regarding the Mineral Sector. In this way its employees participate in the process of elaborating public policies through entities and sectoral associations. To regulate this action, Vale has important governance instruments, such as the Anti-Corruption Policy, Anti-Corruption Manual, Code of Ethical Conduct, Compliance Programs, Institutional Relations Guide, besides the compliance and respect of laws.

In 2017, Vale participated in discussions related to the Mineral Industry Modernization Program that changed the calculation basis and the Financial Compensation Rate for the Exploration of Mineral Resources (CFEM, in Portuguese), created the National Mining Agency (ANM, in Portuguese), and proposed the revision of the Regulatory Framework for Mining.

Complaint and grievance mechanisms

103-2

Vale has structured channels of claims and complaints, such as the telephone line and direct contact with professionals who interface with stakeholders, enabling dialogue and improving processes to mitigate or remediate conflicts.

On the human rights theme, in order to complement its operational risk management model, Vale has also developed a policy for treating allegations of human rights violations, which follows a well-defined process and enables critical issues related to this subject to be highlighted.

The importance of this and other subjects is also shared with the value chain. The Supplier's Code of Ethical Conduct, also available online, for instance, has clear policies on diversity, inclusion of people with disabilities and gender equality.

The company maintains the following communication, consultation and dialogue tools:

Channels	Public audiences (stakeholders)						
	Shareholders, debenture holders and investors	Clients	Employees	Suppliers	Communities	Government & civil society	Press
20-F Report, press releases, call notices and AGM/EGM meeting minutes, quarterly reports, reference forms	●	●		●	●	●	●
Vale.com Portal	●	●	●	●	●	●	●
Visits to operations	●	●		●	●	●	●
Meetings	●	●	●	●	●	●	●
E-mail: rio@vale.com	●						
Telephone +55 21 3485-3900 (IR Department)	●						
Ombudsman	●	●	●	●	●	●	●
Investor relations department at www.vale.com	●						
App for iPad – Vale Investors & Media – App Store	●						●
Campaigns		●	●	●	●	●	
Special events		●	●	●			
Satisfaction surveys		●		●			
Contact us		●	●	●	●		
Interactive daily newsletter			●				
Monthly printed newsletter			●				
Noticeboard journals			●				
Intranet			●				
Global Employee Survey ¹			●				
Communication Committee			●				
Social networks			●	●	●		
Structured meetings and collaboration workshops		●	●	●	●	●	●

¹Quantitative study carried out by Human Resources for Vale's employees.

Channels	Public audiences (stakeholders)						
	Shareholders, debenture holders and investors	Clients	Employees	Suppliers	Communities	Government & civil society	Press
Vale Supplier Portal (Nimbi platform) ⁱⁱ				●		●	●
Vale Procurement Global Services ⁱⁱⁱ				●			
Conference call	●	●	●	●		●	●
Telephones and emails		●	●	●	●	●	●
Supplier area on www.vale.com				●			
Committees for communication inter-change					●		
Socio-economic diagnoses					●	●	
Public hearings					●	●	
Social dialogue process				●	●	●	
Leadership Meeting Program					●		
External disclosure – News					●		
Alô Ferrovias (railway hotline)					●	●	
Contact with Community Relations team				●	●	●	
Contact with other areas				●			
Participation in associations and entities				●		●	
Participation at conferences, forums and debates				●	●	●	
Press interviews	●	●	●	●	●	●	●
Pressroom			●	●		●	●
Webcast							●
Visits to the newsrooms	●			●	●		●
Conversation circles			●	●	●		●

ⁱⁱThe Vale Supplier Portal (Nimbi platform) is a virtual space for the commercialization of products and services that interfaces the Company and its suppliers, increasing the integration of the purchasing processes, ranging from quotation to payment.

ⁱⁱⁱVale Procurement Global Services is a virtual environment created to address problems related to Vale's purchasing chain. It is divided into three subjects: contracts, payment of invoices and electronic invoices of services.

Our perspective

Vale believes that developing the territories is intrinsically linked to strengthening people and, consequently, communities. Therefore, the company seeks to establish lasting relationships that develop a positive social legacy and create long-term value for its internal and external audiences.



Launch of books and educational games in the Tribe of Saint Laurent, Païta, New Caledonia. Kanak Native Language Enhancement Program. Photo: Claude Beaudemoulin

Our work

Internal audience

102-8 | 202-2 | 401-1 | 405-1

In 2017, Vale's workforce totaled 130.6 thousand employees, including its own (fixed term, trainees and people with disabilities -PWD, which started to be counted as workforce in this year) and third-party employees (35.2 thousand service providers in permanent activities and 21.8 thousand in projects)¹.

Out of the total number of own and third-party employees, 101.6 thousand (77.8%) worked in Brazil², mostly in the states of Minas Gerais and Pará, which together represented 61.1% of the national workforce. Compared to 2016, there was a decrease of 17% in the number of third parties, especially due to the demobilization of completed projects, such as the S11D Eliezer Batista Complex.

The participation of women in the own staff was 12.3%. Among the professionals, 50.9% occupied technical posts (operational and administrative), 42.9% were in the specialists segment (analysts, engineers, geologists etc.), 2.7% were supervisors and 3.4% managers or coordinators. The Board of Executive Officers, the Board of Directors and the Fiscal Council are integrated by 29 professionals, and at the end of 2017 there were four women in this group: one executive director and three advisors. In relation to the age group, one is under 30 years, 7 are between 30 and 50 years and 21 are over 50.

¹In general, they work in the works of reform, expansion and new ventures.

²The employees of Biopalma da Amazônia S.A. (Biopalma) are not being considered in the total number of employees reported (130.6 thousand). In 2017, Biopalma added 4.1 thousand employees and, from 2018, the company will be an integral part of the report. In Brazil, there is no part-time hiring.

In 2017, the local hiring rate³ was 68%. Considering only the members of top management⁴ from the local community⁵, the rate was 46%.

Turnover

	2015	2016	2017
General	8.7%	7.2%	9.0%
By gender			
Men	8.6%	7.0%	9.0%
Women	9.8%	8.4%	9.6%
By age			
Under 30 years	11.0%	10.6%	9.7%
Between 30 and 50 years	7.6%	6.1%	7.8%
Over 50 years	10.8%	7.8%	13.9%
By region			
Brazil	8.9%	6.8%	9.0%
Canada	5.6%	4.3%	6.9%
Mozambique	18.0%	29.5%	19.5%
Indonesia	2.9%	2.9%	4.1%



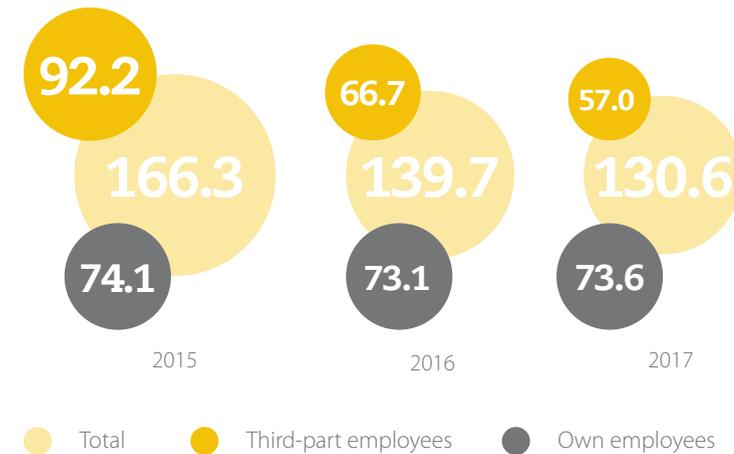
Turnover rate calculated by the sum of admissions and annual withdrawals divided by two. The result is divided by the total number of employees from the previous year. Own employees of this indicator [401-1] correspond to 100% (2015-2017) of the total number of employees reported [102-8].

³Our own employees in this indicator [202-2] correspond to 91% (2017) of the total number of employees reported [102-8]. In Canada employees' birthplaces cannot be traced.

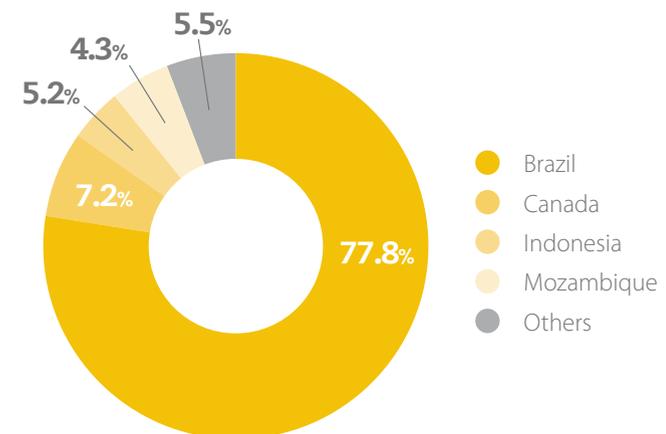
⁴Managers and officers are considered to be top management.

⁵Although the calculation of the indicator has considered the employees' states or provinces of birth, the practice of hiring, when applicable, prioritizes residents in the state, not necessarily people who were born in that state.

Workforce
(in thousands)

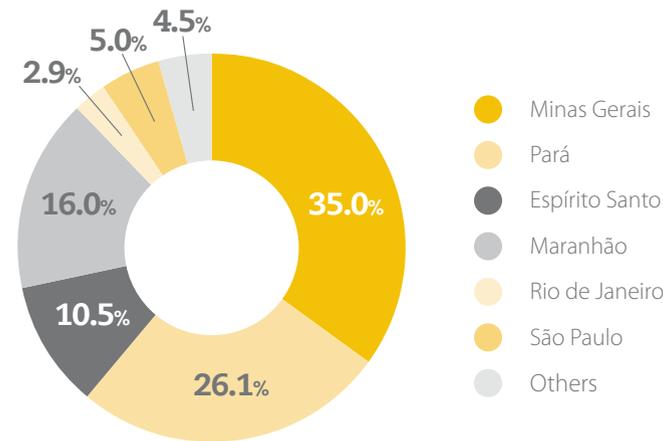


Distribution of own and third-party employees by geographical region
2017

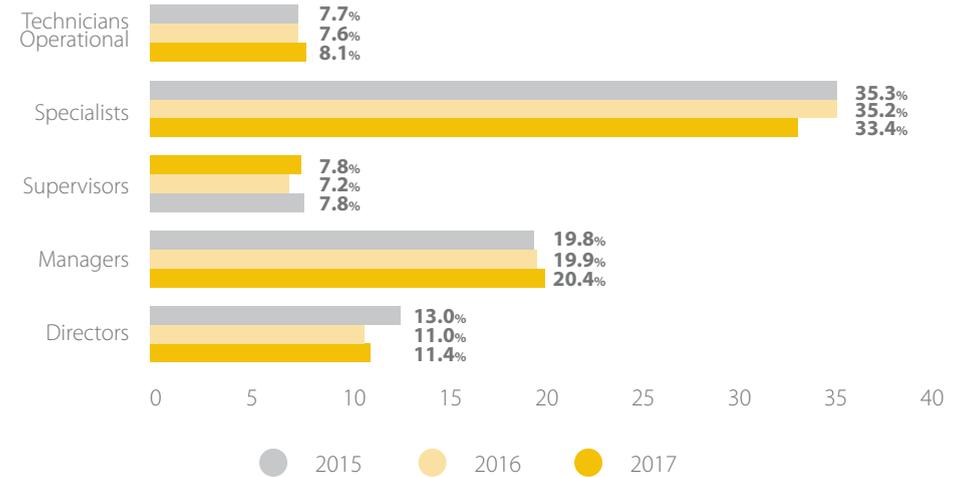


Distribution of employees by Brazilian State

2017

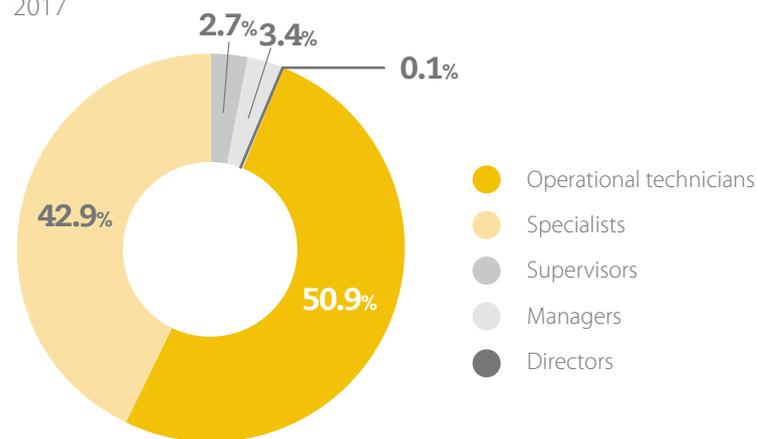


Proportion of women by functional category



Distribution of women by functional category

2017



Relationship with employee associations

102-41 | 402-1 | MM4

Vale seeks a balanced and productive relationship with the entities that collectively represent its employees. Therefore, it meets with representatives of these institutions throughout the year to address relevant issues. In the understanding of the company, these meetings strengthen dialogue and transparency, as well as contributes to the stability of operations.⁶



Employees of this indicator [405-1] correspond to 100% (2015-2017) of the total number of employees reported [102-8].

⁶Since 1989 there have been no strikes in the main Brazilian operations, and in 2017 there was no notification of strikes or interruptions in other locations.

To express themselves directly and individually on any subject, employees can use their leaders, the HR area or also the company's ombudsman. For employees' representatives, the most usual and direct channel is Vale's Labour Relations team⁷. In Brazil, 100% of Vale's employees are covered by collective agreements. In other countries, the coverage aligns with local legislation.

Compensation and benefits

202-1 | 401-2 | 401-3 | 405-2

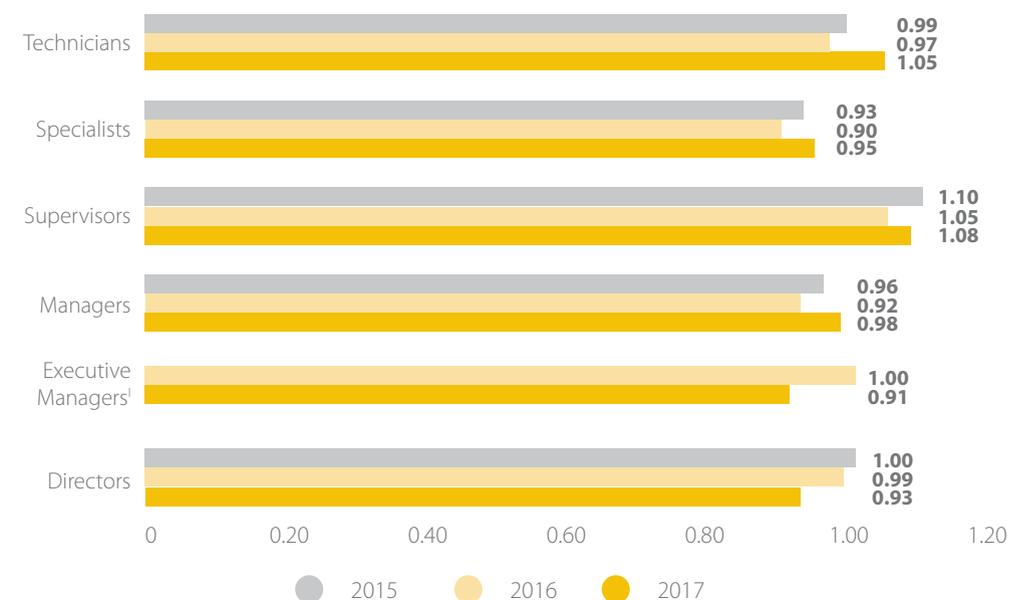
Vale's philosophy of performance-based compensation gives employees equal growth opportunities, regardless of the length of time they have been working for the company. Management measures in this regard include annual evaluation of the competitiveness of professionals' compensation, conducted through market research in locations where the company operates.

Vale respects the local legal minimum wage, and pays equal base salaries⁸ to men and women who perform the same functions, as determined by our Human Resources Policy. Any possible variations arise solely from different levels of the employees' seniority and maturity in their functional category.

Also, once a year, the Board of Directors discusses and approves the CEO's and executive officers' goals for the period, which are assigned to their teams. If the goals are achieved, the employees are paid additional amounts according to their team's and the company's performance,

which are both evaluated under the Profit Sharing Program⁹ (PLR, in Portuguese). In 2017, 97.5%¹⁰ of employees had their performance evaluated.

Proportion of basic salary between women and men by functional category



¹Professional category considered from 2016.

Own employees of this indicator correspond to 97% (2017), 98% (2016) and 99% (2015) of total employees reported.

⁷A Prior notification of significant change is not part of the Vale's standard practices and is not included in collective wage agreements. According to the Global Reporting Initiative (GRI), significant changes are those which cause changes to production levels, such as restructuring, the closure of activities, acquisitions and mergers.

⁸Vale respects the legal or mandatory determinations that decide on the salary and its adjustments in each locality where it operates.

⁹Eligibility for participation in the program respects labor laws, collective bargaining agreements and / or local rules applicable in the localities where Vale operates.

¹⁰Our own employees in this indicator (404-3) correspond to 100% of Vale's total number of employees (102-8) who are eligible to participate in the Stork Program.

The benefits policy is aligned with the company's attraction and retention strategy, and complies with current legislation, as well as local market practices in the countries where Vale is present. It consists of a competitive and attractive benefits plan that targets the health, well-being, protection and quality of life of employees and their dependents. The main benefits offered are medical and dental care, life insurance, a private retirement pension plan, personal accident insurance, transportation allowance, educational training and meal allowance, among other things. Each year, the company invests about US\$770 million in benefits to its own employees.

In 2017, Vale's practices and commitments regarding maternity and paternity leave have remained in accordance with local legislation. In Brazil, the duration is 120 days for mothers and five days for parents. In both cases, there is a guarantee of employment or salary for periods of 120 and 60 days, respectively, after the end of the license.

Employee retention rates for parents who return to work after maternity and paternity leave in Brazil in 2017 were 90.6% and 93.6%, respectively.

Sustainability incorporated into variable remuneration

103-2

In the search for continuous improvement in its operations, Vale has a broad variable compensation program that impacts the company's own employees and is a way of rewarding them for their contribution to the company's results. The dimensions of sustainability are present in this program, along with economic and operational indicators. The Key Performance Indicators (KPI) for sustainability

are composed of indicators for environmental aspects, energy consumption and critical social aspects. There is also a Health and Safety goal, mainly composed of the evolutionary implementation of the Integrated Management System (SGI, in Portuguese) and the health, safety and environmental risk profile.

All goals are negotiated, defined and entered to the Career, Succession and Performance (CSP) monitoring system until April of each year. As already mentioned, for Sustainability targets, this subject is addressed in three dimensions, Environment, Energy and Social. The main indicators of each dimension are:

- **Environment:** Water, Contaminated Area, Effluent, Atmospheric Emissions, Recovery of Degraded Areas and Waste.
- **Energy:** Fuel and Electric Energy Consumption.
- **Social:** Reducing Time of Railroad Shutdowns, Addressing Critical/ Relevant Issues, and Social work in Critical Communities, including Indigenous Peoples and Traditional Communities.

The Environment dimension represents 40% of the weight of Sustainability grade, while Energy and Social represent 30% each. The indicators are negotiated and defined at the level of the operations, then grouped together to form the grade of the company's top leadership.

In addition to encouraging the continuous improvement of the company's performance in material subjects, through a strict weighting of indicators, the goals program encourages units that have not, or have only partially, achieved the proposed objective to make adjustments to comply with the program in the subsequent year. The results achieved in 2017 compared to 2016 are shown next:

KPI for Sustainability Table

Business area	Indicators	2016 Results	2017 Results
Iron Ore, Pellets and Manganese	Recovery of Degraded Areas (RDA)	●	●
	Water Resources	●	●
	Hazardous Waste Generation	●	●
	Atmospheric Emissions	●	●
	Energy Consumption (Fuels and Electricity)	●	●
	Significant Social Initiatives	●	●
Base Metals	Waste Management	●	●
	Water Resources	●	●
	Environmental Incidents	●	–
	Atmospheric Emissions	●	●
	Energy Consumption (Fuels and Electricity)	●	●
	Significant Social Initiatives	●	●
Coal	GHG Emissions	●	–
	Waste Management	●	–
	Atmospheric Emissions	–	●
	Water Resources	–	●
	Energy Consumption (Fuels and Electricity)	●	●
	Significant Social Initiatives	●	●
Fertilizers	Hazardous Waste Generation	●	●
	Waste Generation	●	●
	Waste Disposal	●	●
	Water Resources	●	●
	Energy Consumption (Fuels and Electricity)	●	●
	Significant Social Initiatives	●	●
Logistics	Water Resources	●	●
	Atmospheric Emissions	●	●
	Hazardous Waste Generation	●	●
	Energy Consumption (Fuels and Electricity)	●	●
	Significant Social Initiatives	●	●
Supplies	Waste Disposal	●	●
Mineral Survey	Recovery of Degraded Areas (RDA)	–	●

● Challenge Overcome ● Goal Achieved ● Goal Partially Achieved ● Goals Not Achieved – Not Applicable

Career and succession

404-2

The Career and Succession Program aims to build a culture of meritocracy, development, transparency, protagonism and continuous dialogue, generating value for people and Vale's businesses. This process involves a cycle with two phases, Evaluation and Development, with the aim of evaluating competencies, identifying potentials and guiding the development and protagonism of employees' careers.

Based upon the results of each phase, the employee and manager prepare an Individual Development Plan (IDP) based on the employee's strengths, weaknesses and career aspirations, to help them achieve full performance in their current role and prepare for future challenges. In 2017, the Development Phase covered approximately 83%¹⁰ of the global workforce, which resulted in performance evaluation monitoring for 56 thousand people.

To help employees expand their understanding of their career and increase their awareness of internal opportunities, Vale launched the Career Center in 2017. This platform offers content, tools and initiatives to support employees in developing and managing their careers. The services offered include Lectures, Career Fairs, Virtual Library, Career Counselling and a Career in Movement (webpage summarizing movements and vacancies).

¹⁰Own employees in this indicator [404-3] correspond to 100% of the total number of employees that are eligible for the Career and Succession Program (which does not include the companies of Vale Fertilizantes group) which represents 92% of the total number of employees reported [102-8].

Development and qualification

404-2 | 403-4

Vale's educational strategy is dedicated to developing and qualifying its professionals. This is achieved through a portfolio of training and qualification exercises, through which employees reinforce the skills they require to perform their activities, whether they be technical, managerial, leadership, or transversal (related to health and safety, the environment, respect for diversity, among others).

In 2017, Vale invested approximately 3.6 million hours in the training of its employees around the world. Investments in training totaled US\$14 million and were allocated to employee development in Africa, Asia, Europe and Americas. To reinforce Life Matters Most corporate value, the company maintains training and development initiatives specifically related to Health and Safety. During the year, more than 537 thousand hours are devoted to H&S training, such as our Accident Victim Assistance Group, Integrated Health, Safety and Environment Management, Hearing Protection Program, Respiratory Protection Program and Personal Equipment Protection (PEP).

One of the topics that drives trade union entities and collective agreements is the dissemination of a Health and Safety culture associated with the challenge of achieving Zero Harm. Vale considers employee representatives' concerns and points of view in defining mechanisms and requirements to prevent occupational accidents and diseases, and respects local regulations and legislation. It promotes training on the use of machines and equipment, provides Personal Protective Equipment, conducts periodic surveys in Vale's operational areas, and maintains joint Health and Safety committees. Employees have the right, guaranteed and reinforced by internal policies, to refuse unsafe work.

Ethical conduct is a premise that is strongly reinforced among Vale's employees. It is extensively promoted in the Anti-Corruption Program courses, which are available in Portuguese, English, Arabic, French, Mandarin and Malay. In 2017, more than 10 thousand employees were trained on this subject in Brazil, Argentina, Austria, China, Japan, Switzerland, Paraguay, Oman, Singapore, United Kingdom, Mozambique and Canada.

Operational technical and expert's development

To support the training of technical operational employees, Vale provides technical tracks, which enables workers to visualize the technical training required for each function in Vale's operations around the world. In Brazil, it was possible to obtain operational gains by properly using the Technical Track in the Port of São Luís, in Maranhão. We achieved a 62% reduction in the cost of brake changes in yard machines through good management of the tracks and quality training.

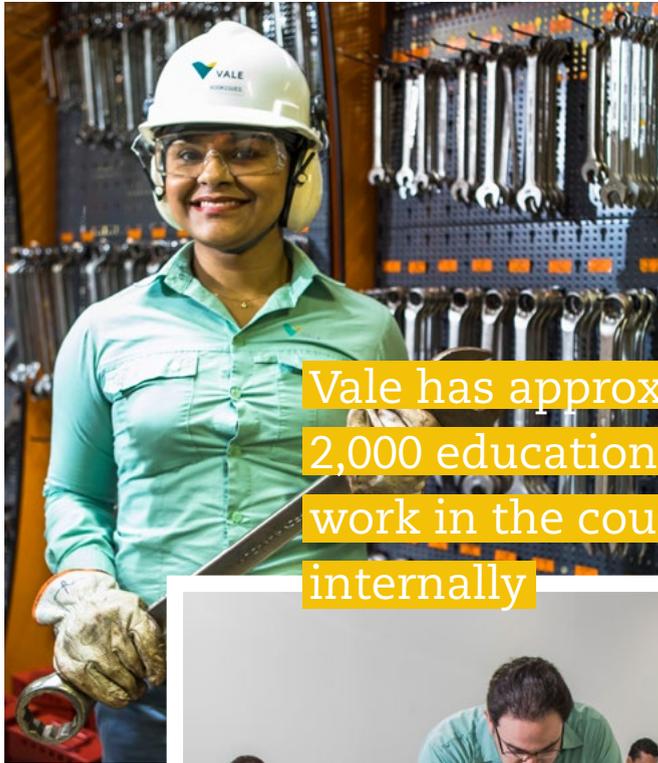
Experts are developed mainly through the Vale Academies, a structured training program in which technical and behavioral content is developed for critical and relevant company's topics. One example is the

Territorial Development course, which gives employees an understanding of the complexity of the subject and emphasizes the importance of the Sustainable Development Goals (SDGs). In 2017, Vale consolidated the implementation of Academies for technical professionals on the subjects of Sustainability, Finance, Supplies, IT, and Projects and Logistics, totaling about 9.4 thousand attendees in the courses, which represented 98 thousand hours of training.

Also to develop experts, the company promoted the Specialization in Mining and the Specialization in Railway Transport courses for 36 employees. Also in 2017, two master's degree courses (Automation and Sustainable Use of Natural Resources) were offered, in partnership with the communities, to 20 Vale employees and 20 residents of the regions where we operate in Brazil.

To share technical knowledge related to exploitation, mining and logistics, the company promoted the Fourth Meeting of Vale's Experts, which brought together about 410 employees in discussion forums on best practices and trends in these areas.

Regarding Information Security, Vale trained about 13.5 thousand employees in Brazil and in countries such as Canada, Mozambique, Switzerland, Paraguay and Malaysia through an online course called Information Security – Good Practices. The purpose of the initiative was to stimulate the conscious use of company information, maintaining its integrity, reliability and correct availability.



Mechanical Technician Oziane Robrigues in the Central Tooling of the Carajás Complex, in Parauapebas (PA)

Thought Thinking Training Workshop held at Vale's office in Corumbá (MS)

Photos: Ricardo Teles and Moisés Euzébio de Oliveira

Vale has approximately 2,000 educational agents who work in the courses taught internally



Young Professionals

The Professional Training Program (PPF, in Portuguese), aimed at training young people to undertake equipment operation and maintenance jobs in mining, port, railroad and pelletizing areas, resulted in 923 qualified trainees being contracted to work in the North of Brazil. The initiative aims to develop young people from the locations where Vale operates and is available in Brazil, Mozambique and Malaysia.

Employees who teach

Internal educational agents conducted 75% of Vale's training globally in 2017. In Brazil, this percentage reached 80%. These employees are trained internally to become content developers, multiplying their knowledge and are responsible for conducting more than 1,800 different trainings. Currently, Vale has about 2 thousand educational agents, who are gaining more and more importance in ensuring the quality of the courses provided as well as reducing the costs of external training.

Leadership Academy

Leadership Academy was consolidated as the model for developing Vale's leadership. There were 233 classes offered in Brazil, reaching about 3.5 thousand participants and totaling more than 37 thousand hours of training. One of the highlights was the live broadcast of HSM EXPO 2017, the largest management event in Latin America, which involved more than 42 thousand employees from different countries.

With a specific focus on the company's senior leadership, Executive Education offered 11 classes throughout the year, with renowned external partners such as MIT and HSM. In total, 94% of our executives were trained in topics such as Culture of Performance and Feedback, Facilitation of Change, and Stakeholder Management.

At the end of the year, the Leaders Forum was held, bringing together all the company executives with the objective of discussing strategy and critical issues and promoting the exchange of experiences.

The Community of Leaders, a virtual environment created exclusively for leadership development, continued to foster learning among other Vale leaders. In 2017, we had 8.8 thousand leaders participate in more than 20 skills development actions, such as chats with internal and external leaders, polls, availability of different development content (podcasts, articles, videos and bookmarks), with 92% of positive evaluation. The Fifth Virtual Meeting of Leadership was also held, focusing on the theme Culture of Performance, which was attended by 1.5 thousand leaders from Brazil, Mozambique and Anglo American and Gerdau companies.

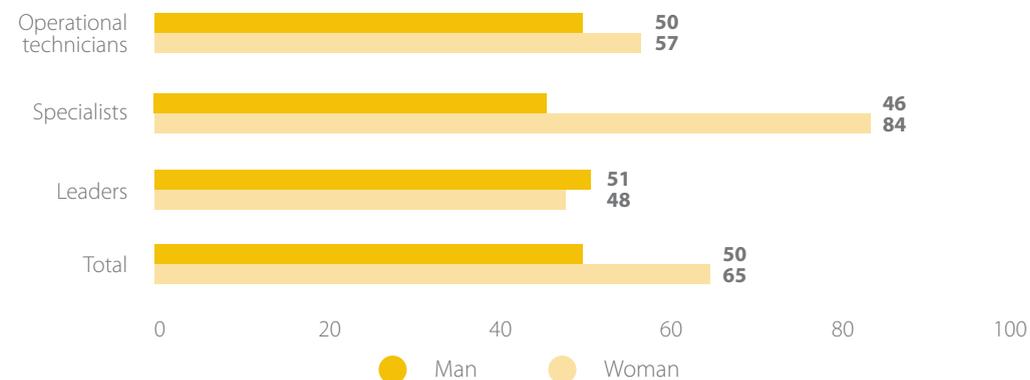


The Staff category, from 2017, will be considered within the Technical and Operational category, to follow the nomenclature used in Vale's systems. Employees covered by this indicator [404-1] correspond to 95% (2017), 86% (2016) and 92% (2015) of the total employees reported on [102-8].

Training hours

2017 (average per functional category and gender)

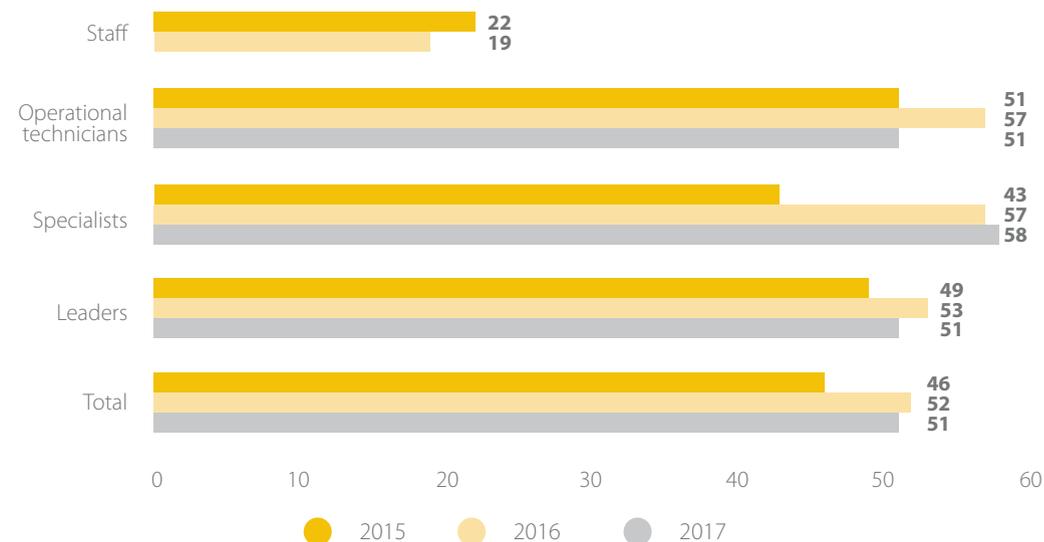
404-1



Training hours

(average per functional category and gender)

404-1



Training in human rights

410-1 | 412-2

Training in human rights has been a Vale practice since 2007 and it was intensified after the launch of the Human Rights Policy in 2009. Its focus is disseminating the concepts and broadening employees' training in the area, providing actions for different audiences, such as leadership and employees from Corporate and Operational areas. The training also provides for the prioritization of critical areas for the subject, such as business security, community relationship teams and supplies.

Supported by a target defined for Operations, in 2017 a total of 400 company leaders and about 1,500 employees were given on-site, online and chat training sessions. In addition to presenting and applying internationally-recognized concepts, the training also enabled the exchange of experiences and lessons among participants. For 2018, the company intends to launch one new online training program to maintain the capacity of leaders, employees in general and corporate security employees, in addition to contributing to the training of public security teams in Mozambique.

Training for professionals in Corporate Security could be carried out in person and are also available through the Vale Educational System (VES) training platform, covering many areas of knowledge, such as ethics and conduct, anti-corruption and human rights. For both our own and third-party staff, face-to-face human rights training was performed.

In the period, the company included in its training program the guidelines of Voluntary Principles on Security and Human Rights and invited external experts to debate on Human Rights and Vale's leadership. Another highlight was the participation and support in external initiatives such as the Global Compact Working Group in Brazil, which developed the Due Diligence Training in Human Rights and counted on the participation of companies from different sectors.

Engagement

Vale understands that engaging, developing and recognizing its employees is also an effective way to generate continuous growth for the company with consistent and sustainable results.

Since 2011, the company has administered the Global Employee Survey to monitor people's engagement level based on the information collected, implement action plans to promote an increasingly healthy and collaborative environment. The annual questionnaire measures employees' connection to the company and willingness to give their best. It also measures the perception regarding the experience of organizational values and the support offered to perform the tasks in a productive and efficient way, aiming at the employee's physical, interpersonal and emotional well-being.

In 2017, Vale launched a pulse survey to follow up on the Global Employee Survey action plan implementation and measure the employees' perceptions regarding the most critical themes in the overall results, in 2016. Among the 25.9 thousand participants, 61% are employees from Operational areas, and the countries with the largest volume of respondents were Brazil, Canada, Indonesia, Mozambique and Oman.

The results showed that 91% of the respondents stated that their areas' action plan was collaboratively constructed, and 82% said they could share their opinions openly without fear of negative consequences during discussions of results and creation of action plans associated with the 2016 Global Employee Survey.

In general, critical themes evolved positively, especially survey follow-up, meritocracy and career development. The perception of bureaucracy remained stable, indicating that there is still an opportunity to simplify processes and gain efficiency in the company. The next survey cycle is expected to happen in the second half of 2018.

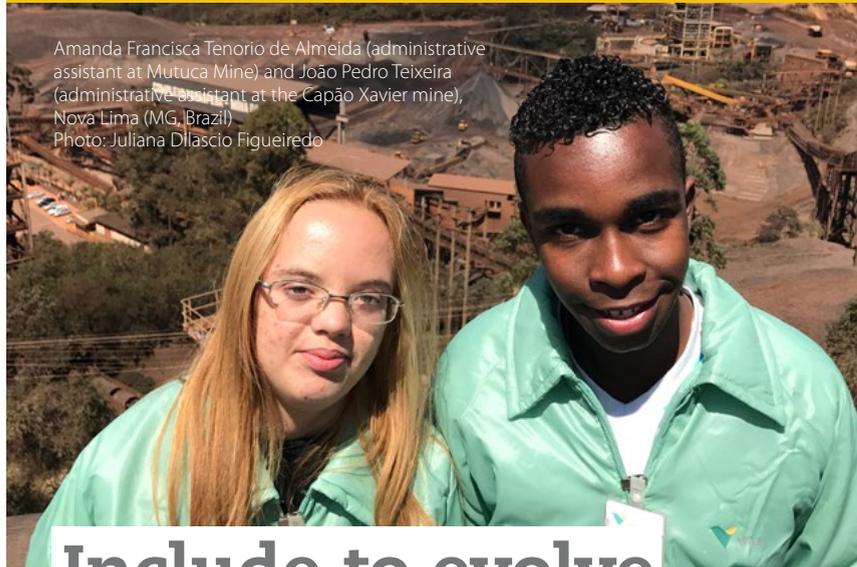
Incentive to volunteer

Vale Volunteers program, encourages employees and their family and friends to get involved in the communities neighboring Vale's operations. In 2017, about 4 thousand volunteer actions were carried out through the program, which benefited more than 45 thousand people.

These actions are recognized every year by the Vale Volunteers Award. In the last edition, 46 projects from eight Brazilian states applied for the award, totaling around 16,800 beneficiaries and 1,800 participants.



Case



Amanda Francisca Tenorio de Almeida (administrative assistant at Mutuca Mine) and João Pedro Teixeira (administrative assistant at the Capão Xavier mine), Nova Lima (MG, Brazil)
Photo: Juliana Dilascio Figueiredo

Include to evolve

Investment in the process of hiring and developing people with intellectual disabilities.

Creating a culture of diversity and inclusion is one way of reinforcing the experience of our core values, "Acting Correctly". One of the behaviors associated with our value is respect for differences and inclusion of all. Moreover, Vale seeks to contribute to the SDG through various actions and projects, and such commitments are in its Sustainable Policy. The topic 'people with disabilities' appears in many parts of the SDG, including eradication of poverty, education, dignified jobs, reduction of inequalities, and sustainable cities and communities.

Having this mission in mind, a diagnosis of accessibility was conducted from January 2017 to January 2018 at the operational unit of the Ferrosos Sudeste Board (MG), in the PPE Management area, to better qualify our process of hiring people with intellectual disability. Vale is committed to complying with Law 8213/91, which provides for the proportion of PCD employees in company staff, 5%.

With the diagnosis, APAE Supported Employment was identified in the market and chosen as a partner, a social technology for integration/inclusion of people with disabilities in the market. It has on-the-job qualification strategies and offers the necessary support to carry out the job obligations.

At the second stage, four candidates participated in the Recruitment and Selection process for functions such as Administrative Assistant at the PPE Central. An awareness-raising lecture was also held for Vale employees, for the purpose of raising awareness about the types of intellectual disability and the limitations of each one, and giving tips of relationships with colleagues with special needs and maintaining a healthy and prejudice-free environment.

At the end of the selection process, in September 2017, two people were hired and, with that, we started the stage of specific qualification and monitoring of adaptation of new employees in their jobs, with excellent results, such as individual development. The team managers also went through tutoring, to better contribute to the integration of colleagues, with weekly monitoring of Apae-MG, which contributed to broaden empathy and tolerance internally. The pilot initiative is being disseminated to other areas. The investment with advisory for implementation of the project, during 12 months, was US\$1.6 thousand per inserted user.

No discrimination and harassment

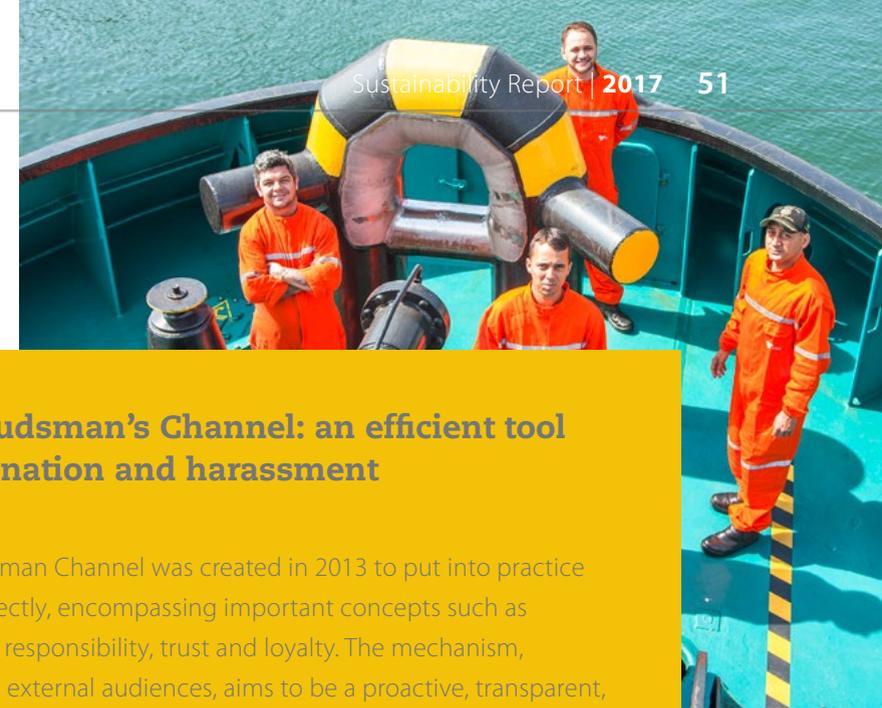
406-1

Vale advises its employees to report any form of disrespect through the Vale Ethics and Conduct Office and Ombudsman's Channel. Their reports are heard, directed and handled and the appropriate measures are applied. The Ombudsman's Office is responsible for investigating and handling all cases related to disrespect in partnership with Human Resources, through interviews with concerned parties, peers and managers.

In an effort to increase representativeness and diversity inside the company, the subject of racial discrimination is covered by Vale's Code of Ethical Conduct in on-site and online trainings and through the company's stakeholder reporting actions. In 2017, 38 reports related to discrimination were received, three of which were confirmed, resulting in dismissals and disciplinary measures.

Sexual harassment complaints received by the Ombudsman's Office during the year (an increase of 50% compared to 2016) resulted in the dismissal of all the respondents in the seven confirmed cases. For 2018, Vale intends to launch an explanatory video and other actions through its internal communication channels to promote ethics.

Crew at the Itabira tugboat, at the Guaíba Island Terminal, in Mangaratiba (RJ)
Photo: Ricardo Teles



Ethics and Ombudsman's Channel: an efficient tool against discrimination and harassment

103-2

The Ethics and Ombudsman Channel was created in 2013 to put into practice the value of Acting correctly, encompassing important concepts such as ethics, honesty, respect, responsibility, trust and loyalty. The mechanism, available to internal and external audiences, aims to be a proactive, transparent, independent and impartial communication tool in the investigation of possible violations of the Code of Ethical Conduct. Complaints can be sent by completing the form online, by email, by letter, by phone or in person.

To measure and monitor the effectiveness of the Ethics and Ombudsman's Channel, the company uses indicators, including, but not limited to, the time taken to reply to the complainant and the average duration of investigations. In addition, monitoring the number and categories of complaints received, investigated and confirmed helps the Ombudsman to develop strategies for improving ethical awareness as well as handling complaints.

Furthermore, the area conducts a survey with employees in Brazil, Canada and Mozambique to measure their trust in the Ombudsman's work and to identify key points for improvement. Another way to measure the effectiveness of the channel is the increasing number of complaints received, which demonstrates increased employee trust in the area's independence, the quality of the investigations and the mitigating actions.

Human rights

Vale is committed to respecting, protecting, raising awareness of and promoting human rights and non-discriminatory practices. This commitment extends throughout all activities, operational areas and production chain. In this regard, the company permanently evaluates human rights concepts in its activities, verifying the subject during business risk analysis and also in licensing phases. Impacts are identified and actions are defined, mitigated or compensated.

Two key milestones demonstrated the consistency of the company's actions related to human rights during 2017. One of them was Vale's return to the International Council on Mining and Metals – ICMM, which is the leading mining entity and strongly committed to business sustainability and human rights.

The other milestone was Vale's first performance as a member of the Voluntary Principles on Security and Human Rights and its participation in the Plenary Meeting of Voluntary Principles. This membership took place in the form of a work plan that includes the reinforcement of training for employees and third parties, as well as the definition of an engagement strategy for government security forces, mainly in Mozambique and throughout the Nacala Logistics Corridor. This process will enable mutual support, train professionals, share lessons learned, and integrate other actors as partners.

To improve its human rights performance, the company presented an action plan that includes initiatives such as a review of Vale's Code of Ethical Conduct and Human Rights Policy, which we expect will be approved for sharing in 2018. The work started in 2017 to determine procedures for engagement and the proportional use of force when necessary, and is pending internal validation by the company.

Other highlights were Vale's participation in and contribution to renowned human rights entities such as the Global Business Initiative (GBI), the UN Global Compact, and the Brazilian Global Compact Committee. In the latter, the company supported the human rights training process, in line with the Guiding Principles on Business and Human Right and in partnership with other companies in Brazil.

Human rights in the value chain

408-1 | 409-1

The relations with business partners also follow Vale's commitments to its Global Human Rights Policy, its Code of Ethical Conduct and its Supplier Code of Ethical Conduct. The executed contracts contain a clause of commitment to human rights and the company's principles and values, including prohibition of the use of child labor, forced labor and work that amounts to slavery.

Business relations also require compliance with legislation with regard to Health and Safety at work, the environment and respect for labor rights. In the same way, potentially inadequate conduct related to Health and Safety is also considered in the registration process for new suppliers. In 2017, no cases of forced labor were reported in Vale's Brazilian operations.

In addition to dealing with non-execution of contracts, there is provision for termination for noncompliance with commitments. Other situations that may occur are investigated and addressed broadly, and the consequences for all stakeholders, including workers and communities, are assessed. Vale also inserts a sustainability clause into contracts with service providers globally, specifying that they shall comply with this Code and share the principles of its Sustainability and Human Rights Policies.

In registering service providers allocated in its premises, Vale seeks to verify compliance with legal obligations and to determine if there are pending cases in the National Social Security Institute (INSS, in Portuguese) and the Guarantee Fund for Length of Service (FGTS, in Portuguese), as well as concerns related to the environment, business security and Health and Safety.

Security practices

410-1

When hiring security teams, Vale follows the rules of its Human Rights Policy by selecting and strictly monitoring the teams based on criteria such as prior experience, technical skills and emotional stability.

The company guides and trains its security professionals (our own and third parties') to carry out their activities according to human rights principles, repudiating abuses of power, discrimination, interference with citizens' privacy, or inhuman and degrading treatment. In addition, there is a determination to prioritize the search for peaceful solutions that guarantee people's physical integrity, preserve property and information, and maintain the production process.

Security Master Plan guides the management of internal corporate security practices, structured to introduce over the long term new operational and intelligence practices, as well as emerging technologies. The Master Plan also aims to determine all activities that have been performed and controlled by the security structure, increasing the reliability of critical processes.

Another internal rule for guiding operational safety practices is the Protocol of Engagement Rules for Security Agents in Land Invasion Occurrences and Railway and Access Interdiction. This document guides the individual and collective conduct of our Corporate Security teams, both for our own employees and third parties', in situations defending Vale's operational assets in events of trespass and interdiction. The objective is to maintain and/or recover the company's land, operations, railways and accesses, whenever possible in a negotiated manner and without use of force, prioritizing human life, according to the company's Values.

There is also systemic requirements, which are structured procedures to guide and standardize security activities. Some of the topics covered in the document are corporate security planning, risk and change management and analysis, training of professionals, operational control, and compliance in corporate security processes.

Critical security situations

Annually, an average of 110 thousand diverse occurrences in operational areas are recorded by Vale and classified in 43 types, such as preventive actions, trespass to property, intrusion, robbery, theft, vandalism, among many others.

Vale's security professionals are oriented and trained to carry out their activities in accordance with human rights principles



Sailor Elaine Oliveira dos Santos Russel at the Guaíba Island Terminal, Mangaratiba (RJ)
Photo: Ricardo Teles

An event that gained repercussion in the press was recorded in February 2017, when an Environmental Vigilance Inspector retaliated against the aggression of Fazenda Boa Sorte leaders, a band of invaders, on property owned by Vale in Canaã dos Carajás, Pará. The Military Police were deployed and then the case was registered at the Civil Police Station. Subsequently, the case was tried in the local judicial district and filed by the judge.

Land use disputes

MM6 | MM7

Despite the company's efforts and policies to promote a peaceful environment in the territories where it operates in Brazil in 2017, 474 cases of disputes still occurred between the company and local communities, including indigenous peoples and traditional communities. Almost 80% of these disputes were settled through dialogue and consensus was reached among the parties involved. Regarding the subjects, 93 of these cases were interdictions or invasions to company operations and assets, and 12 areas belonging to Vale remained occupied by third parties until the end of 2017.

In Indonesia, two disputes occurred during the year regarding settlement processes: one dispute related to Vale's failure to pay the amount to offset a gas pipeline and the other dispute alleged that Vale affected the community's subsistence.

In Mozambique, a dispute related to resettlements resolved in 2011 (25 de Setembro and Cateme Villages) where company maintains a 24-hour customer service in the premises, and provides a call center and regular visits to community leaders.



More information in the Resettlement in Mozambique box, on page 133



Case



Strengthening family agriculture to transform the life of Vila Ouro Verde

Leaving a legacy in the territory and supporting communities in their development and autonomy is also promoting sustainability in the rural community of Vila Ouro Verde which Vila Ouro Verde is located near the S11D Eliezer Batista Complex, in Canaã dos Carajás (PA), a project developed by the Relationship with Communities Area has helped to structure the income generation of 35 families who live on the land. The strengthening of family

farming by supporting field mechanization and strengthening associativism and cooperativism, included the purchase farming equipment and training the families in planting practices to increase productivity, soil conservation and environmental preservation.

Through conversations, Vale diagnosed the families' economic potential and defined a strategy to support them. The initiative, which materializes the precepts of Vale's Sustainability Policy, has perennial positive effects throughout the entire local production chain. It has promoted productivity in the field, meaning more income for farmers, an incentive for families to stay in the field, and brought more products to consumers.

With this project, which had the investment of US\$146,7 thousands from Vale, local producers formed an association, which has reaped the following benefits:

- Overall income with the project: US\$29.8 thousand;
- The community's contribution to the project: US\$14.1 thousand;
- Reduction of 40% in agricultural production costs (corn, manioc, rice, other grains) with the purchase of equipment (mechanized patrol); Production diversification in 60% of the participants;
- Increase of 48% of cultivated areas;
- The collective sales of milk through the association caused profits to increase by 53% and milk prices to increase in up to 10%;
- Diversification of 60% of the families' source of income;
- Courses on the management and storage of hazardous waste in agricultural activities;
- Sustainable Handling: setting good agricultural practices with incentive to protect areas with fountainheads.

Indigenous peoples and traditional communities

MM5

Vale's Sustainability Policy stipulates guiding principles for relationship with Indigenous peoples and traditional communities, according to international standards. To implement its actions, the company counts on a multidisciplinary and indigenist team. In addition, it works with reference entities such as the National Indian Foundation (Funai, in Portuguese), the Special Secretariat of Indigenous Health (Sesai, in Portuguese) and the Cultural Palmares Foundation in Brazil (with focus on quilombola populations), putting into practice the International Council on Mining and Metals (ICMM) principles on mining and indigenous peoples.

Vale maintains an active relationship with 20 traditional communities and 27 indigenous peoples, and executed

21 agreements with these populations, including the mandatory impact mitigation programs established by the legislation of each country. There are 18 traditional communities in Brazil, two in Malaysia and Peru; and there are 14 Indigenous peoples in Brazil, and 13 abroad (Canada, Indonesia and New Caledonia).

In recent years, the company has sought to be more present in these communities, maintaining frequent agendas in the villages and communities to influence its enterprises and improving communication channels with this public. The results achieved in 2017 include expanding dialogue with the communities and strengthening spaces for dispute resolution as well as implementing impact mitigation programs regarding licensing processes and Voluntary Agreements programs.

For example, our agreement with the Awá, Ka'apor and Guajajara indigenous peoples invests in structuring actions for the next ten years in territorial protection, natural resources conservation and preservation, economic sustainability and income generation, cultural strengthening, institutional strengthening, health, education, citizenship, and basic sanitation and infrastructure. In addition, in Brazil, income generation projects were prioritized in the traditional communities of Quebradeiras de Coco, Ribeirinhos and Quilombolas in Maranhão.

Despite these advances, in 2017 the company registered three railroad bans by indigenous and traditional peoples in Brazil for reasons unrelated to the company.

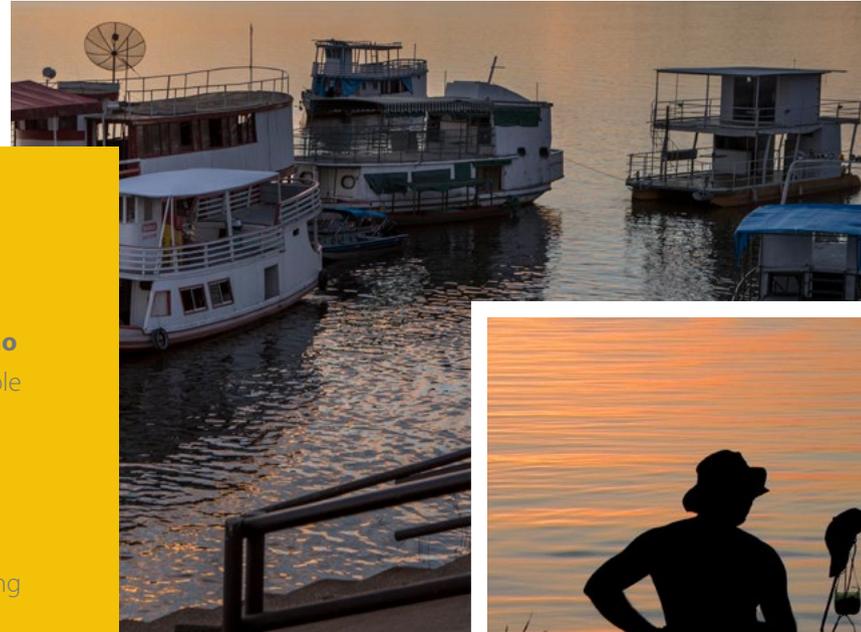
Partnership work with indigenous communities

Awá and Guajajara indigenous People, in Maranhão

This bioconstruction project provinces Indigenous people with training in sustainable construction techniques and their practical application in cultural home building idealized to preserve indigenous culture and tradition. With this initiative, Indigenous peoples improve their traditional techniques and gain autonomy in constructing culturally appropriate residences and sustainable social infrastructures with local, low-cost or zero-cost materials.

Training for Indigenous Managers

This 12-month course involves a workload of 1,500 hours and is certified by the State University of Maranhão (UEMA), with the participation of 20 Indigenous peoples. Its objectives are to increase the knowledge of the Guajajara People from Caru and Rio Pindaré Indigenous Lands on managing their organizations, preparing and implementing projects. It boosts the qualifications of Indigenous managers and leaders in managing their organizations and projects. This course includes a subscription to Wiráhu magazine, which is produced with active student participation to explore the Brazilian



River edge in Marabá (PA, Brazil), in the neighborhood Pioneira City
Photo: Ricardo Teles



"A Look at Sustainability"
Global Photography Contest, organized by Vale in partnership with National Geographic Magazine. Man and young man inside the river Paraná.
Photo: Giovana Giberti

Indigenous reality.

Study of Indigenous Component

411-1

In May 2016, Vale became aware of the Public-Interest Civil Action filed by the Bayaprá, O-Odja and Porekro Indigenous Associations for Defense of the Xikrin People of Catetê village, related to the Study of Indigenous Component for the Environmental Licensing of S11D Eliezer Batista Project, pending before the 2nd Federal Court of Marabá (PA). The action was filed against Vale S.A., the National Indian Foundation (Funai, in Portuguese), the Brazilian Institute for the

Environment and Renewable Natural Resources (IBAMA, in Portuguese), and the National Bank for Economic and Social Development (BNDES, in Portuguese). Plaintiffs request suspension of the environmental licensing of S11D Eliezer Batista project until Indigenous communities are consulted and payment of US\$573 thousand per month per village until the studies are completed. This amount refers to alleged pecuniary damages to be determined by reason of not carrying out the studies. They also demand, as pecuniary damages, US\$286.5 million. In addition, the amount in dispute was indicated to be US\$20.7 billion.

Vale filed a defense claiming that Interministerial Ordinance 60 exempts the study of the Indigenous Component for licensing of the S11D Eliezer Batista Project, since it is more than 10 km away from the Xikrin Indigenous Land, and there is no damage to be compensated. After judicial inspection in the enterprise area, the injunction requested by plaintiffs was denied. However, the Federal Judge verified the case again and partially granted the injunction to determine that Vale conduct the study, upholding the rejection of the license suspension. Vale filed an appeal against this new judgement, which is pending decision, and a conciliation hearing was appointed between the parties.

Mitigation of impacts

To mitigate the impacts of its projects, Vale complies with all the provisions set forth in Brazilian legislation and adopts international best practices, which provide

for specific impact assessment studies for indigenous peoples and traditional communities. In countries where the relationship with indigenous peoples is standardized, such as Brazil and Canada, Vale follows the existing legal process.

The subject of indigenous and traditional peoples is taken into account throughout the enterprises' life cycle. The first impact assessment studies are carried out in the phase of mineral exploration and the projects' feasibility analysis, to minimize any interferences. During the implementation and operation phases of the enterprises, risks and impacts are identified, according to Brazilian legislation required. All stages are validated with the respective bodies responsible for indigenous rights or other traditional populations, such as quilombolas (in Brazil, Funai or Fundação Cultural Palmares), as well as the indigenous people themselves and the environmental licensing body. Risk and impact mitigation programs are developed and implemented based on agreements reached.

Peoples from the territories affected by the accident in Mariana (MG)

The accident with the Samarco dam in Mariana, in 2015, affected some Indigenous lands: the peoples from the Krenak and Comboios territories, located in an area classified as having a direct environmental and socioeconomic impact, and the Tupiniquim-Guarani and Caieiras Velhas Indigenous Lands, located in an area of socioeconomic impact.

Vale continues to operate in these localities as its own enterprises are located in the region. The dialogue and relationship were intensified, and these communities are included in the Terms of Transaction and Conduct Adjustment (TTAC, in Portuguese) executed by Samarco, its shareholders and the Brazilian governmental authorities. Vale is providing emergency support and conducting ongoing studies.

Planet



Responsible management of impacts

Photos Marcelo Coelho
and Ricardo Teles



Seeds produced at the
Environmental Protection and
Education Center Mata do
Jambrelro, Nova Lima (MG, Brazil)

Vale's environmental performance shows the company's commitment to sustainability in the territories in which it operates. This means to invest financial, human and technological resources to mitigate and compensate the impacts of its activities on the environment.

Salobo Mine Plant Nursery (PA, Brazil)



In some aspects, the company's actuation goes beyond simple mitigation or reduction of production process impacts. One good example is the work developed for biodiversity conservation in Vale's 8.5 thousand km² of protected areas, in different biomes.

Vale is committed to improve its environmental performance (eco-efficiency) in a constant and consistent manner and for this defined global sustainability targets (see chapter Purpose, page 26).

Sustainability is a constant search in Vale's decisions, that proposes to contribute to the debate and confrontation of their challenges

The Planet and SDGs

In 2030 Agenda, the topic Planet takes a significant perspective in different dimensions, especially in issues related to consumption and production, as well as the sustainable management of its natural resources, and demand immediate action on climate change.

The main objective of Sustainable Development Goals (SDGs) related to the Planet chapter are SDG 6, 7, 12, 13, 14, 15 and 16, which deal with water, clean energy, responsible consumption and production, climate, life on the water, earth life, peace, justice and effective institutions, respectively. All these themes are a priority for Vale's environmental management, which seeks to constantly improve policies, actions and results that protect the Planet.

Our commitment

Natural resources are essential for Vale's activities, since our main business consist in transforming mineral resources in shared richness and value. Thus, the company is alert to its activities' impacts on the environment and consequently on its communities.

Policies and commitments

Sustainability is a constant quest in Vale's decisions. Vale proposes to contribute to the debate and confrontation with the challenges of sustainable development associated to the diverse regions and countries where it operates. Vale's environmental actuation is guided by its Sustainability Policy, revised in 2016 and available on Vale's website (www.vale.com), in the About Vale section and in the Sustainability Report tab.

Another reference to the company are the (SDGs) and its goals for contribution to the objectives of 2030 agenda.

Vale assumes, in its Policy, that sustainability is inherent to its business and that is reached when its activities, products and services generate value not only for its shareholders and also for its public relationship, such as its employees, partners and communities.

This position may be demonstrated, among other ways, by the responsible environmental approach that implies risk management and mitigation of negative impacts arisen from its operations and maximizing positive impacts on territories.

The materialization of the principles presented in the Sustainability Policy is based on three dimensions:

Be a Sustainable Operator:

Work consciously and responsibly across the life cycle of our projects, from their conception, through their implementation and, operation, to the closure of our activities, respecting the local culture where we operate.

Local Development Catalyst:

Operating beyond the risk and impact management of our operations and projects, Vale strives to be a Local Development Catalyst by collaborating towards the socio-economic and environmental development of the territories where we are present throughout the mineral cycle and by establishing cross-sectoral partnerships with the aim of leaving a positive legacy.

Global Sustainability Agent:

Work contributing to the discussion and confrontation of the challenges in terms of sustainable development that are shared across various regions and countries where we are present.

Sustainability is inherent in Vale's business and is achieved when its activities generate value for all stakeholders

Nursery of seedlings of Onça Puma Nickel Operation, in Ourilândia do Norte (PA, Brazil)



Vanessa Santos at the seedling nursery
of the Urucum Mine, in Corumbá (MS)
Photo: Ricardo Teles



Environmental management

In order to ensure that its acting is aligned with the challenge of production in harmony with the planet, Vale considers, in its Strategic Agenda, four key drivers that guide its environmental management.

The first one is focused on the development of transparency regarding governance, policies, procedures, practices and development with globally interested parties. The second one is the pursuit of collaboration opportunities for reaching the global goals adherent to the company's businesses through partnerships, solutions and technologies that tackle the environmental development challenges.

The company is willing to work in an integrated manner with several society representatives in order to contribute with the construction of a sustainable legacy for the future generations. Last, Vale is committed to monitor and anticipate trends in global sustainability issues that allow it to develop, adopt, share and foster good practices.

Integrated Management System

A key tool for effectively implementing the Sustainability Policy is Integrated Management System (IMS), which outlines processes to minimize impacts and risks to the environment, safety, health and quality in their respective processes. In addition, by defining roles and responsibilities, and providing guidelines and criteria, the to helps us achieve Sustainable Development Goals. It also continuously improves the company's environmental and healthy and safety performance, using the the PDCA (Plan – Do – Check – Act) approach.

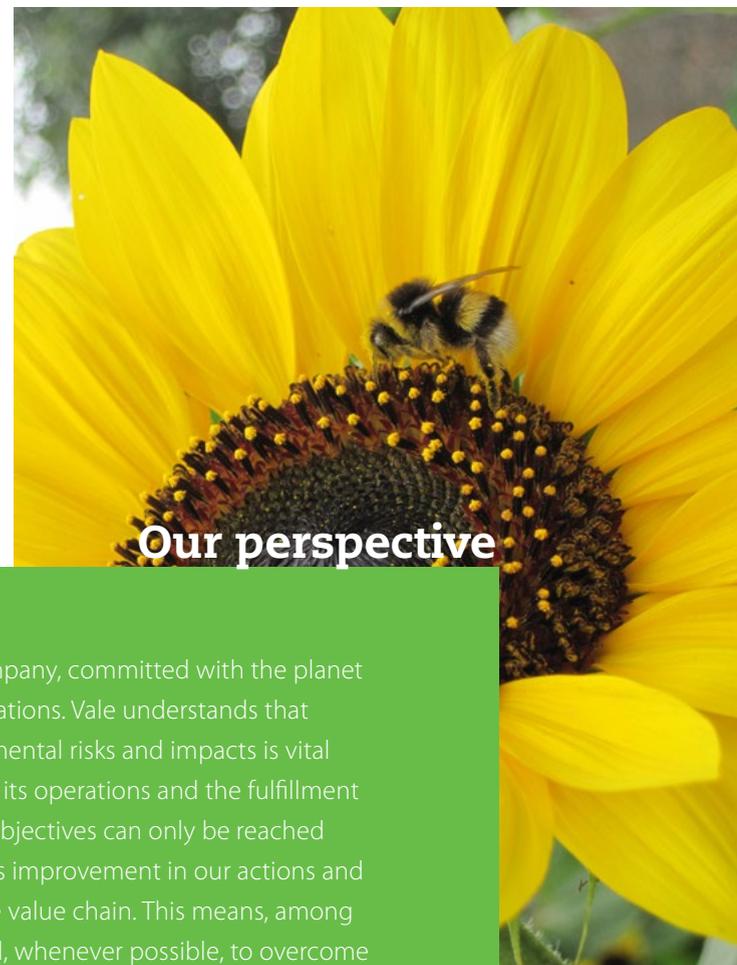
Providing organizational learning in the IMS context, based on operational deviations (non-compliance and incidents), is a fundamental pillar of Vale's continuous improvement. The Incident Management tool, of SAP (information technology system used internally), make possible, through the recording and treatment of incidents, allied to the verifying its applicability in the company's operations, to share the event causes and the solution actions.

The performance of integrated management contributes to the achievement of Vale 2018-2022 Strategic Agenda objectives, as it consolidates the company's governance and improves the culture of its processes management. This management model considers not only the needs and expectations of the consumer market but also other stakeholders, addressing solutions to environmental issues such as water consumption and atmospheric emissions, including greenhouse gases.

Integrated Management System Requirements

- 1 Policies, objectives and goals
- 2 Hazards and risks / aspects and impacts / change management
- 3 Legal and other requirements
- 4 Leadership, roles and responsibilities
- 5 Competence, training and behavioural development
- 6 Communications, participation and consultation
- 7 Documents, records and information
- 8 Operational control
- 9 Preparation and emergency response
- 10 Preventive actions, treatment of incidents and non-conformities
- 11 Inspections and audits
- 12 Monitoring, performance indicators and continuous improvement

Global Photography Contest "A Look at Sustainability", organized by the Vale in partnership with National Geographic Magazine
Photo: Luisa Almeida Vila



Our perspective

Vale is a citizen company, committed with the planet and the next generations. Vale understands that managing environmental risks and impacts is vital to the continuity of its operations and the fulfillment of its Mission. Our objectives can only be reached through continuous improvement in our actions and commitment to the value chain. This means, among others, to reach and, whenever possible, to overcome the regulations requirements, to mitigate impacts and to collaborate with the recovery, conservation and preservation of environmental areas.

Our work

The year 2017 brought consistent results on items related to environmental performance, pointing to consolidation and continuous improvement in management. Vale had invested US\$487.3 million in environmental protection and conservancy. The biggest values were applied in atmospheric emissions (US\$145.0 million), water resources (US\$108.7 million) and waste (US\$87.5 million). Of the total applied, 68.6% were compulsory expenditures and 31.4% were voluntary.

Environmental compliance

It is a priority for Vale, and is defined in the Sustainability pillar of its business, guided by the Sustainability Policy, Functional Standards and environmental guidelines, from the environmental qualification of its suppliers to the analysis of the life cycle of its products and considering the environmental impacts in the various phases of the project.

Periodically, the company is evaluated internally and externally to ensure its environmental compliance as a premise for its operations.

Environmental licensing

In 2017, Vale sought to perfect its tools of environmental licensing with the aim to achieve processes that are more assertive, develop projects that mitigate negative social-environmental impacts, and incorporate actions that contribute to a positive social-environment legacy.

One of the year's highlights was reviewing the Guide of Good Practices – Environmental Licensing and Environment, a document that orients and serves as reference for the way Vale conducts its environmental licensing process. Another important step was, was the preparation of Environmental Manual, developed with the intention of stablish processes, define responsables and standardize environmental requirements and deliverables. Both publications are in finalization process.

To facilitate the management of information about environmental licensing, was created a Registration of Permissions and Permits Conditioning procedure.

Throughout the year, Vale obtained 62 environmental licenses, with emphasis to the Preliminary License of Brucutu mine openpit expansion in Minas Gerais State, and the operational improvements installation license in S11D Eliezer Batista Complex.

In addition, was created an Environmental Education working group aimed at understanding, alignment and implementation of the actions established in the new Minas Gerais environmental licensing legislation.

In relation to environmental management system certifications (ISO 14.001), as well as those focused on quality (ISO 9001), in 2017 Vale in most of its operations, altered its model of certification from Single Site (considering each operational unit separately) to Multi Site, in which operations, including corporate areas, are evaluated concomitantly. This amendment simplifies documents and processes, especially technical and operational ones.

While altering this scope, the Usin 8 of Pelletizing in Vitória (ES) was included on the ISO 14.001 certification.

Environmental compensation and compensatory measures in Brazil

Up to 2017, the company followed more than 100 environmental compensation processes in accordance to Federal Law Nº. 9,985/2000, and in 90% of the cases values were collected by environmental agencies. In addition, Vale undertakes compensatory measures to neutralize the negative environmental impacts caused by its activities and ventures, in accordance to specific regulations.

To this end, the company maintains priority actions for territorial environmental management, applying techniques and best practices to meet its various legal obligations, while, at the same time, strengthening the protection of public and private conservation areas and valuing environmental attributes and ecological corridors.

Some of Vale's effective actions developed until 2017 include:

- Spent approximately US\$100 million and estimated an additional payment of US\$30 million (subject to monetary adjustment) on environmental compensation.
- Created 19 Private Reserves of Natural Patrimony (PRNP), covering approximately 100 km² in Minas Gerais, and put 42 conservancy proposals that are being evaluated by the responsible environmental agency, to preserve more than 130 km².
- The company planted more than 140 thousand seedlings of species protected by law.

- Paid more than 13 km² for measures related to compensation of native vegetation suppression, including Atlantic Forest areas.
- Protected more than 5 km² by donating to the public control of an area earmarked to preserve Archaeological Heritage, in addition to investing approximately US\$5 million;
- Paid more than US\$24 million for compensatory measure resulting from the suppression of vegetation in the area of projects in Pará;
- Protected of 170 testimonial cavities and destination of more than 200 km² to create the National Park.

Rural Environmental Registry and Legal Reserve

Vale had already registered 90% of its properties on the Environmental Regulation Program (PRA, acronym in Portuguese), totaling more than 450 registrations, surpassing one thousand properties and possessions in its responsibility in 10 Brazilian states, currently owning 880 km² dedicated to the Legal Reserve. The company has been improving its internal management to effectively control and knowledge of the different situations, to comply more fully with the registration deadline currently stipulated as May 31, 2018.



To learn about environmental lawsuits see **Legal Compliance** – Page 118

In addition to registration in the CAR the company follows up the regulations and laws to meet with the Environmental Regulation Program (PRA, acronym in Portuguese). In this sense, all properties that have Areas of Permanent Preservation, Legal Reserve and Areas of Restricted Use still without native vegetation cover will be evaluated and, when necessary, the most appropriate alternatives to regularization will be selected based on current legislation.

Dam and mineral residues management

Vale maintains the management of its dams in permanent alignment and updating with the good and strictest international practices, standards of which exceed the legal requirements. In this sense, it bears emphasizing that the Brazilian dam safety legislation is quite stringent, also based on good international practices and very judicious, both in terms of safety management requirements and emergency management.

In general, society's knowledge and legislation advance at the pace of events and learning. With respect to dams, Vale is dedicated to advancing the dam safety movement and has contributed in a transparent manner to discussions at several forums, whether technical, legislative or civil society in general.

Among the international standards used as reference, we highlight the guidelines of the International Committee of Large Dams (ICOLD) and the Mining Association on Canada (MAC). International specialists and external auditors recognize Vale as a model for risk management in the global industry.

The strictness adopted is a demonstration of our understanding that efficient dam management is a vital aspect not only for Vale operations and its workforce, but also for the communities surrounding these structures.

In the Ferrous area, Vale's Integrated Risk Management System for geotechnical structures is based on three main pillars: People, Processes and Information Systems. In the People pillar, specialized teams are

dedicated to controlling Vale's dams, deploying qualified professionals at the operation sites to take care of the structures day-to-day, and at the offices to develop projects, studies and analyses to assure safety and reduce structural risks.

In the Processes pillar, procedures are organized in Safety Management, Risk Management and Emergency Management throughout the life cycle of the structure, from design implementation, operation, maintenance and monitoring. In all these phases, the prognosis of the risks and the state of our readiness in case of an emergency.

In the Information Systems pillar, the Ferrous area has two systems that support geotechnicians with information for fast and effective decision-making. One of them is Geotec, which stores structural maintenance and monitoring data. The other is Geotechnical Risk Management (CRG, acronym in Portuguese), which stores technical information on the structures, the Dam Safety Plan and information on risk analyses.

In addition to applying best practices pertaining to dam safety management, Vale submits its structures to audits conducted by specialized external consultants, and rigorously complies strictly with applicable legislation.

Another highlight this year was implementing the International Panel of Experts on the Ferrous area, composed of international and national technicians who work in

risk management, geotechnics and water resources. The panel's purpose is to evaluate governance, processes, studies, projects and technical analyses of geotechnics and hydrology.

Managed structures

The Ferrous area, responsible for managing iron ore dams in Brazil, closed 2017 with 150 dams and dikes designed to contain tailings, sediments and water. Regarding the size of these structures' reservoirs, 80% are considered small, 14% are medium-sized, and only 6% are large. Of the small dams, 71% have reservoirs with volumes of less than 500 thousand m³. At the end of the year, the area ended another cycle of external dams auditing, in which 100% of the audited structures were certified to be in stable condition, physically and hydraulically.

In the North Atlantic Basic Metals operations, 356 dam structures, including 56 tailings dams and 14 inactive dams, are being managed under a specific model of governance. All structures are subject to regular stability inspections as well as a rigorous audit program by internal and external consultants and specialists. Most of these dam structures (53) are located in Canada, where the performance is reported publicly, according to the Canada Mining Association's Reject Dams Management Directive.

The South Atlantic Base Metals area, in turn, manages 16 hydraulic structures in Brazil, including dams, dikes and tailings disposal ponds. Of this total, two are large dams, in the operations of the mines of Sossego and Salobo, in Pará.

In relation to the base metals inactive dams, there are 12 tailings structures associated with historic operations in Ontario (Canada) while there are two structures at Igarapé-Bahia mine (state of Pará, Brazil), which has been closed since 2002.

Investments

In 2017, the Iron Ore Department dedicated approximately US\$182 million to managing all of its dams. The resources were invested in maintenance, monitoring, improvement works, audits, risk analyses, revisions to the Mining Dams Action Plans for Emergencies (MDAPE) and warning systems implementation, among other services. The company has also been developing a structure automation project, which includes signage and lighting improvements, video monitoring and automated instrumentation of its structures. These actions are expected to be completed by 2019 and fulfill the requirements of the Brazilian legislation, National Department of Mineral Production (DNPM, acronym in Portuguese) Ordinance 70,389/17, and current National Mining Agency (ANM, acronym in Portuguese).

At Vale Fertilizantes, was implemented the Management System of the Dam Safety Plan (MSDSP), which offers the main benefit of auditable document control. Other important initiatives were reviewing the Action Plans for Emergencies of Mining Dams (EMD) and implementing microseismic monitoring and applying geophysics to monitor the rock mass structures and reservoir substrate, in addition to improving the Dam Management System (SIGBAR, acronym in Portugueses). In all, US\$1.6 million was invested in these initiatives.

The Base Metals area invested a total approximately of US\$25 million in 2017, more precisely to raise the crest of the Salobo tailings dam, and to work on the Puma Dam 1 of the Onça Puma operation, both in Pará, north Brazil. There has been US\$11.5 million invested on the dams in the operation in Sudbury and Thompson related to engineering studies and dam upgrades.

Investments in dam management

Area	Investment	Action
Iron Ore	US\$ 182 million	Maintenance services, monitoring, improvement works, risk analysis, audits, Mining Dam Emergency Action Plans, alert systems, videomonitoring and instrumentation.
Fertilizers	US\$ 1.6 million	Implementing the Dam Safety Plan Management System, revising the Action Plans for Emergencies at Mining Dams, implanting microseismic monitors, applying geophysics to monitor rock mass structures and reservoir substrate, and improving the Dam Management System.
Base Metals	US\$ 25.1 million	Raising the crest of the tailings dam of the Salobo mine and to work on the Puma Dam 1 of the Onça Puma Project, both in Pará.
International ¹	US\$ 11.5 million	Management systems, instrumentation, inspections and revisions, specialized team, implementation of independent review board, emergency preparedness and response plans.

¹Operations in Canada and New Caledonia

External audits and inspections

In 2017, external audits were carried out on 107 structures in the Ferrous area, located in Brazil. All of them had their physical and hydraulic stability certified, and were issued Statements of Stability Condition (DCE, acronym in Portuguese) by the responsible auditors. Also in 2017, Vale hosted three meetings of the Panel of Experts.

However, seven official notifications were received from the National Department of Mineral Production (DNPM, acronym in Portuguese) regarding Vale's management of Ferrous area dams. These notifications refer to the company's compliance with legal requirements. Five of them, however, lack actual legal grounds, so Vale does not recognize them and is appealing the matter. The other two refer merely to formal errors regarding the completion of the SIGBM (Mining Safety Integrated Management System for Mining Dams) system, so the company decided to pay the corresponding fine. It should be noted that none of these notifications are related to the hydraulic and physical safety of the structures.

All the active hydraulic structures in the Base Metals area were audited by external companies and internal professional engineers. In Brazil, the Base Metals dam structure had their stability verified, with the respective issuances of DCE. The two inactive hydraulic structures of Igarapé Bahia did not have their DCEs issued in 2017, due to the need to adapt their spillway systems to one-in-ten-thousand-year rain. Investment is earmarked for regularization works in 2018, within the budget cycle.

All of Vale Fertilizantes' 22 dams were audited in 2017 and were issued their statements of stability. The facilities were also subjected to several inspections, and did not receive any official notifications or fines.

Areas of influence

In operating the Iron Ore Department in Brazil, 18 municipalities are within the self-rescue zone, the region in which accident warnings are the responsibility of the company rather than the competent authorities. Of these, 16 are in Minas Gerais, one is in Mato Grosso do Sul, and one is in Pará. The estimated population in the first seven kilometers downstream of the dams, in the direction of the current, consists of approximately 20 thousand people in the flood stain area.

In compliance with Federal Law no. 12,334 and DNPM regulations 416/2012 and 526/2013, both replaced by DNPM n. 70.389 / 2017, Vale has filed since 2015 the Mining Dam Emergency Action Plans (PAEBM, acronym in Portuguese) referring to its structures. Since then, it has maintained an intense process for identifying opportunities for improvement, which is reflected in periodic updates with a new version filed in 2016, and current work to revise the file in the first half of 2018.

The company maintains a permanent and joint project with the Civil Defense Coordinator's Offices of these municipalities, to assure these plans' effectiveness. In 2016 and 2017, contact was maintained with the communities of all the mapped areas, which made visible the context of coexistence with the dams.



The Reserva Natural Vale, in Linhares (state of Espírito Santo, Brazil), a pioneering initiative of biodiversity conservation, complete 40 years in 2018. In the besides photo, Seedling Nursery where native species of the Atlantic Forest are produced for the forest restoration
Photos: Pedro Cattony and Lucas Lenci.

In 2017, Vale invested
US\$ 487.3 million in
environmental protection
and conservation



The project also implemented a survey to collect information, enabling the creation of emergency maps detailing escape routes, muster stations and alert system implementation.

Plans for the orderly return to communities were also started, to present these plans in an integrated manner that will enable drills to perform in 2018. Thus, we consolidated an emergency operational routine to assure all agents are properly qualified and readied, including employees and the community. These actions are preventive, as all the structures in the Ferrous area are completely normal and stability-certified by the audit completed in September 2017.

The dams' areas of influence in the Fertilizer area cover the municipalities of Tapira, Patos de Minas and Araxá, in Minas Gerais; Catalão, in Goiás; and Cajati, in São Paulo. All the communities in these areas have undergone training in our emergency response plan, and with the performance of periodic dam safety reviews the PAEBM are being reviewed again. Afterwards, training and emergency drills shall be conducted again.

Vale Fertilizantes also has communication and community relations teams at each of its units, responsible for direct contact with the residents of the regions around the dams. Communications are largely made through personal contact.

The Base Metals structures cover three municipalities in the State of Pará self-rescue zone. The estimated population in the first seven kilometers downstream of the Sossego Dam consists of approximately 1.2 thousand people in the area of the flood stain. Downstream of the Salobo Dam, there is no fixed population. For this reason, meetings are held with civil defense leagues, community leaders, and communities to seek proper updatea and engagement of all stakeholders in the process.

Goals for 2018

As a goal for 2018 in the Ferrous area, the company will continue to improve its management of structures. Vale's main objectives are to decommission some of its dams and obtain Statements of Stability, within the scope of the External Audit and the Periodic Dam Safety Review. Moreover, Vale is scheduled to continue its efforts to implement alert systems and risk analyses, automate monitoring processes, increase closeness with social and public authorities, and maintain the International Panel of Experts.

Another defined goal is to implement the system for managing routine operational inspections and controlling dam maintenance action plans (GeoInspector) in fertilizer operations. The company also plans to automate the dam monitoring system, implement mass notification towers, and continue use of SIGBAR (Intergrates DAM Management System)

For 2018, Vale Base Metals has the stated goal of establishing independent Tailings Review Boards for each site (where it does not already exist). Continuous improvement efforts in the implementation of management systems under the new Base Metals Dam Governance Policy will be a focus in 2018. A program of rigorous internal audits will continue to be executed, in addition to planning the implementation of GeoTec IV in New Caledonia and Newfoundland.

Aerial view of the Salobo dam,
Marabá, Pará (PA)
Photo: Ricardo Teles



The decommissioning of some dams and obtaining the Stability Declarations are some of Vale's goals for the Ferrous area in 2018

Mineral residues

MM3

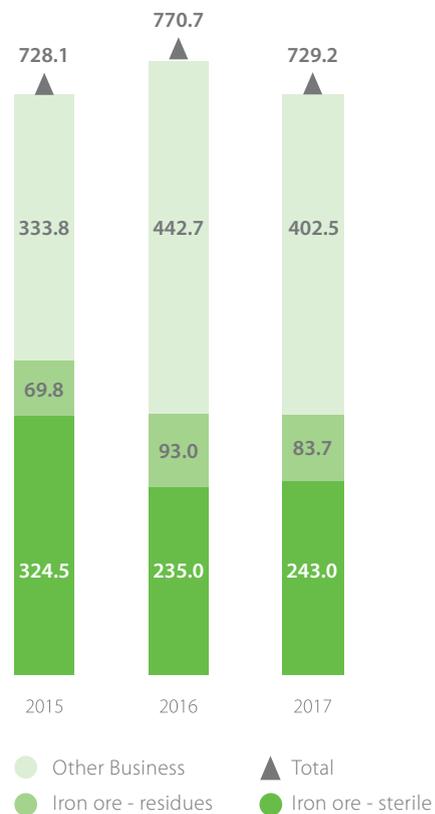
In 2017, Vale generated 729 million tons of mining and metallurgical residues, 5.4% less than in 2016. In the iron ore business alone, 243 million tons of sterile wastes and 84 million tons of residues were generated. Sterile waste is material without economic value that must be removed to free up access to the ore body. Vale's other businesses together produced 402 million tons of sterile wastes and residues.

Mineral residues are sent to dams (residues and sediment) or to piles (sterile wastes and residues). The volume generated depends on annual production and on the mine's geological profile.



"Other businesses" include nickel, potassium, manganese, coal, copper, slag (manganese alloy) and fertilizer byproducts.

Total of mining and metallurgical residues (in millions of tons)



Biodiversity

304-2 | 304-4 | MM2

Vale considers biodiversity and ecosystem services¹ as essential topics intrinsic to its business. Based on its Sustainability Policy, Vale develops a strategy for managing biodiversity based on commitments:

- To know and to monitor the regions in which it operates.
- To manage risks and impacts to biodiversity, by adopting prevention, mitigation, compensation and monitoring measures that are prioritized when planning socio-environmental expenditures.
- To act with transparency regarding the company's practices and performance in protecting biodiversity.

Focusing on these commitments, Vale's long-term objective is to achieve the Neutral or Positive Net Impact (PNI) on biodiversity in the territories where it operates -- that is, to search for gains or legacies in biodiversity. To achieve this objective, the company's strategy is to manage risk and impact, preserve the territory's important environmental attributes, and continuously improve its biodiversity performance with the aid of risk analysis tools and information management while applying the mitigation hierarchy of impacts.

¹Ecosystem services are benefits people derive from ecosystems, such as clean water, pollination and erosion control.

Today, Vale's operations cover 1.5 thousand km², being that the main risks and direct and indirect impacts of our operations are associated with modifications to the natural environment and land use, that can impact the physical landscape, elements that support the biotic lifeforms (flora and fauna), and therefore are able to change the biodiversity and the ecosystem services of an area. Of this total area, 59% is dedicated to mineral extraction, industrial production, processing, processing and transporting products; and 41% is dedicated to industrial plantations. In relation to 2016, was added 19.8 km² due to the planned operations expansion, while was subtracted 94.6 km² due to operations divestments such as the Nacala Corridor, in Mozambique.

Of these operations, 60.5% are in areas classified as wilderness areas and 27.5% are in so-called hotspots, distributed across 11 ecoregions. Considering their locations relative to the protected area or the high-value diversity area (wilderness areas and hotspots²) outside protected areas, Vale's total operational areas are distributed as follows³:

- 8.42% or 126.7 km² are in areas of a high-biodiversity index outside protected areas;
- 12.7% or 190.5 km² are adjacent to high-biodiversity index areas;
- 31.5% or 468.7 km² are close to legally-protected areas;
- 3% or 195 km² are in legally-protected areas (sustainability-protected areas that allow the mining activity).

Focusing on managing impacts, Vale develops specific studies, from planning entry into new territories to final project conception, aiming to assess sensitive areas, habitats and evaluate risks, and especially to avoid and mitigate impacts on biodiversity. In addition, Vale conducts research to expand our the knowledge of the territories where operates, both in innovation and in technological developments that allow the increasingly sustainable use of natural resources.

The research and impact management initiatives also involved recovery of degraded areas, aiming to recover native habitats previously existing in the region, assessing and planning to recover important ecosystem services. After all these initiatives, Vale works to compensate impacts, invest in conservation units, and plan and maintain protected areas that are important remainders of the meddled habitats.

The elements resulting from these approaches, together with Research and Development (R&D) initiatives, are the basis for Vale's management the biodiversity efforts, articulated in our Strategic Plans for the Management of Local Biodiversity, developed for areas with high or very high risk to biodiversity.

These plans show the company's environmental commitments and communicate the three axes of our strategy for managing biodiversity: (1) organizing and structuring all information, (2) guidelines and actions to be planned and executed in the area by the operational units and projects, which help to conserve biodiversity and ecosystem services, and (3) establishing challenges, goals and indicators for continuous improvement.

Operations, new projects and expansions are assessed to determine the need and size of the strategy that will be required to manage biodiversity in their area, based on evaluated potential risks and impacts to biodiversity, using a process similar to that used to manage impacts. In 2017, 22 (44%) of the 50 operational units pointed to a need to prepare and implement management plans. Twenty-one (95%) of these operational units have already deployed their plans and the last one is preparing it.

²Large geographic areas considered important for conserving the world's flora and fauna

³To calculate the adjacent area, was considered a buffer of 10 km, generated from the external limits of protected areas and high biodiversity index (environment) and evaluated its overlap in relation to the area of the operational unit. Territories related to Indigenous lands were not considered in analyses.

All deployed plans involve actions to manage impacts on biodiversity, highlighting those related to research and monitoring fauna and flora. Plans were prepared based upon aspects important to the area, such as sensitivity to biodiversity and the existence of icon and/or endangered species, besides the ecosystem services rendered and local community interfaces. More than 80% of these plans were in compliance with legal requirements.

In 2017, 5,067 species were reported in habitats within areas affected by Vale's operations and in its surroundings: 2,436 were fauna and 2,631 were flora. These figures were increased by 30% due to new studies and monitoring activities.

Regarding the total number of species, 2.8% (140) are included in the list of nationwide endangered species (Ministry of Environment, 2014); 12 are considered "critically endangered" and 34 are considered "endangered". The other 1.8% (89) are included in the list of species globally endangered, which was prepared by the International Union for the Conservation of Nature (IUCN, 2017), of which four are classified as "critically endangered" and 17 as "endangered."

Research and preservation projects

In 2017, Vale started research and preservation projects carried out in partnership with the research support foundations of the states of Rio de Janeiro (Faperj) and Espírito Santo (Fapes), with an investment greater than US\$5 million. These projects cover several themes, including environment and biodiversity.

This year also showed progress in the Verena project, with Reserva Natural Vale (RNV) in Linhares, in partnership with the World Resources Institute (WRI), the International Union for Conservation of Nature (IUCN), the Coalizão Brasil, Clima, Florestas e Agricultura, among other institutions. The project is carried out in several properties, but the RNV is its main field of study. The purpose is to show the technical and economic feasibility of forest restoration and reforestation with native species and large-scale agroforestry systems. Forty species were made available to assess wood quality and the best technology to adopt. Based on these evaluations, a book will be launched about the growth of these species and the use of their wood and biomass, among other information.

In parallel, Vale's Technology Institute – Sustainable Development, a non-profit institution for research and education maintained by the company in Belém (PA), published the Guia de Plantas para Recuperação de Áreas Degradadas das Cangas do Quadrilátero Ferrífero de Minas Gerais e a Flora de Carajás (Guide of Plants for Recovery of Degraded Areas in the Yokes of Minas Gerais' Quadrilátero Ferrífero and Carajás' Flora, in english), in partnership with Museum Emílio Goeldi. Both publications are very important sources of information on habitat restoration and biodiversity conservation in the Quadrilátero Ferrífero and Carajás.

In Nova Lima (MG), the Centro de Tecnologia de Ferrosos - CTF (Ferrous Technology Centre) (FTC) biofactory, the first of this kind in the world, cultivates 70 species. More than 350 seedlings were reintroduced into the field in 2017 and 12 of these species are threatened and largely restricted to environments of ferruginous rupestrian fields; for example, *Cattleya milleri*, a type of orchid considered critically endangered by the Ministry of Environment.

Vale took part in discussions in the Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável -CEBDS (Brazilian Business Council for Sustainable Development, in english) aiming to facilitate the entry of Brazil's Natural Capital hub. Among the actions being considered are translating the Coalition for Natural Capital, as well as using its tools and cases; qualifying professionals in a partnership with the World Business Council for Sustainable Development (WBCSD) and the University of Cambridge; discussing valuation and tools for sharing information; and participating in chapters about preparing the sector.

Endangered species conservation projects supported by Vale

Speaking of partnerships, this year Vale financed projects to conserve endangered species. Here are some highlights:

- **Projeto Ararinha Azul na Natureza** – This partnership between BirdLife International and Save Brasil with Vale's support seeks to conserve the species Spix Macaw through action in Public Policies, Scientific Research and Environmental Education, among other areas, to conserve the caatinga, which is the spix macaw's habitat.
- **Projeto Amigos da Jubarte** – This partnership with the O Canal Institute, Baleia Jubarte Institute, the City Hall of Vitória and the Federal University of Espírito Santo develops conservation and education initiatives to conserve the Humpback Whale.
- **Programa de Conservação do Gavião-real e do Uiraçu-falso** – This agreement signed by Vale and the National Institute for Research in the Amazon Instituto Nacional de Pesquisas da Amazônia (INPA), 2011 to 2017, serves to support conservation of the Harpy Eagle and of the False Harpe Eagle units located in Carajás and other regions of the states of Pará, Amazonas, Rondônia and Espírito Santo (including Vale's Natural Reserve).
- **Projeto Cavalão-marinho** – This partnership with Rio de Janeiro universities such as the State University of Rio de Janeiro (UERJ) and Santa Ursula (USU) involves monitoring, cultivating and supporting environmental education initiatives in schools and communities located around Vale's Marine Farm (Guaíba Island Terminal in Mangaratiba/RJ), to conserve the Hippocampous reidi (also known as the Slender Seahorse) by disseminating knowledge about the species and using techniques to cultivate it.
- **Onça Pintada** – the project "Competição, coexistência e saúde geral de grandes felinos na Mata Atlântica de Tabuleiro", developed in the Reserva Natural Vale (RNV) since 2005, focuses on the study of the local population of jaguar (*Panthera-onca*), one of the most endangered species in the Atlantic Forest.

In order to favor and contribute to the environmental balance, Vale maintains 8.5 thousand km² of protected natural areas



National Action Plan for the Conservation of Blue-Eyed Macaw, of FUNBIO, sponsored by Vale
Photo: João Freire / ICMBio

Protected areas

304-1

Protecting natural areas is one of Vale's main initiatives to promote environmental balance and conserve natural resources and ecosystem services. Protected areas total 8.5 thousand km², about 5.6 times the area occupied by the company's facilities and 9.4 times greater, if land reserved for industrial planting is not considered. These areas shelter a great diversity of habitats to help protect fauna and flora species threatened with extinction.

Of these total areas that the company helps protect, 4.5% belong to Vale, and the remaining 95.5% are maintained in partnerships with public environmental agencies such as the Instituto Chico Mendes de Conservação da Biodiversidade (ICMBio). It is important to highlight that 92.6% of these areas are in regions classified as wilderness, 7.4% are considered hotspots (i.e., IUCN categories for regions with a high concentration of biodiversity), and 94% are located close to our operational units.

Vale has a long-standing partnership with ICMBio to support protected areas management. Examples are (1) in the Reserva Biológica Sooretama, which is contiguous to Reserva Natural Vale and forms the most important forest block destined to conservation in Espírito Santo; and (2) in Carajás National Forest. The partnership involves monitoring, research, measures to combat poaching and illegal extraction, fire prevention and fighting, and environmental education.

In the Carajás National Forest, Vale helps to protect about 7 thousand species of plants and animals, among them more than 50 species of endangered vertebrates and about 300 species of animals endemic to the Amazon region. In the same region, Vale helps to protect the Parque Nacional dos Campos Ferruginosos, created in 2017, as well as a 16.7 km² of privately protected area in Mozambique.

Units protected or supported by Vale

Protected area	Location	Biome	Property	Area (km ²)
Carajás National Forest	Brazil (Pará)	Amazon Forest	ICMBio	3,910.0
Tapirapé-Aquiri National Forest	Brazil (Pará)	Amazon Forest	ICMBio	1,142.4
Itacaiúnas National Forest	Brazil (Pará)	Amazon Forest	ICMBio	1,365.9
Tapirapé Biological Reserve	Brazil (Pará)	Amazon Forest	ICMBio	992.0
Igarapé do Gelado Environmental Protection Area	Brazil (Pará)	Amazon Forest	ICMBio	232.7
Ferruginous Fields National Park	Brazil (Pará)	Amazon Forest	ICMBio	220.0 ¹
São Luís Botanical Park	Brazil (Maranhão)	Amazon Forest	Vale	1.1
Tubarão Botanic Park	Brazil (Espírito Santo)	Atlantic Rainforest	Vale	0.3
Vale's Natural Reserve	Brazil (Espírito Santo)	Atlantic Rainforest	Vale	230.0
Sooretama Biological Reserve	Brazil (Espírito Santo)	Atlantic Rainforest	ICMBio	278.0
Natural Heritage Private Reserves (NHPR) in Minas Gerais' Quadrilátero Ferrífero	Brazil (Minas Gerais)	Atlantic Rainforest	Vale	128.0
Two natural heritage private reserves (NHPR) associated with fertilizer operations	Brazil (Minas Gerais)	Brazilian Savannah	Vale	1.6
Protection area related to four small hydro fields (PCHs)	Brazil (Minas Gerais)	Atlantic Rainforest	Vale	3.3
North Forests Natural Reserve (Forêt Nord Nature Reserve)	New Caledonia	Forest and Maquis Shrubland	Governo da Nova Caledônia	2.7
Pic du Grand Kaori Reserve	New Caledonia	Forest and Maquis Shrubland	Governo da Nova Caledônia	3.1
Private Protected Area	Mozambique	-	Área privada	16.7
Ecological Centre Vale Malaysia (Vale Eco Centre)	Malaysia	Sundaland	Vale	2.9
Total				8,530.7

¹The Campos Ferruginosos National Park has part of its area internal to the limits of the Carajás National Forest. The value in question refers only to the area outside these limits.

Reserva Natural Vale (RNV): Outpost of the Atlantic Rainforest Biosphere Reserve

In 2018, Reserva Natural Vale -RNV in Linhares (ES) celebrates 40 years as an officially protected area. It was created in 1978 as an area dedicated exclusively to fauna and flora conservation and scientific research, an unprecedented initiative in Brazil.

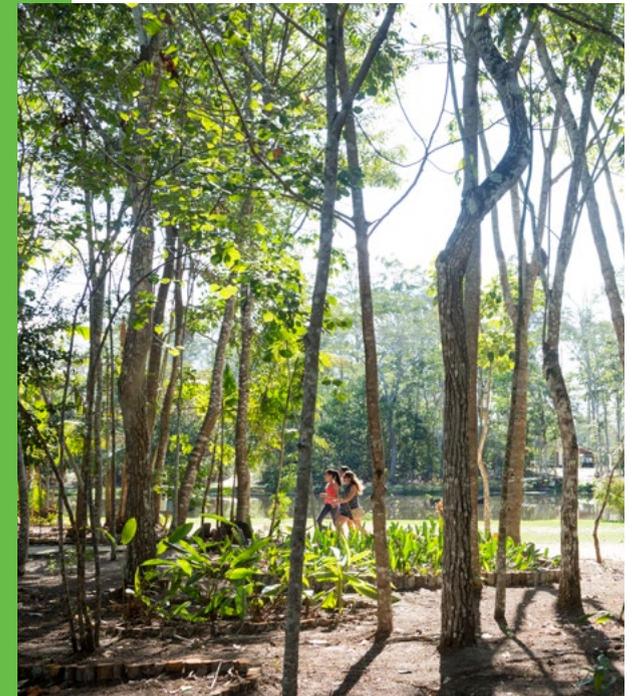
RNV heralds the start of environmental awareness at Vale. The company's experience with the reserve served as a basis for the development of Vale's first structured environmental policy in the 1980s. Created by Eliezer Batista, then Vale's president, in 1980, the Group for Environmental Studies and Counseling (Geamam) decisively took steps to conserve the natural protected areas of Carajás.

RNV is an important Atlantic Rainforest preserve, protecting about 5 thousand species of this biome's plants and animals, among them more than 160 species threatened with extinction and 64 endemic species.

To develop and disseminate Vale's activities related to biodiversity protection, sustainable development and knowledge gathering to protect the Atlantic Rainforest internally and to surrounding communities, Unesco awarded the RNV the title of Outpost of the Atlantic Rainforest Biosphere Reserve in 2008. This title was renewed successfully twice, in 2013 and 2017, in recognition of the important actions undertaken by Vale to help conserve this area.

To build a bridge between our environmental commitment of the recent past and our enhanced commitment for the future, in 2018 will be produced four documentaries about the RNV, whose themes are: Origin, Ecosystem Protection, Research and Public Well.

Reserva Natural Vale,
in Linhares (ES)
Photo: Marcelo Coelho



Recovery of Degraded Areas (RDA)

MM1 | 304-3

Parallel desenvolved the operational activities, the process of Recovery of Degraded Areas (RDA) involves interventions of distinct nature, intensity, duration and costs, once the company's activities permeate different ecosystems.

Vale may adopt different treatments, either isolated or combined, ranging from simply protecting ecosystems in the local area to be recovered (controlling invasive species, preventing fires, etc.) to executing geotechnical projects, remediating land and densely planting forest species.

The company's temporary and definitive revegetation strategies, adopted according to the degree of resiliency and/or future use of the areas to be recovered, also deserves highlighting.

The quality and effectiveness of the RDA process are monitored by indicators and methodology that measure the work's effectiveness over time. References include technical and legal standards and good practices adopted in the regions where Vale operates.

Another important characteristic of Vale's work in recovering degraded areas is pursuing improvement through scientific research developed in partnership with universities and technology and innovation centers.

As a relatively recent knowledge base, multidisciplinary process and an initiative intrinsically associated with the company's operations, RDA presents opportunities for methodological, operational and cost improvements.

The tables below illustrate the indexes for the areas impacted and recovered in the context of all Vale's activities, specifically for activities associated with mining.

Areas impacted and recovering (km²)

304-3

	2015	2016	2017
Impacted	15.6	17.3	13.0
Recovery (total)	9.7	19.4	13.7
Permanent	7.0	14.9	8.6
Provisional	2.7	4.5	5.1

Opening and closing balance (km²)

MM1

Year	Areas impacted (opening balance)	Areas impacted in the reference year	Areas in permanent recovery in the reference year	Areas impacted (closing balance)
2015	612.3	15.1	6.6	620.8
2016	620.8	13.9	6.7	628.0
2017	628.0	10.8	7.6	631.2

In 2017, the pilot phase of the Program for Improvement of the Recovery of Degraded Areas (Prorad) was implemented in Carajás; a similar program was implemented in 2016 in Minas Gerais' Quadrilátero Ferrífero.

Prorad is a joint initiative of the Executive Environmental Management and the Instituto Tecnológico Vale (ITV), to improve the RDA processes by utilizing the company's experiences and material resources of the company.

Investments in Degraded Areas Recovery in 2017 totaled US\$ 23.5 million, which represented 5% of the company's total environmental expenditures.

Mitigating impacts to biodiversity in S11D

In 2017, Vale started a partnership with The Biodiversity Consultancy (TBC) based in Cambridge in the United Kingdom (UK), with a focus on concepts and premises for directing and maximizing the company's biodiversity management plan, focusing on the S11D Eliezer Batista Complex. This initiative continues the pilot project that was executed in 2016, focusing on the Hierarchy for Mitigation of Impacts application in that complex.

During the first phase, information was gathered, organized and structured, and actions were planned and executed for the operational unit to help conserve biodiversity, and establish guidelines and challenges for continuous improvement in biodiversity management.

Adaptations were made to the project to avoid intervention in more than one thousand hectares of native vegetation. Initiatives for innovation and technology investment allowed for the reduction in fuels and water consumption, minimizing impacts on important ecosystem services. The implantation and monitoring of environmental controls were also carried out.

Recovery efforts in degraded areas, both in areas where the company worked and in neighbouring properties, is focused on remediating natural environments. The areas reserved for conservation maintained by S11D Eliezer Batista Complex, including compensation actions and Legal Reserve regularization, total more than four thousand hectares of native vegetation.

Caves

Vale understands that the subject of caves, specific to Brazilian operations, demands investment in applied research to solve problems arising during environmental licensing processes. This is a way we can ensure that knowledge, which is still evolving on this subject, does not hinder our planning for such areas and our compliance with legal requirements.

Data provided by the studies carried out by Vale subsidized the permits, assessed regulatory marks and prepared technical reports, as well as generated results. In 2017, 11 cavities were reclassified, 21 cavity surroundings were adapted, two others were featureless, and 54 million tons of iron ore blocked by cavities were liberated.

Some of the studies maintained by the company focus on the biological area, in which the Bioespeleology Program, which focuses on studying species of bats living

in such structures, and on the real-time monitoring of temperature and humidity environmental indicators. The other area studied is the physical medium of the cavities, with a focus on rocks and surfaces.

Vale has been looking for partnerships with universities and museums to ensure scientific collections of national subterranean fauna are organized and new species are described. As an example, the Reference Center for Subterranean Fauna, recently inaugurated in a partnership with the Lavras Federal University, will contribute to formatting new Brazilian researchers.

Environmental regulations regarding caves are evolving and frequently adapted. As an example, in 2017, regulations about the relevance classification of cavities and the possibility of speleological compensation were issued: respectively Ministry of Environment Normative Instruction 02/2017 and Chico Mendes Institute 01/2017 for the Conservation of Biodiversity Normative Instruction (ICMbio).

New regulations and the evolution of technical knowledge require constant adjustments in speleology work, both in field practices pertinent to new project licensing and monitoring routines in operational areas, as well as in data treatment, which impact geological resources and mineral reserves available for future mine projects.



In pursuit of sustainable development, Vale maintains its own research technological institute and is a partner of universities and museums



In the left-hand photo, researchers Cinthia Bandeira and Wesley Rangel at Instituto Tecnológico Vale (ITV), in Belém (PA)
Photo: Ricardo Teles

Next, Geovane Siqueira analyzes samples of species cataloged in the herbarium of the Reserva Natural Vale in Linhares, (ES)
Photo: Pedro Cattony

This condition requires detailed mine engineering projects that include preserving the most relevant cavities and determining areas available for speleological compensation.

The year 2017 ended with 25 instrumented cavities, 27 geotechnical instruments installed and 36 storages, energy and telemetry stations made available. The installation of a micro-seismic monitoring net was concluded by year-end; this structure allows the tracking of (1) deformation superficial movements, (2) the occurrence of micro fractures inside the rock mass, (3) the reactivation of geological structures and (4) the whole cavity and its surroundings. Proposals for cave compensations associated with the licencing processes have been planned to preserve areas with speleological heritage to preserve complex and diverse cave ecosystems, as in the case of the recently-created Ferruginous Fields National Park in Pará, with 790.7 km², that ensured the preservation of about 290 caves.

Ferruginous rupestrian fields

Ferruginous rupestrian fields are formations associated with iron ore outcrops and thus are environments at risk within the company's operation areas. To manage this assessment, Vale acts to prevent and mitigate the impacts on these formations, invests in research and recuperation and restoration activities, and searches for conservation alternatives.

The company develops specific studies, from planning our entry into new territories through to the final completion of its projects, trying to avoid risks and impacts and investing in research to expand our knowledge of ferruginous

rupestrian fields and associated species. Since 2010, Vale has worked in partnership with research funding institutions in Minas Gerais and Pará, investing in projects associated with rupestrian fields species. A partnership was started in 2017 with the Federal University of Minas Gerais and the Federal University of Viçosa, through the Minas Gerais Research Funding Foundation, to develop projects to expand knowledge and improve the restoration process.

Vale established the Instituto Tecnológico Vale Desenvolvimento Sustentável (ITV DS) in Belém that maintains a group dedicated to studies ferruginous rupestrian fields' ecological restoration.

Among the company's measures to minimize impact on this formation are the Flora Rescue Program, the Reproduction Nurseries Program and the Biofactory Cultivation Program (Brazil, state of Minas Gerais, Nova Lima), as well as environmental recovery. Currently, 70 species are researched in the Biofactory. The seedlings of these species are already been acclimatized and prepared to reintroduction and some were planted in degraded areas on Capão Xavier and Pico Mines, and Visitors Center of Rola Moça State Park. See more in Projects of research and conservancy.

Vale acts to conserve its own and third-party areas in the Quadrilátero Ferrífero (MG) that protect formations representing the Atlantic Rainforest and Brazilian Savannah biomes, among them the ferruginous rupestrian fields. The Carajás Ferruginous Fields National Park was created in June 5, 2017, after an agreement between Vale, ICMBio and IBAMA. The Park comprises approximately 790.7 km² hectares that contain ferruginous rupestrian fields formations and endemic and endangered species associated to these formations.

Water resource management

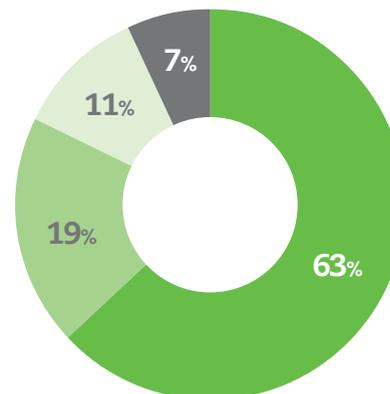
303-1 | 303-2 | 303-3

Vale recognizes its activities' impacts on water resources and works to ensure their conservation, protection and quality, developing initiatives that surpass compliance with legal requirements, such as technologies to reduce water consumption.

The company sets a high priority on minimizing risks related to water stress and conflicts due to the need for water. One of the tools Vale supports in this analysis is the Aqueduct Water Risk Atlas developed by the World Resource Institute (WRI), which maps global water risk. The Aqueduct makes it possible to correlate Vale's operational units and their respective water uses with the degree of risk indicated by the Aqueduct.

Distribution of the total volume of new water abstracted by regions according to water risk

- Low
- Low to medium
- Medium to high
- High



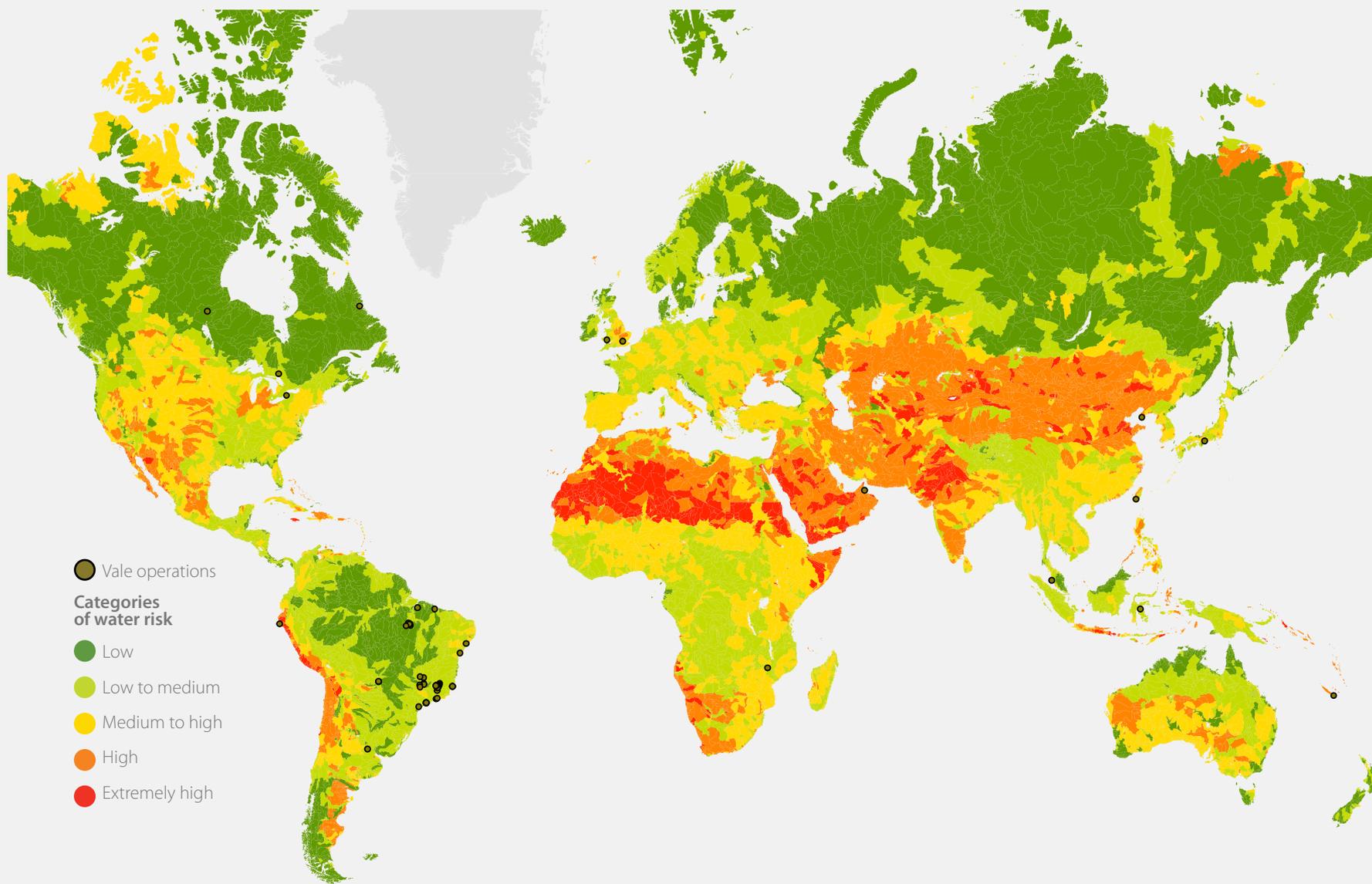
Africa, Asia and Oceania	Volume (million of m³)	Percentage (%)
Total water withdrawal by region	60	19
Low	36	12
Low to medium	24	7
Medium to high	0	0
High	0	0
Extremely high	0	0

South America	Volume (million of m³)	Percentage (%)
Total water withdrawal by region	207	68
Low	21	7
Low to medium	162	53
Medium to high	8	3
High	16	5
Extremely high	0	0

Africa, Asia and Oceania	Volume (million of m³)	Percentage (%)
Total water withdrawal by region	39	13
Low	0	0
Low to medium	9	3
Medium to high	12	4
High	18	6
Extremely high	0	0

Risks related to water stress – Aqueduct

Font: World Resource Institute (WRI)



To mitigate these risks, Vale has established a multiyear plan to reduce the specific water use in its operations, called our Water Goal. The objective is to reduce the abstraction of water in its production processes, stimulating projects and initiatives aimed at reusing, improving processes in the operational units, and using rainwater. The goal is to reduce the specific use (fresh water collected and used in the processes per ton produced) by 2030, which means using less fresh water for its production.

In 2017, we evolved our engagement in training, applying and assimilating new concepts in water and effluents guidelines, revised in 2016. The gains achieved include appointing a water resources coordinator by area of

coverage and updating/improving the units' water balance; that is, better control of abstractions, derivations and disposal of water and effluents.

In 2017, the total volume of water captured for use in Vale's production processes was 306 million m³, 10% decreased compared to 2016. Another 115 million m³ of water was collected, but not used in the production process. Of these, 41 million were destined for the neighbouring communities and 74 million were returned directly to the environment, in water courses and in spring replenishment. The volume of water reused in Vale's processes was 1.4 billion m³, representing 82% of total production demand. After use in industrial operations, the effluents are directed to control, treatment and disposal systems, totaling 92 million m³.

Total production increased by 4% over 2016, the total volume of water abstracted for production decreased by 10%, and reuse increased by 2%, which shows greater efficiency in the use of new water abstracted from the environment and impairment of the units with our overall Water Goal.

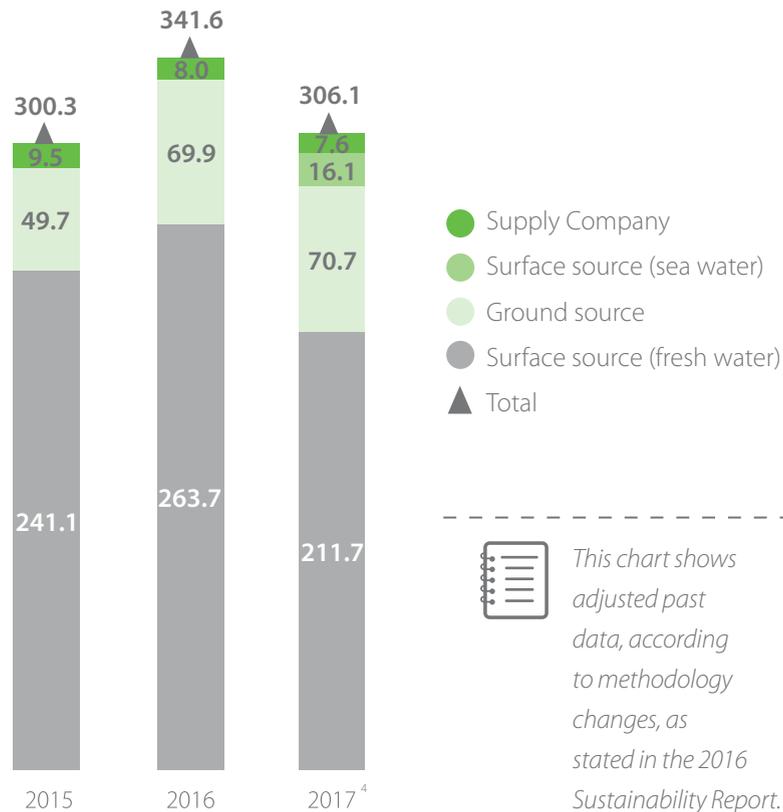
Hydric balance

(In million m³)



Water withdraw for use in Vale's production processes

(In million m³)



- Supply Company
- Surface source (sea water)
- Ground source
- Surface source (fresh water)
- ▲ Total



This chart shows adjusted past data, according to methodology changes, as stated in the 2016 Sustainability Report.

⁴From 2017 the surface water is stratified in fresh surface water and sea surface water.

Destination of other funding

(In million m³)



- Environment
- Third parties (population)

Investment in technologies for the use of water resource

303-2 | 306-5

Vale's investments in technologies and controls for water resources efficiency, conservation, protection, quantity and quality amounted to US\$108.7 million in 2017, or 22% of the company's total environmental expenditures.



This chart shows adjusted past data, according to methodology changes, as stated in the 2016 Sustainability Report.



Case

Pau Atravessado river forest restoration project



Brazil has been suffering from a water crisis for the last few years that directly affects nature conservation, the agricultural and industrial production and daily life for its towns' residents. Forests' vital importance in protecting rivers and springs that supply cities is widely recognized, for they filter out pollutants, stabilize the weather and water flows, and reduce erosion, sedimentation, flooding and drought. To help solve the water shortage problem, Reserva Natural Vale team sought a natural solution – they developed the Pau Atravessado River Forest Restoration Project to protect water sources and riparian forests in Espírito Santo state (Brazil).

RNV established a priority to recover ecological systems using native vegetation along the microbasin of the Atravessado river that feeds its reservoir. Its creeks are located upstream in the Sooretama (Espírito Santo State) municipality, and have been suffering from low water availability due to degraded, dammed water used for farming. A highly specialized forest restoration team with seven members (biologists, engineers and field technicians) was responsible for deploying the project.

The first step was to map the region's dams and creeks by georeferencing, and to conduct field trips to register rural property owners in the vicinities of the 97 existing dams. Thirty-seven springs were found and defined as priority restoration areas. With the data survey essential for water monitoring, 23 specific projects were developed for these properties, including a supply of native plant and tree seedlings from the Atlantic Rainforest and technical support for the rural property owners.



Case

Until December 2017, 17 subprojects were implemented in partnership with rural landowners committed to restore the riparian forests. The subprojects will be monitored twice a year for three years to assess the success of the planting. Already, 23.5 thousand native seedlings were donated to reforest 14 hectares of Permanent Preservation Areas (PPAs) in the Atlantic Rainforest.

The final phase of the project is scheduled for December 2019. Until then, we expect to:

- Develop and put in place all 23 forest restoration subprojects.
- Donate around 80 thousand seedlings to regional rural property owners.
- Recover 50 hectares of Atlantic Rainforest Permanent Preservation Areas (PPAs).
- Involve the community in environmental awareness actions, focusing on those that affect the region's water shortage.
- Improve the region's water offering.
- Conduct a lecture series to spread awareness and diffuse information about the importance of recovering and preserving water resources.

Mitigation and adaptation to climate changes

305-5

Understanding that this is a challenge to be faced globally, Vale closely monitors climate change-related studies and debates, including discussions on pricing of greenhouse gas (GHG) emissions. Vale, among other civil society actors, participates in national and regional discussions to define the regulatory and economic instruments applicable to each country and has actions on two fronts, mitigation and adaptation, to deal with the effects of climate change.

In 2017, Vale signed a letter of the Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável (CEBDS in Portuguese) on carbon pricing, an initiative of the Council, with the support of the World Bank and the Business Initiatives for Climate (BIC) to promote the discussion of pricing in the country.

Regarding mitigation, Vale acts to manage its emissions and supports actions aimed at conservation and forest recovery. Efforts to adapt are mainly based on risk management and adaptive capacity enhancement of the company's assets.

Two of the ten commitments of the Policy on Mitigation and Adaptation to Climate Change associated with mitigation, which are a commitment to reduce Vale's specific emissions and to establish a global goal of GHG reduction, are highlighted. In 2012, Meta Carbon⁵ was launched, a multi-year target that proposes to reduce direct GHG emissions by 5% by 2020. By 2018, the company will also have annual variable compensation targets directly associated with reducing its specific emissions of Scope 1, within the Sustainability KPI.

⁵Meta Carbon considers the emissions that would occur in 2020 if the company did not take any initiative to avoid or reduce its emissions, that is, consider emission reduction in relation to a business-as-usual scenario.

The company also actively participates in national and regional discussions on the subject, collaborating in the elaboration of policies and strategies aimed at transitioning to a resilient and low-carbon economy. An example is the participation in the development of AdaptaClima – a governmental platform of knowledge in adaptation, which seeks to contribute to the access to information and connect stakeholders to this topic in Brazil.

Another important Vale position during the year was the voluntary adherence to the recommendations of the Financial Stability Board-led Task-Force on Climate Related Financial Disclosures (TCFD), containing guidelines for reporting financial risks related to climate change by companies and financial institutions. As of the signature, the company also began internal work to adapt the qualification and quantification of climatic risks to the recommendations of the Task Force. In 2018, Vale will prepare scenario studies recommended by the Task Force – low-carbon economy scenarios and a catastrophic scenario of failure to meet the target defined in the Paris Agreement, which will help identify the main risks and material opportunities related to change for your business.

These results earned Vale a ranking among the 12 largest open-capital, diversified mining companies in terms of corporate readiness to transition to a low-carbon economy, according to the Carbon Disclosure Project (CDP) Mining Report 2017⁶. This result is due to the company operations' low emissions, energy intensity, and low-cost production.

Vale created in 2011 the Carbon Program in the Value Chain, which trains suppliers to prepare GHG emissions inventory and also predicts the annual emissions reporting from critical Vale suppliers. For more information, see the section Suppliers Management (page 114).

GHG Emissions and mitigation measures

305-1 | 305-2 | 305-3 | 305-4 | 305-5 | 305-6

Vale emitted⁷ 13.5 million tons CO₂ equivalent (tCO₂e) in GHG direct emissions (Scope 1)⁸ and 1.6 MM tCO₂e in indirect emissions (Scope 2)⁹. The company's scope 1 emissions increased by 2.8% when compared to 2016 mainly due to expansion of the Moatize mine, to the start of operations of the S11D Eliezer Batista Complex and resulting increase in transportation by the Carajás Railroad. Besides that, other factors contributed to the emissions increase, such as increased production of ferroalloys and pellets, and the start of our fertilizer operation in Patrocínio.

Scope 2 emissions increased by 10.6% compared to the previous year, due to the ramp-up of Conceição I (iron ore expansion, Minas Gerais, Brazil), production increases in some operations, and increased emissions from the Brazilian grid. The specific emission from energy sources was slightly lower compared to the previous year, totaling 48.8 tCO₂e / TJ in 2017. The specific emissions, taking the net operating revenue as the parameter of analysis in 2017, were 445.4 tCO₂e for US\$1 million.

⁶Digging Deep: Which miners are facing up to the low-carbon challenge?

⁷Vale's inventory is based on an operational control approach, has a mobile base year and includes the gases carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFC) and SF₆ (sulfur hexafluoride). The methodologies, guidelines, global warming potentials, references and emission factors adopted in the inventory are published annually in the Climate Change CDP questionnaire.

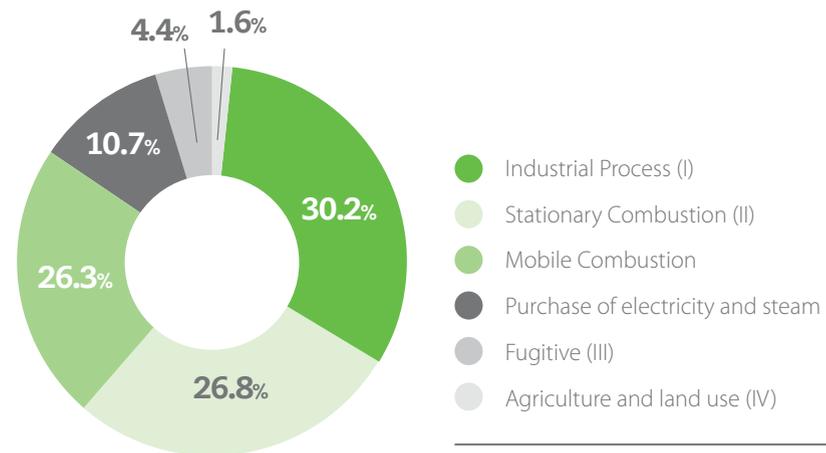
⁸They cover emissions from Vale's own or controlled sources, such as the use of fuels, production processes, fugitive emissions, agricultural emissions and changes in land use.

⁹They cover emissions related to Vale's purchase and use of electric power and process steam produced by third parties.

**Green House Gases Emissions
Scope 1 and Scope 2**
(millions of tCO₂e)



GHG Emissions (scope 1 & 2) by source



- I. Industrial Process: Burnt iron ore pellets, Nickel and co-products, Ferroalloys, Nitric Acid, Ammonia and Phosphate Rock.
- II. Stationary combustion: Fuel consumptions and use of explosives.
- III. Fugitive emissions: coal mining and HFCs losses.
- IV. Agricultural and land use: fertilizer application and changes in soil use.

¹⁰The 2016 results were adjusted due to data review and methodology adequacy.

The Carbon Targets projects and initiatives helped the company to avoid or reduce its direct emissions by around 830 thousand tons of CO₂e. This means Vale's emissions would be about 6% higher in the absence of these projects. Among the initiatives of the Carbon Targets portfolio (emission reduction projects) are the truckless system launch at the Serra Sul S11D mine, fuel exchange at the pellet plants (fuel oil by natural gas) energy efficiency measures in the railways, in addition to the better Itabira mine planning and N₂O (nitrous oxide) reduction in the production of nitric acid. In addition, in 2017, Vale removed 22,700 tons of biogenic CO₂ from the atmosphere by planting tree species.

Scope 3 emissions, indirect GHG emissions along the value chain, cover upstream emissions (related to goods and services purchased) and downstream emissions (related to goods and services sold). In 2017, these emissions totaled approximately 327.6 million tCO₂e in the year, about 94% of emissions in categories 10 and 11 of Scope 3. These categories refer to the processing of intermediate products and use of products, that is, they account for the emissions from the manufacture of products from the ore, metals, ferroalloys and coal sold by Vale.

S11D Eliezer Batista Complex Long Distance Belt Conveyor, in Canaã dos Carajás (PA), one of Vale's initiatives to reduce emissions
Photo: Ricardo Teles



The projects and initiatives helped the company avoid or reduce its direct emissions by around 830 thousand tons of CO₂e

It is worth highlighting the contracting of the two new VLOCs iron ore freighters by Vale, which will help to mitigate emissions of scope 3. More details in the following case.

Emissions of ozone-depleting substances totaled about 1.7 tonnes of ODS in 2017. These emissions relate to the use of refrigerant gases and other fluids controlled by the Montreal Protocol.



Case

New ships reduce greenhouse gas emissions



Fuel consumption and the reduction of greenhouse gas (GHG) emissions receive Vale's special attention in the maritime transportation of its cargoes, mainly in the Brazil-China route.

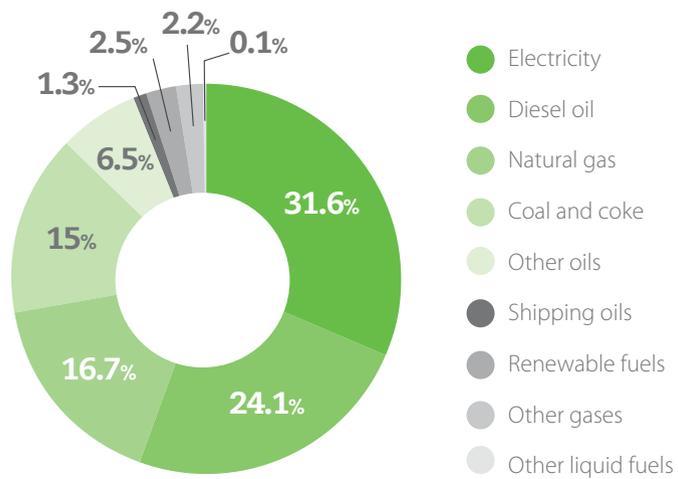
The company currently uses the world's most efficient class of ships in terms of energy consumption and emission of greenhouse gases, taking into account the Energy Efficiency Design Index (EEDI) of the International Maritime Organization (IMO), which collects data from almost 3,000 ships. Vale's pioneering project, first-generation VLOCs, also called Valemaxes, have been in operation since 2011 and emit 30% less CO₂ compared to the standard iron ore shipping vessels, known as capesizes. Built on Vale's initiative, the second generation of super-carriers, with capacity for 400 thousand tons, reduces CO₂ emissions by approximately 20% in relation to the first generation, and by 41% the emissions in relation to capesize vessels of 2011.

In January 2018, Yuan He Hai was delivered, the first of 33 new second-generation VLOCs. The construction of the vessels started in 2016, and these shall be delivered to the shipowners by 2019.

Energy

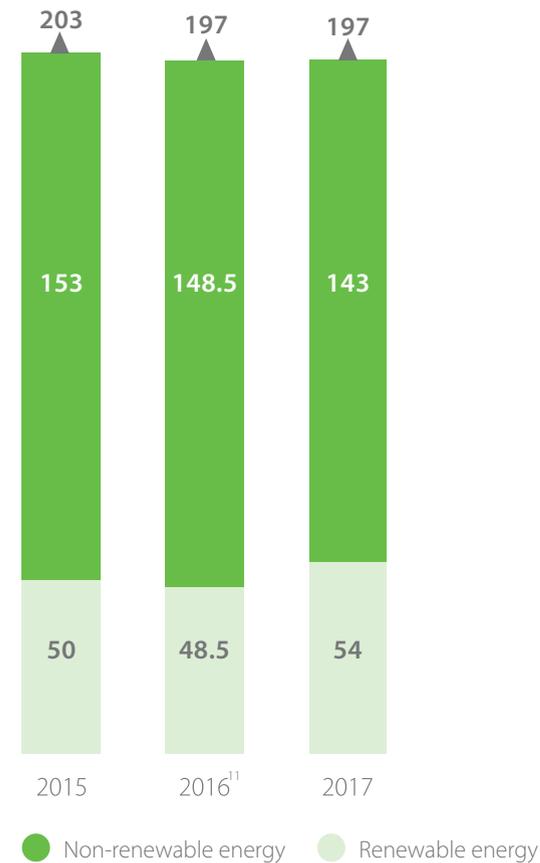
About 27% of Vale's energy matrix is based on renewable energy and the other 73% on nonrenewables. Power, fuel oil and natural gas total 72% of the company's entire consumption.

Energy matrix
2017



Energy Matrix Distribution

(thousand TJ)



¹¹ The energy consumption reported in 2016, 193 thousand TJ, was adjusted to 197 thousand TJ, due to the adequacy of the natural gas and diesel oil report.

	-	2017
Non-renewable fuels	66%	130
Coal and coke	15%	30
Diesel oil	24%	47
Shipping oil ^I	1%	2
Other oils ^{II}	7%	13
Natural gas	17%	33
Other gases ^{III}	2%	4
Other liquid fuels ^{IV}	0%	0
Renewable fuels^V	2%	5
Electricity consumed – self production (Indonesia and Canada)	5%	10
Electricity consumed – purchased (GRID)	-	-
Electricity non-renewable GRID	6%	11
Electricity renewable energy GRID	18%	36
Electricity consumed – purchased (OFF GRID)	-	-
Electricity non-renewable OFF GRID	1%	1
Electricity renewable energy OFF GRID	2%	3
Energy recovery	-	-
Electricity – energy source NR	0%	1
Electricity – energy source RE	0%	-
Consumed energy – renewable steam	0%	-
Consumed energy – non-renewable steam	0%	0
Refrigeration consumed purchased	0%	-
Heat consumed bought	0%	-
Total	100%	197

In 2017 Vale kept focused on optimizing its energy consumption through several kinds of efficiency actions, what led to a 3% reduction regarding the goals defined for this year. The internal energy consumption was 197 thousand TJ. This figure considers the reduction obtained with the reported energy efficiency projects, 4.2 thousand TJ. One of the projects relates to the trains operation changes and formation in the Estrada de Ferro Vitória Minas, described below.

Understanding that energy is essential to its operations, Vale manages this resource based on three principles: (1) quality and security of supply, (2) cost competitiveness and (3) sustainability. We seek to satisfy our energy demands in a reliable way, with low costs and respect for the environment and our communities.

In 2017, our own power generation (own production) reached 55% of Vale's power consumption

^I Marine diesel, IFO, MGO, MDO

^{II} Oil, BPF oil, HFO, light distillate oil, residual oil

^{III} LPG, HLR, propane, gas fuel

^{IV} Gasoline, methanol, kerosene and jet fuel

^V Biodiesel, splinter, biomass, charcoal and ethanol

Vale intends to expand the attendance to satisfy your demand for electric energy through self-production, to achieve self-sufficiency in electric energy in Brazil from renewable sources such as hydro, wind and solar with competitive costs.

Vale is also seeking alternatives for fossil fuels, such as the diesel fuel that powers off-road trucks and locomotives. Investments in renewable energy reached US\$ 19.5 million in 2017, both in hydroelectric power generation and energy efficiency.

Regarding fossil fuels, reduced consumption of bunkers due to the sales of vessels should be highlighted. This item is incorporated in energy consumption outside the company, which, for Vale, was limited to the computation of categories 4, 7 and 9 of the GHG Protocol, i.e., transport contracted for the company's operations, about 208.4 thousand TJ.

Vale holds direct and indirect equity participation, through its subsidiary Aliança Geração de Energia S.A. (Aliança Geração), in nine Hydroelectric Power Plants (HPPs) and four Small Hydro Units (SHUs) in Brazil. Also in the Aliança Geração, in December, the company inaugurated the Santo Inácio Wind Farm in the state of Ceará, Brazil, with an installed capacity of 99 MW. The energy generated in this park contribute to Vale's demand.

Through Aliança Norte Energia S.A., the company also holds a 4.59% indirect equity participation in Norte Energia S.A., whose purpose is implantating and operating the Belo Monte Hydroelectric Power Plant, in the state of Pará. Vale owns three HPPs in Indonesia and five SHUs in Canada.

Specifically, in the case of hydroelectric power plants, Vale deploys a set of social measures whose goal is to genuinely approach the local communities, developing initiatives focused on education, culture, sport, income generation,

tourism and security. The company constantly carries out monitoring activities to minimize environmental impacts.

The energy intensity indicators correlate with energy consumption and production. These indicators are also defined in a specific way for each production process: mine, processing plant, railway, port, etc. They are performance indicators that directly relate to operational costs and greenhouse gas emissions, are constantly monitored and checked by the units.

The strong correlation between consumption and production was seen by analyzing the specific consumption indicators for each business area. The increase in energy consumption observed mainly in the Iron Ore, Pelletizing and Coal business is due to increased production in 2017 compared to the previous year.

As highlights, in the Iron Ore business, the successful ramp-ups in S11D Eliezer Batista Complex, in north system, and Conceição I, in the southeast system, as well as Carajás' good operational performance. Vale's pellet production also surpassed last year's, but the energy consumption increased proportionally less, which shows an improvement in consumption efficiency.

In the Coal business, increased consumption is due to the launch of Moatize II operations.

The company's specific energy consumption, taking the net operational revenue as an analysis parameter, was 5.8 thousand TJ / billion US\$ in 2017.



Case



Review of the model of operation and formation of trains

Improving energy efficiency and pollutant emission reduction indexes is one of the daily focuses of all areas of a railway. Seeking gains in productivity and cost, and reducing its impacts, the team of the Vitoria Minas Railroad (EFVM) organized to restructure the railroad's operational model to reduce diesel consumption in the transportation of ore to the Port of Tubarão, in Espírito Santo.

The job did not require any extra investment. Without the use of new technologies or the purchase of assets, the purpose of the project was to restructure the operational model of the railroad, reviewing customer service processes in a regular and leveled manner, focusing on a more economic operation and formations of larger and more economical trains.

Some innovations in process:

- Adoption of the pulled production, that is, without remaining resources in the yards, in the circulation mesh and at the terminals. Only the expected to be unloaded was loaded.
- Hourly grids of train departures with greater predictability and autonomy for the yards, whose teams started to define the best formation of wagons for each timetable, depending on the demand.
- Creation of more economical driving procedures, which often undergo reviews, with new adjustments suggested by the drivers, which further increases efficiency gains.
- Review of standard trains for formations of increasingly larger and more economical trains, using technologies already available. This has reduced the number of trains in the mesh and the number of stops, and also the interferences in the routines of the communities along the railroad.

These initiatives have led to an increase in the number of trains with 252 and 336 wagons, the largest on the railroad, from 40% to 70% of the large-scale trains in circulation. The change allowed a reduction of 8 trains per day circulating in the EFVM.

In the last 5 years, the railroad has improved its efficiency level from 1.985 L/kTKB to 1.599 L/kTKB (total liters divided by gross ton times the distance traveled). An improvement of 19.5% of the indicator, which represents annual consumption savings of around 44 million liters of diesel.



Aerial view of Operation Onça Puma Nickel, in Ourilândia do Norte (PA)
Photo: Ricardo Teles

Vale invested US\$ 145 million in operational improvements and adoption of new technologies for the control and management of atmospheric emissions

Pellet belt conveyor at the Pelletizing Plant of the Vargem Grande Complex, in Nova Lima (MG, Brazil)
Photo: Marcelo Coelho



Atmospheric emissions

305-7

Vale invested US\$145 million in operational improvements, adopting new control technologies and managing atmospheric emissions. The goal is to continuously improve emissions management inherent in the extraction processes and ore processing.

Atmospheric emissions may arise from fixed or mobile sources. Fixed sources include equipment located in a stationary place, and may be punctual (stacks or ducts designed to disperse pollutants into the atmosphere in a directed way) or diffuse (emissions sources that are not fitted with structures to direct or control the flow of emissions, which hinders their quantitative monitoring) .

For the mining sector, the most important fixed sources of atmospheric emissions are Particulate Matter (PM), Sulfur Oxides (SOx) and Nitrogen Oxides (NOx); other atmospheric emissions are not meaningful. Next these emissions are shown.

Particulate matter

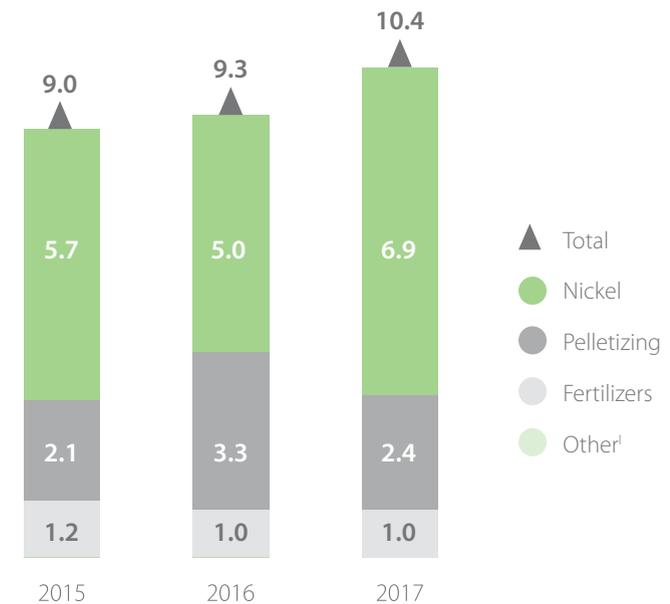
Particulate matter monitoring arising from Vale's production processes is carried out in specific locations defined together with the environmental agencies, to ensure air quality standards in operational areas and neighbouring communities. Nevertheless, external influences may undermine the measurement results' accuracy.

Control measures to mitigate the emissions' impacts include aspiration systems, powder suppression products, closed conveyor belts and transfer houses, windfences¹², slope revegetation and management processes.

Emissions arising from fixed and point sources allow us to consistently monitor the particulate matter mass emitted. This is done with the help of gas flowmeters and particulate matter concentration analyzers. The increase in particulate matter shown in the graphic below of about 11% compared to 2016 is due mainly to the increase reported by the nickel units located abroad, responsible for 87% of this increase.

Particulate matter emissions

(In thousand tons)



¹²Artificial wind barriers that surround product storage yards and reduce the sweeping of dust.

¹Coal, Copper, Manganese and Iron Ore

Sulfur oxides (SOx)

Emissions of sulfur oxides (SOx) originated in production processes and fuel burning. In Vale operations, it is considered that sulfur compound oxidation reaches the atmosphere as SOx.

Direct monitoring of exhaust gases to determine the amounts emitted was carried out for some fixed sources. Emission from sources that could not be monitored were calculated based on the sulfur content of feedstocks, inputs, and quantities of fuel consumed.

The most significant SOx emissions arise from the Nickel business unit. Process improvements and investments in control systems carried out by the Sudbury Complex in Canada led to significant reductions in SOx emissions in 2017.

Vale maintains its policy to improve operational processes and control systems and to increase productivity, aiming to use fuels with smaller sulfur content. This is illustrated in the graphic below also for the logistics area, where we achieved a 60% reduction in emissions compared to 2016.

Sulphur oxide (SOx) emissions (In thousand tons)



¹Coal, Copper, Manganese and Iron Ore

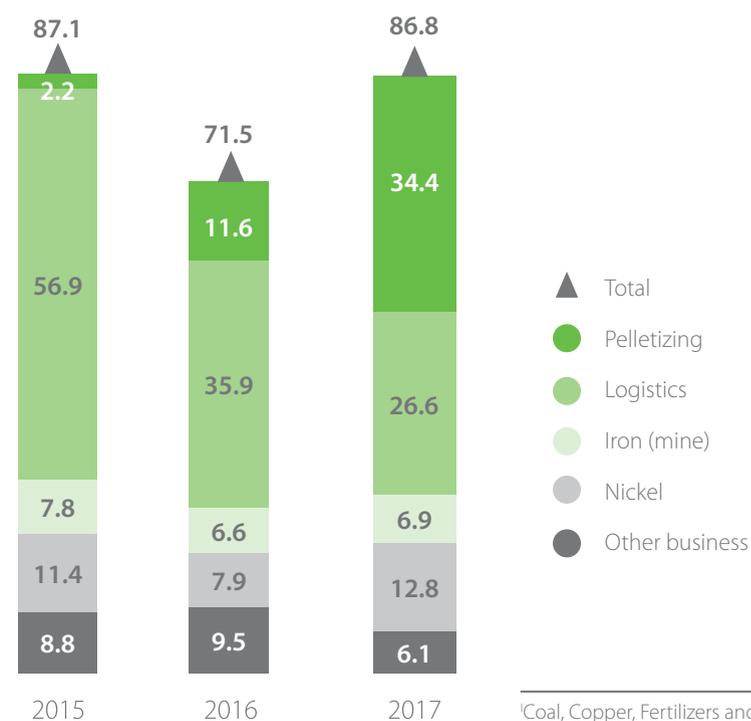
Nitrogen Oxides (NOx)

Combustion processes are the main generator of nitrogen oxides (NOx) emissions. Some point sources are fitted with regulated methods and instruments for continuous emissions monitoring; other emissions are calculated based on fuel characteristics and on where equipment is used.

Improvement actions for the company's control systems and operational processes continued in 2017, however the increase observed compared to 2016 was caused mainly by changing our calculation methodology and including sources not previously considered (scope increase), mainly for our Pellet Plants.

Nitrogen Oxide Emissions (NOx)

(In thousand tons)



¹Coal, Copper, Fertilizers and Manganese

Prosperity

Commitment to social and environmental development

Photos: Ricardo Teles and Marcelo Coelho

One of Vale's commitments, reflected in its mission, is to create value for its shareholders and for society. This pledge is guided by the search for increasingly more sustainable production, focus on world-class assets, and by policies and codes that aim to ensure that company's procedures are in accordance with the highest ethical standards, transparent management, and legal compliance in the countries where Vale operates.



Operator of the electric excavator Flavio Luis Dias, at the Pico Mine of the Itabirito Complex, in Itabirito (MG, Brazil)



Passenger and ore trains on the Vitória-Minas Railway





The value to “Do What Is Right” is reflected in all company rules and guidelines and go beyond generating financial return. Vale’s goal is to play a role as a local development agent in the territories where it is present, and also act as a global sustainability agent throughout the life cycle of its projects.

This happens by strengthening the value chains; including local suppliers; training and qualifying the workforce; fostering ethical and transparent relations with local government, the community and the market; in addition to mapping, managing and preventing the its operational risks.

Through the lens of economic performance, in 2017 our activities’ goal was to increase our profit margin instead of prioritizing production volume to meet the market’s preferences and demands. The purpose of this strategy was to reduce production costs, investments, indebtedness and, consequently, financial expenses.

In 2018, the focus will be to continue reducing company debt, improve the performance of its assets and further improve corporate governance with the ultimate goal of generating more shareholder returns. The goal is to reduce the company’s net debt to US\$10 billion by the end of 2018, and no new investment is expected in the CapEx.

► Prosperity and the SDGs

The subject of Prosperity in 2030 Agenda promotes access to a prosperous life, with full personal fulfillment, and economic, social, and technological progress in harmony with nature. The principals Sustainable Development Goals (SDGs) related to this axle and discussed in this chapter are 2, 9, 10, 11, 16 and 17, which focus respectively on eradication of hunger and sustainable agriculture; industry, innovation and infrastructure; reducing inequalities; sustainable cities and communities; peace, justice and effective institutions; as well as partnerships and means of implementation. Vale, as a Catalyst for Local Development, acts to strengthen prosperity throughout its value chain.

Our commitment

Vale’s purpose is to deliver to its shareholders financial return combined with continuous investment in innovation, process automation, and analytical and risk prediction systems. To ensure transparency in this process, in addition to publishing press releases to the market, relevant facts, and quarterly and annual income statements, Vale periodically participates in events with its stakeholders and analysts from financial institutions. The company also performs periodic surveys with analysts and investors on the level of information provided and the respective publishing actions.

Another important topic in this matter is the company's relationships with its suppliers. The company's management process seeks to control the performance and regulation of procedures, related to the subject, with the propose of mitigating the financial risk of the enlisted companies. To that end, these suppliers are identified monitored, and save their financial standings are disclosed, as well as, the evaluation and mitigation of the corruption risk and these companies, and their commitment to sustainability.

Since low supplier performance can have a negative impact on the operations, the supply history is one of the factors in the risk analyses, and can be used as a criterion for future purchases. This also applies to all suppliers with high and extreme risk ratings.

Policies and commitments

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Vale's main reference for subjects related to prosperity is the Sustainability Policy, which guides the company's operation as an inductor and multiplier of territories' sustainable development. In addition to the Policy, the company has codes of conduct and internal policies established transparently, such as Vale's Code of Ethical Conduct, with which employees and suppliers are demanded to comply.

The Code of Ethical Conduct contains the main guidelines to be followed by the members of the Board of Directors and its

advisory committees, members of the Audit Committee, the CEO and other executive officers, employees, interns, contractors, and any person that acts in the name of the company and its controlled companies. Among its main principles, is the compliance with the best corporate governance practices; principles and management of accounting practices; and clear, objective and timely communication to shareholders, investors and to the stock market.

This document also defines the pursuit of corporate goals with corporate social responsibility, in a mindful and responsible manner, while considering the social, economic and environmental aspects of its activities, contributing to the development of the communities where Vale operates, encouraging the exercise of citizenship.

Vale seeks, in all its policies and procedures of, purchases and procurement, to ensure equal treatment for any and all suppliers. Therefore, local commercial partners are guaranteed participation in egalitarian competition processes.

Additionally, to leverage and increase local companies' participation in its suppliers' base, Vale partners with entities to continuously map potential regional companies with the capacity to become a part of Vale's supply chain. Industry federations, trade associations and suppliers' development programs are components of this initiative.

In situations where no local suppliers are available to provide certain equipment, materials or services, Vale encourages national and multinational companies to establish themselves in its locations, thus contributing to the demand for services and materials in the supply chain. Initiatives such as this boost regional development through these companies' investment.

Suppliers must abide by Vale's Suppliers' Code of Ethical Conduct and other rules that reflect the high management's position in relation to the social and environmental aspects of its operations. The Code of Ethical Conduct, for example, requires that the operations and respective products and services comply with environmental legislation, with due compliance with licensing procedures and authorizations. There



Vale employees Luis Sobreira (with glasses) and Riverley Torres (training supervisor) in the area of operation of the mine, in Canaã dos Carajás (PA, Brazil), in the Complex S11D Eliezer Batista
Photo: Ricardo Teles

The Anti-Corruption Program is aligned with the best market practices and the agreements to which Vale is a signatory

is also an equivalent requirement regarding human rights, notably health, safety and the environment. Labor rights and local legislation, including fiscal and tax legislations, are also taken into consideration.

It is also necessary to know the Health, Safety and Environment Guide, which must base the technical and commercial proposals, ensuring compliance with all items described during the term of the agreement. Another requirement is the commitment to the GHG Protocol, the most-used methodology to quantify the greenhouse gas emissions.

Internally, Vale has a blacklist of forbidden and a greylist of products that should be avoided in its operations. If it is necessary to use a greylist product, a specific risk analysis must be performed.

Vale also has an Anti-Corruption Program, based on three main documents that define its rules: The Code of Ethical Conduct, the Anti-Corruption Policy and the Anti-Corruption Manual. These are rules, procedures and controls intended to prevent and detect the risk of corruption to which the company is exposed to because of its activity and of the countries where it operates. The rules of the Program are aligned with the best practices of the market, the pacts to which the company is a signatory (UN Global Compact and the Business Pact for Integrity and Against Corruption) and with anti-corruption laws applicable to Vale.

Also relevant to the subjects of this chapter are documents such as the Compliance Program, the Institutional Relation Guide, the Institutional Relations Manual for Capital Projects, and Institutional Relations Training.

Held annually since 2015,
the Integrity Movement
is Vale's main initiative
to promote ethics and
integrity in the company

Resources and responsibilities

The responsibilities for the subjects discussed in this chapter are described in the documents that guide Vale's management. For matters related to public policies, the Government Relations Office works, jointly with the technical areas, to identify matters that can impact Vale's business and to define strategies.

The management of ethics and integrity is made by the Corporate Integrity and Ombudsman's Office areas, jointly with Human Resources and Communication areas. In addition to receiving complaints, the Ombudsman's Office is responsible for proposing revisions, clarifying doubts, and creating training and communication actions related to Code of Ethical Conduct.

The main initiative to promote ethics and integrity in the company is the Integrity Movement, held yearly since 2015. This is a global action recommended for all leaders, employees and third parties. In this initiative, the main numbers are shown to collaborators, chats on ethics-related subjects are held, and, finally, there is an encouragement to report on incorrect attitudes. This initiative shows that all of the company's hierarchical levels are committed to creating an ethical, righteous and respectful environment. In 2017, this action reached 53 thousand collaborators around the world.



Case

Agir Program



Entrepreneurs benefited by the Program, in Carajás (PA, Brazil)

Expressive results in generation of income through social impact businesses

Vale believes that contributing to projects that generate work and income is one of the best ways to build a legacy for and with the most vulnerable people and communities close to its operations. Created by the Vale Foundation in 2013 and present in 20 municipalities, the Agir program is a social technology focused on the incubation and acceleration of social businesses - primarily family and collective - offering qualification, technical and managerial advisory, mentoring, direct investment, and monitoring of projects so that they thrive in an autonomous and sustainable manner.

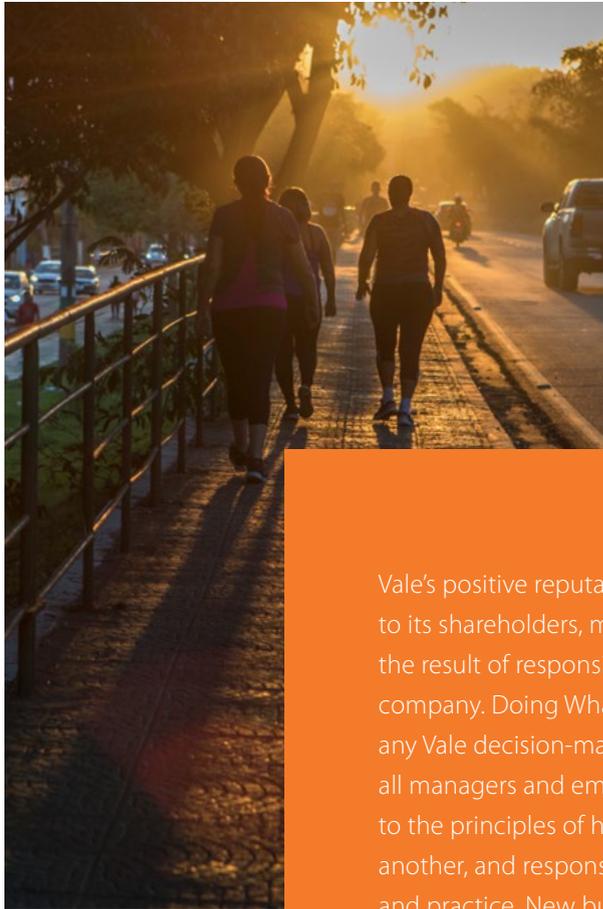
With its improvement, Agir has become more than a program, a methodology that contributes to local development and that can be replicated by public, private and third-sector entities.

The implementation of Agir takes place at three phases: Prospecting, in which local entrepreneurs are mapped, trained in integrated business management and mentoring for development of their business plans; Incubation/Acceleration, with a personalized work business to business, promoting an effective contribution in the axes of financial management, production, marketing, governance, people, in addition to direct capital investment in equipment and infrastructure; and Monitoring, which consists of monitoring established businesses with help from the project.

With more than 1,000 entrepreneurs benefited and 80 incubated or accelerated businesses, the program has histories of success in municipalities like Itabira (MG), which benefits more than 130 local entrepreneurs, mainly in the development of family agriculture, through the improvement of the most sustainable production techniques, and the creation of traveling fair; and Canaã dos Carajás (PA), with emphasis on support to a cooperative of recyclable waste pickers, which increased its revenues by more than 300% and helped to prevent more than 100 tons of waste from being sent to a public landfill in 2017.

On the Carajás Railroad (EFC, in Portuguese), the program focused on the development of alternatives of income for people, especially women, who worked in the informal food trade on the margins of the EFC. Products were sold through the windows of the compositions, at each station, and became unfeasible with the air conditioning of the new passenger train, which keeps the windows closed.

To prevent those people from losing their livelihood, the Agir program worked preventively and, from 2014 to 2017, worked with this public in the structuring of business. Today, there are 22 social businesses in operation with 137 engaged project owners. For this initiative, the Vale Foundation won the first place in the 2017 edition of the Human Being Award, organized by the Brazilian Association of Human Resources.



End of afternoon in the city of Parauapebas (PA, Brazil), where there is iron ore operation
Photo: Ricardo Teles

Our perspective

Vale's positive reputation and image are valuable to its shareholders, managers and employees, and the result of responsible work developed by the company. Doing What is Right is a basic premise of any Vale decision-making process. This means that all managers and employees must be committed to the principles of honesty, trust, respect for one another, and responsible information dissemination and practice. New business, new investments, and improvements to existing operations are based on knowledge of the risks and impacts involved. By acting according to these principles to stimulate development in regions where it operates, Vale contributes to Brazil's growth and that of other countries where it is present.

Economic scenario

In the global context, the first period of synchronized growth since the 2008 financial crisis was registered in 2017, in both developed and emerging countries. As a result, increased consumption, job creation and return on investments, boosted demand and steel production. Meanwhile, the continuous increase in global awareness of importance of environmental protection, specially in China, favored the demand for high quality iron ore, which also contributed to increase productivity, resulting in lower emission of pollutants and better performance in the steel process.

China's steel output hit a high record of 832Mt, supported by consistent growth in demand from the construction and manufacturing sectors. This was mainly due to the offer reforms facing China, aiming to eliminate the exceeded capacity in some heavy industries, including steel and coal, and also increasing the efficiency and industry productivity. China, the world's largest iron ore consumer, has pledged to reduce emissions in these sector and improve air quality. In 2017, China eliminated more than 50Mt of obsolete steel production and announce the closure of more 30 Mt in 2018. China's consistent efforts to reduce industry emissions naturally have Vale a competitive advantage as a preferred supplier of high quality iron.

In the Metallurgical Coal segment, based on data available on the Chinese demand and on Australian exports, it is possible to conclude that there have been positive pressures on the prices. This is due to a 14% increase in metallurgical coal imports by China, compared to 2016, combined with a drop of nearly 9% year-on-year of exports from Australia. Japanese imports remained relatively stable at around 72 million tons (Mt), while India showed an increase in imports of metallurgical coal from 49 Mt to 51 Mt, a year-on-year increase of 5%. Based on these figures, estimated global metallurgical coal imports increased by around 4% in 2017. The outlook for 2018 is for stable demand and normalized supply, as the congestions at the main Australian export terminals decreased.

The strong demand created by stainless steel producers, as well as by the positive macroeconomic fundamentals, particularly in China, helped support the increase in nickel's price. The demand for this metal is already reaping the benefits from the growth of the electric vehicles market, with a potential for additional incentive in the future, with the increased use of nickel in battery composition. On the other hand, a 2% increase in supply was observed, driven in

part by the additional supply of nickel ore from Indonesia. The outlook for demand to drive stainless steel production in 2018 is growing, with stability to other input applications.

On the supply side, overall refined copper production remained relatively stable, growing by 0.8% in 2017 compared to 2016. Global input demand increased by 2% in 2017 compared to 2016. With regard to China, which accounts for approximately 50% of global copper consumption, demand increased by 3.2% year-on-year and was driven mainly by increased investment in infrastructure and the residential market. In the long run, demand for copper is also expected to grow, driven in part by growing investment in renewable energy. In addition, supply constraints should be observed because of the declining ore levels and the need for investments in new greenfield projects.

In Brazil, the main event was the Federal Government's sanctioning of provisional presidential decrees that change the mining sector regulation and the tax rate of the Financial Compensation for the Exploration of Mineral Resources (CFEM, in Portuguese), among other measures

Our work

Results and added value

201-1

Vale's robust performance in 2017 is notable for its strong cash generation, boosted by improvements in pricing, rigorous discipline in capital allocation and better results in the Basic Metals and Coal segments. Regarding cash generation, adjusted EBITDA – which excludes gains or losses on the sale of non-recurring assets and expenses and includes dividends received from affiliates – was 28% above 2016, totaling US\$15.3 billion. In general, the result is due to higher prices and commercial initiatives.

Prices were also responsible for the highest net income of US\$5.5 billion, which increased by 38% compared to 2016. The result was also influenced by the lower depreciation of assets from discontinued operations (impairment), which was partially offset by exchange variation.

Investments have reached their lowest level since 2005, totaling US\$3.8 billion in 2017, a reduction of US\$1.3 billion compared to 2016, mainly due to completing the S11D mine and plant project. Investments in executing projects totaled US\$1.6 billion, while investments in maintaining existing operations reached US\$2.2 billion in 2017. In 2017, the level of capital investments returned to being lower than maintenance, a level not reached since 2005.

The divestment program's exceptional operating performance and completion in 2017 resulted in accelerating the reduction of Vale's net debt, which totaled US\$18.1 billion at the end of the year, representing a reduction of US\$6.9 billion when compared to the US\$25 billion debt in December 2016.

Vale achieved a solid performance in 2017 in operational terms, with several records recorded in the year. These include an annual production of 366.5 million tons¹ of iron ore 169.2 Mt by the North System, 5.8 t of cobalt, and 485 thousand ounces of gold as a by-product of copper and nickel concentrate.

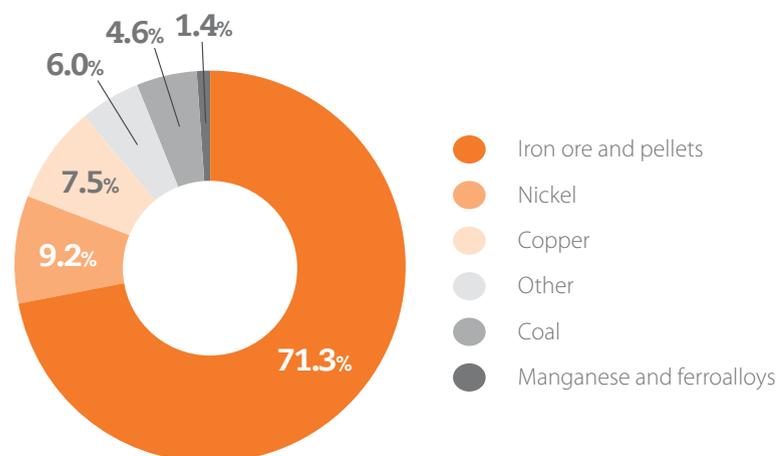
The results achieved by Vale in 2017 reflected a moment of transition, in which large investments give way to a period of stability, focusing on management, performance and shareholder remuneration. One of the objectives of debt reduction is to adopt an aggressive dividend policy, applicable in any scenario of commodity prices, linking shareholder remuneration to the company's cash generation.

The new dividend policy will be more robust, sustainable, easy to estimate and able to generate significant returns for Vale shareholders in the coming years. The terms of the new guidelines should be announced by the Board of Directors at the end of the third quarter of 2018.

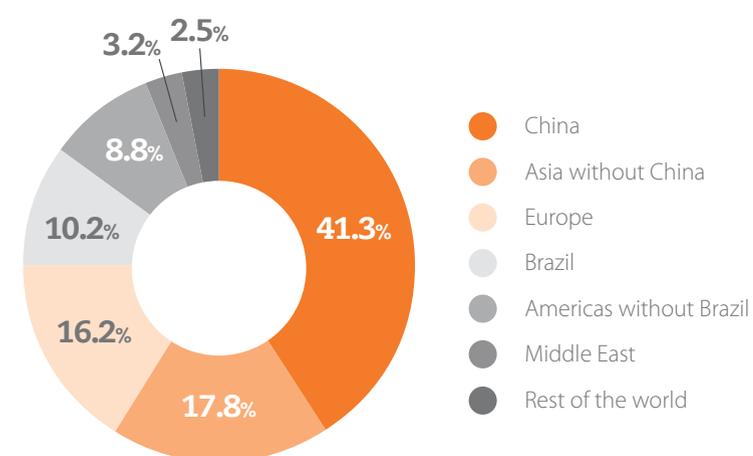
¹Including third-part purchases

Net revenue per product

2017 (US\$34,0 billions)

**Net revenue per market**

2017 (US\$34,0 billions)

**Production summary**

Thousand metric tons	2017	2016
Iron ore ⁱ	366.511	348.847
Pellets ⁱ	50.300	46.220
Manganese ore	2.173	2.371
Coal	11.260	7.216
Nickel	288.2	311.0
Copper ⁱⁱ	438.5	445.5
Cobalt	5.811	5.799
Gold (thousands ounces)	485	483

ⁱ Excluding production attributable to Samarcoⁱⁱ Excluding production attributable to Lubambe

Investments per type

(US\$ billions)

	2016	2017	2018 ⁱ
Execution of projects	3.2	1.6	1.6
Maintenance of operations	2.3	2.2	2.2
ROM replacement ⁱⁱ	-	-	-
Total	5.5	3.8	3.8

ⁱInvestment budgetⁱⁱInvestments to maintain current operations productivity**Value generated and distributed**

(US\$ million)

	North America, except Canada	Canada	South America, except Brazil	Brazil	Europe	Africa	Australasia	Middle East	TOTAL
Recipes	-	1,759.0	16.0	2,812.0	27,470.0	-	1,909.0	1.0	33,967.0
Direct Economic Value Generated	-	1,759.0	16.0	2,812.0	27,470.0	-	1,909.0	1.0	33,967.0
Operational costs	109.0	3,709.0	28.0	11,843.0	3,352.0	1,546.0	222.0	230.0	21,039.0
Wages and benefits of employees		355.0	11.0	1,555.0	41.0	117.0	574.0	45.0	2,698.0
Research and Development	-	60.0	11.0	215.0	13.0	13.0	28.0		340.0
Payments to capital providers	327.0	3.0	1.0	4,261.0	49.0	-	16.0	6.0	4,663.0
Government Payments	(10.0)	166.0	2.0	3,134.0	20.0	25.0	46.0	3.0	3,386.0
Environmental Expenditures		192.9	5.8	242.2	5.2	9.5	31.5	0.2	487.3
Social Expenditures		5.7	0.6	112.2		0.7	6.1	0.1	125.5
Distributed Economic Value	426.0	4,491.6	59.5	21,362.5	3,480.2	1,711.2	923.6	284.3	32,738.8
Accumulated Economic Value	(426.0)	(2,732.6)	(43.5)	(18,550.5)	23,989.8	(1,711.2)	985.4	(283.3)	1,228.2

S11D Eliezer Batista Complex

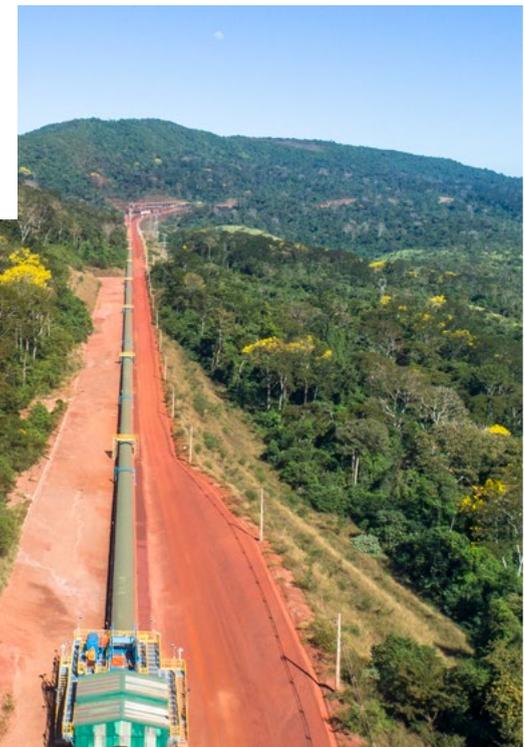
In December 2017, the S11D Eliezer Batista Complex celebrated one year of operation with a production of 22 million tons (Mt) of iron ore. The truckless system – without the use of off road trucks, only a bulldozer, some crushers and conveyor belt – began its operation before the original schedule and exceeded production projections for the first year ramp-up.

From January to November, productivity reached 6.5 thousand tons per hour (capacity of 8 thousand tons per hour). In 2018, production is forecast to be between 50 and 55 million tons, and in 2019, between 70 and 80 million, reaching 90 million tons in 2020.

As the biggest project in the history of mining, the S11D Complex includes a mine, a power plant, railway and port logistics, and received investments of US\$14.3 billion. This is the largest private investment ever made in Brazil in this decade, which has had a positive impact on Brazilian exports, bringing a new stimulus for the country's economic and social development, notably in the states of Pará and Maranhão.

A pioneering project in Brazil for dry mining, the S11D Eliezer Batista Complex completes a year of operation with the production of 22 million tons of iron ore

TCLD (in Portuguese) Belt System
- Long Distance Belt Conveyor
at the Eliezer Batista Complex in
Canaã dos Carajás (PA, Brazil)
Photo: Ricardo Teles



Vale's operations in Minas Gerais have also benefited, since most of the ore produced there is being blended with the ore from the Northern System, favouring its competitiveness in the international market.

The S11D Complex produces the purest iron ore on the market, allowing Vale to adapt to the business' demands and trends, offering ores according to the premium and discount ratio set by the commodities market. In 2017, the Northern System, where the S11D Eliezer Batista Complex is located, produced 170 million tons.

S11D also allows Vale to reduce its production cost. The new mine ramp-up is included in Vale's "second wave" of productivity, which predicts a performance improvements through innovation and automation, reduces costs by implementing a management program, among other actions.

Of the total invested, US\$6.4 billion is being applied to install the mine and plant, and US\$7.9 billion to construct 101 kilometers of railway line to expand the Carajás Railway (EFC, in Portuguese), with works in Maranhão and Pará, and to expand the Ponta da Madeira Maritime Terminal in São Luís, Maranhão.

Managing suppliers

204-1

The process to certify new suppliers entails a background check of the company and its owners, and their compliance with our Global Anti-Corruption Program and environmental requirements. Suppliers are also cross-referenced with sanctions lists of the Brazilian Federal Government, and undergo other verifications.

The programs to develop suppliers are crucial initiatives in training local companies. Training sessions cover subjects such as Occupational Health and Safety, the Environment, Accounting, Tax and Labor Management, Quality and Productivity, and Social Responsibility, among others. The programs intend to develop local companies in the Sustainability area, aligned with Vale's requirements. In 2017, Vale trained 243 supplier companies all over Brazil.

Through the InoveCapital portal, approximately US\$501 million in loans and credits was allocated to suppliers. Managed by Vale, InoveCapital operates as a platform for relationships between suppliers and financial institutions. In this system, suppliers have access to loans or advancements of invoices with attractive prices, contributing to their financial management.

In 2017, Vale's percentage of local operational purchases in Mozambique, Brazil and Canada was 90%, one percent higher than in 2016. In Brazil, the performance was 96% (country), the same level as 2016. In Mozambique, local purchases reached 82%, three percent more than 2016.

Vale seeks, in its purchasing and purchasing policies and procedures, to guarantee the process isonomy for any supplier



Supervisor of engineering Nehemias Costa in the maintenance canteen, in Ourilândia do Norte (PA, Brazil), Operation Niquel Onça Puma
Photo: Ricardo Teles

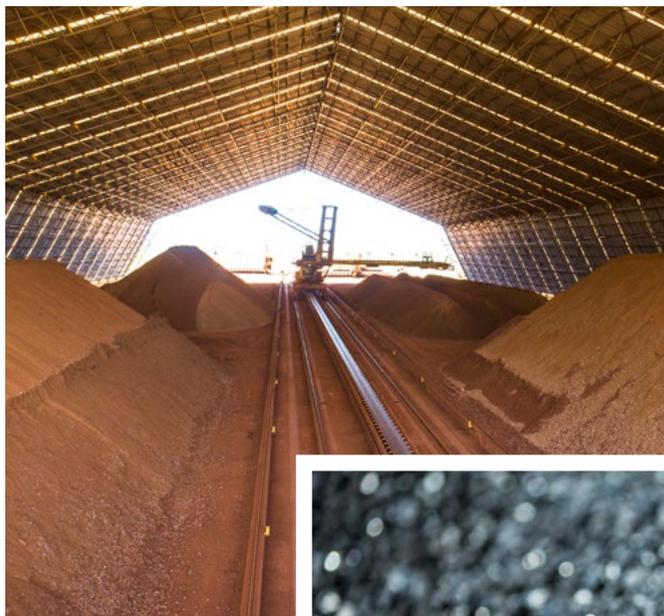
Throughout the entire decision-making process, the supplier's level of financial dependency with Vale is taken into consideration. Examples of decisions made include limiting or adjusting a company's participation in processes to be compatible with their financial structure or adjusting our demands to a company's profile.

Since 2011, Vale requests that its suppliers send a yearly, voluntarily report on their emissions inventory. This program applies to companies from any region, as long as they have active agreements with Vale. In 2017, Vale received 143 inventories from suppliers, representing the best result since the beginning of this verification.

Vale also has a suppliers' qualification program related to climate change and GHG emissions. Since the beginning of the initiative, 500 companies have been trained, and in 2017 the priority was boosting the knowledge of service providers that had participated in previous years and that had agreements in force.

Through the Third Party Agreements Office (NACT, in Portuguese), Vale monitors our subcontracted suppliers' compliance with good labor practices while performing activities at Vale's facilities, such as minimizing risk exposures, attention to Health and Safety, reasonable working hours, addressing labor liabilities and timely provision of labor rights.

In relation to Health and Safety, in 2017, the 359 suppliers that provided services within the Vale units have analyzed the information provided by the Pre-Qualification/Certification in Health and Safety of Service Providers form. In the same period, we verified the documentation of 976 companies' products and services.



Onça Puma nickel
ore storage facility
in Ourilândia do
Norte (PA, Brazil)
Photo: Ricardo Teles



Anti-corruption policy

102-17 | 102-34 | 205-1 | 205-2 | 205-3 | 418-1

In 2017, Vale revised the Anti-Corruption Manual, as part of its ongoing efforts to perfect its processes and controls. The changes involved the revision of contracting rules and updating forms applied to higher-risk contracts. The full version of the document is available to all employees on the intranet.

The execution and revision of the Anti-Corruption Program always consider the corruption risk of the countries where the company operates, and establish a greater presence and focus on the riskiest localities. It is worth noting that Brazil, Vale's country of origin, is considered a country at high risk for corruption. The Program also pays special attention to other specific high-risk countries, such as Indonesia, Malaysia and Mozambique.

All suppliers of materials, services and equipment, entities, or associations, or any third party that receives resources, assets or rights from Vale, in other words, all third parties, must undergo a process of corruption risk assessment before being registered. This encompasses the company's anti-corruption due diligence, which checks, through public information, the third parties' previous records. The risk assessment process covers all of Vale's operations, and in 2017 more than 14,000 queries were carried out.

Generally, the risk being assessed is of someone attempting, for the benefit of Vale, their own self or any other person, to improperly influence a government official with an intent to obtain or secure an advantage.

The monitoring and control activities performed in 2017 by the Corporate Integrity area, which is responsible for implementing the Anti-Corruption Program, were focused on non-compulsory expenditures, such as donations, sponsorships, relationship-building actions, agreements, technical or financial cooperation agreements, environmental expenditures, expenses with traditional communities, social expenses and other non-compulsory contributions. In practical terms, all expenditures require a previous approval by the Corporate Integrity area. All expenditures are monitored, accounts rendered are analyzed, and possible political involvements in the communities involved are monitored. The main goal is to know if the funds are being destined according to request and properly used.

The company also has a procedure to adapt supply agreements to their inherent corruption risk, based on risk classification and due diligence processes. Controlled companies and subsidiaries are subject to the guidelines in the Anti-Corruption Manual.

Violations of Vale anti-corruption rules are not tolerated. Employees who violate the rules will be subject to proper disciplinary actions, which may range from a warning to dismissal. The penalties imposed are evaluated according to the seriousness of the violation and the circumstances of the situation in question.

In 2017, no cases of corruption by government officials were registered, and the Ombudsman's Office is the means for making this kind of complaint. The Office also did not record any proven complaints of privacy violation or loss of clients' data.

Vale constantly and systematically performs a series of actions to qualify its employees based on the Anti-Corruption Program, including members of its Board of Directors and Executive Office. Among these initiatives, highlight online training, which is mandatory for all employees with computer access, and available in Portuguese, English, French, Arabic, Malayan, Mandarin and Bahasa (Indonesia). More than 26 thousand employees received training.

On-site training, which provided qualification for over 5.5 thousand globally employees, is mandatory for people who perform priority tasks or activities. Priority areas considered strategic for the good operation of the company are Legal, Internal Audit, Corporate Safety, Internal Controls, Accounting, Ombudsman, Tax, and Human Resources. Priority is also given to employees whose functions may expose Vale to corruption risks. This includes those who carry out activities that involve interaction with government officials, hiring and managing suppliers or third parties, philanthropic donations, community investments, sponsorships, relationship-building actions, other types of corporate social responsibility, or those that involve any other non-mandatory expenditures.

Legal conformity

206-1 | 307-1 | 419-1

Based on international treaties, on legal frameworks in force in the countries where Vale operated, and on internal rules and policies, Vale orients its commercial areas regarding practices and procedures that must be adopted to comply with competition legislation. In 2017, Vale had no new records of judicial or administrative proceedings involving unfair competition practices, both in Brazil and in countries where it operates.

Regarding labor lawsuits related to discrimination, 22 lawsuits were filed against Vale. Such cases do not address effective discrimination in the workplace, but concern Supreme Court of Labor Precedent 443 (TST, in Portuguese), which presumes discrimination when a severely ill employee is dismissed. Vale filed a due defense in said lawsuits, believing that it had not practiced any act of discrimination relating to such employees.

In the environmental theme, a relevant process² was initiated regarding Maravilhas III Dam. In October 2017, the company was cited in a relevant lawsuit, in which the Minas

Gerais Public Prosecutor's Office questioned the environmental licensing of this Maravilhas III dam. The first degree court ordered the suspension of the project implementation. Due to the presentation of clarifications by Vale, the decision was reformed, and the court released the licenses and the project. The Public Prosecutor has filed an appeal, which is awaiting judgment by the Court of Justice of the State of Minas Gerais (Brazil).

The most relevant Tax Litigation discussions initiated in 2017, refer to: (i) Financial Compensation for the Exploration of Mineral Resources (CFEM, in Portuguese) – royalties (US\$177 million); (ii) Corporate Income Tax (IRPJ, in Portuguese) and Social Contribution on Net Income (SCNI) – (US\$127 million); (iii) Tax Over Services (TOS) – (US\$286 million).

Also a criminal action was filed against members of the MBR administration, alleging fraud related to the collection of State Goods and Services Tax (ICMS, in Portuguese) – (US\$3 million) – discussed in our own action with full debit guarantee.

²In this item, only those processes initiated or terminated in 2017 that meet the relevance criteria of the 20-F report, that is, processes that represent a value involved of 1% of the company's equity, or processes that directly impact the business or image of the company, are reported. Relevant cases already in progress can be found in Vale's Report 20-F, available under Investors at www.vale.com.

Corporate Risks Management

102-10 | 102-11

At Vale, both operations and project feasibility analyzes seek to identify and assess risks in environmental, social, reputational, financial, human rights and health and safety aspects, using specific criteria for decision-making.

This procedure allows the entire company to be involved in a continuous process of framing risks in categories (clusters) capable of impacting Vale's strategies, associated with performance indicators. In this way, it is possible to guarantee the controls preventive and mitigating proposed in full alignment with their internal routines.

These categories consider risks of diverse magnitudes, from those with significant externalities, such as air pollution and damage to physical integrity, to even the smallest, with little effect on communities and the environment.

The process of monitoring the relevant risks follows the company's risk management governance policy, which ensures continuous discussions by the responsible areas

and evaluations by the specific Subcommittees and Executive Risk Committee. Following the risks are discussed in the meetings of the Executive Office and later with the Board of Directors' Advisory Committees, and finally presented in the Board itself.

In 2017, in spite of all these practices, Vale responded to a request from the Board of Directors and began a review of its Corporate Risk Management model to understand the level of maturity and propose adjustments, when necessary.

Risks associated to climate changes

201-2

The main risks mapped by Vale regarding climate changes may be divided in two groups:

Regulatory risks: such as establishing carbon pricing mechanisms in countries where Vale operates and within the framework of the International Maritime Organization (IMO) in the coming years. Vale has contributed to discussions with its technical experts, and developed an internal tool to quantify the potential risk of carbon pricing in its business, as a basis for internal decision making.

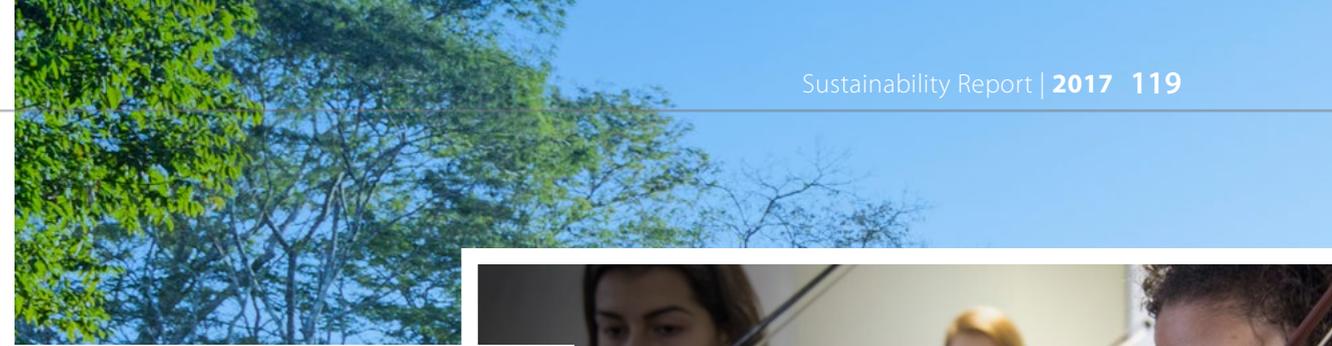
Physical risks: such as the potential negative impacts of meteorological events on the company's assets and environment. To manage such risks, Vale in 2017 refined the information in its map of potential climatic impacts, including future projections, for the Sistema Norte - mines in the Carajás region, Carajás Railway and São Luís port - and Mozambique. In 2017 the company started an internal project to adjust the qualification and quantification of climate risks according to the recommendations of the Task Force on Financial Disclosures Related to Climate.

Peace

Grow and evolve with the community

Photos: Ricardo Teles
and Marcelo Coelho

Vale works to establish responsible and sustainable relationships with communities, suppliers, partners and all of its stakeholders in the territories where it operates. Transparently managing issues that can generate potential conflicts contributes to the company's ability to achieve or maintain a License to Operate. This brings Vale legitimate social acceptance and the approval of other interested parties, especially its local communities.



Music class at the
Knowledge Station
in Serra (ES, Brazil)



Reserva Natural da Vale, Linhares (ES, Brazil)



Many of these issues are typically challenges of the mining sector and are constantly being studied by companies, industry associations and governments, just like particulate emissions, safety in operations, dams, noise and involuntary resettlements, among others, in search for solutions that assure projects with fewer impact and greater social return.

► Peace and the SDGs

The theme of Peace in the 2030 Agenda is related to promoting peaceful, just and inclusive societies, free from fear and violence. The main Sustainable Development Goals (SDGs) related to this axis are SDGs 3, 11 and 16, which deal, respectively, with the health and well-being of people, sustainable cities and communities, and effective institutions that promote peace and justice. In seeking dialogue and acting in partnership with its stakeholders to mitigate its operations' impacts, Vale collaborates to reduce conflicts and consequently develop the territories in which it operates.

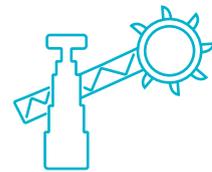
Our commitment

102-15, 103-1, 103-2, 103-3, 203-2

Vale understands the importance of its role as a catalyst in developing the territories in which it operates in a fair and peaceful way. The company is also aware of the inherent impacts in mining activity, and seeks to invest in social and environmental technologies to address them through prevention, mitigation and compensation.

This commitment is reflected in the company's dedication to leaving a positive legacy in the territories where it operates, its efforts to improve the health and safety of its employees and neighboring communities, and its commitment to protect the environment responsibly by controlling risks and mitigating its operations' impacts.

Action lines

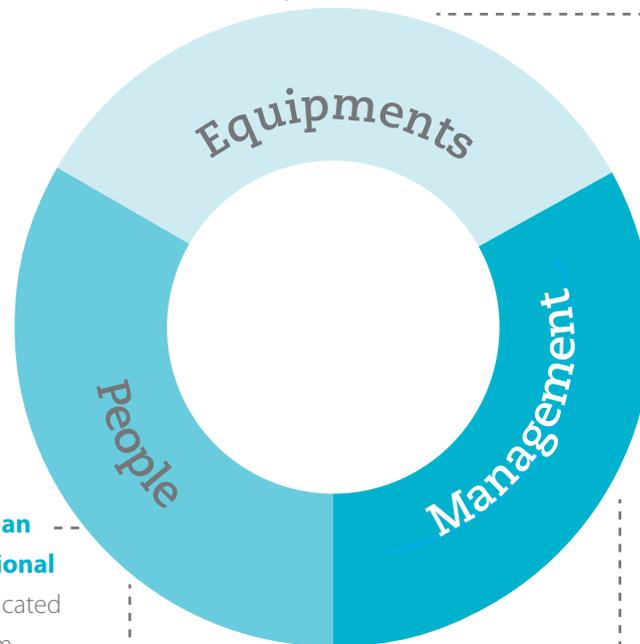


Using equipment and facilities

that improve operational infrastructure and control systems through innovative technologies and practices, especially in high-risk activities or that significant environmental aspects.



Mobilizing **human and organizational resources**, dedicated to the Zero Harm culture, with safe and preventive work practices, and encouraging environmentally correct attitudes.



Managing

through a system that establishes roles and responsibilities, as well as principles and criteria to sustain the productive processes and allow the continuous achievement of set objectives.

Managing impacts and risks is the first step in building a transparent and fair relationship with society. They contribute to achieving and maintaining the License to Operate: through the management of socio-environmental changes from our activities, based on risk analysis of processes and business.

From the business point of view, the company believes that effective management of risks and impacts is the key to ensuring the sustainable results. This is achieved by monitoring and evaluation of operational risks, assessing their severity and likelihood, including the constant searching for unknown risks. There are reference perspectives to analyze the dimensions of social and environmental impact.

The topics considered the most critical and that can generate conflict or tensions in the relationship with the community are constantly mapped and managed, to achieve the best possible solutions and ongoing process improvements through dialogue. Conflict management, monitoring of railroad noise, involuntary resettlements and asset demobilization are among the risks monitored by the company.

License to Operate

Vale's actions to obtain the License to Operate are based on three key drivers: management of risks and impacts, management of the relationship with stakeholders and definition of social investments to generate benefits and positive legacy in the territories in which Vale operates.

The License to Operate is a methodology that seeks legitimacy and acceptance of the company by the society, especially by local communities. It is required to enable the company to install new projects and to maintain the continuity of its operations, as legal compliance alone is not enough to obtain social legitimization. The concept of a License to Operate is applied at Vale considering Global, Formal (legal) and Social Licenses.

The Social License is an intangible asset and, because it is dynamic, must be managed and monitored. In this context, Vale also addresses socioeconomic constraints linked to the environmental licensing processes, and its relationship with communities. These constraints are a legal commitment linked to the environmental licenses of Vale's operations and projects.

Medical Appointment at Mineral Development Center, in Nova Lima (MG, Brazil)
Photo: Ricardo Teles

Vale's health and safety management establishes its own strategy for Zero Harm



Policies and commitments

403-4

Vale's Health and Safety management establishes its own strategy for Zero Harm, where risk of fatalities assume a preponderant role in which SGI, as well as facilities, equipment and people, are essential pillars of this journey. In this context, the Genuine Active Care program is an example of how people can act in a work environment, enhancing their awareness of the risk posed by their tasks.

Another key program of Vale's Health and Safety Strategy is Fatality Prevention, in which fatal risk protocols, called Critical Activity Requirements (RACs, in Portuguese), play a central role in defining the minimum equipment, facilities and personnel training required when executing tasks with a high potential for fatalities.

All these initiatives are aligned with subjects addressed with trade unions and collective bargaining agreements, which concern the dissemination of concepts related to health and safety.

All operational areas of the railroads rely on employees focused on safety, and accident evolution is monitored monthly by the Executive Management. For the Noise and Vibration themes, there is a global procedure to guide operations on managing these environmental aspects. Regarding to railway accidents in Brazil, Vale defines internal goals that complement and exceed the contract requirements of the National Land Transportation Agency (ANTT, in Portuguese).

In cases of mine closure, all the actions performed follow the Mine Closure Plan of each unit, which provides strategies of integration and social inclusion for affected communities. The business board is responsible for conducting the closure of operations. As Vale does not have mines in the closure phase, just progressive closure actions, no initiatives were taken to mitigate these impacts in 2017.

Goals and purposes

The topic of Health and Safety (H&S) is part of Vale's Annual Variable Compensation Program. It is one of our employees' goals, both in Brazil and in other countries, always respecting the local legislation.

In 2017, the panel of Health and Safety Goals consisted of the following indicators: Implementation of the Health, Safety and Environment Management System, Evolution of the SGI Risk Profile, Implementation of Critical Activities Requirements (RAC) and Evolution of Performance of Contractors.

Management of the H&S goal is the responsibility of Executive Health and Safety Management, which develops a management program every year and makes information available on a digital platform, with access to all focal points of the company's operations.

Specific goals and purposes for the topic of Health and Safety of Communities, as well as other items discussed in this chapter, have not yet been established for Vale as a whole.

Vale's performance in meeting the demands of local communities or commitments made with them is measured and monitored through indicators that are part of the Stakeholders, Demands and Issues (SDI) system. Through the SDI system, it's possible to monitor the number of demands met, triggering event, treatment given, estimated time for response, among other factors.

Resources and responsibilities

Responsibilities on the topics covered in this chapter are described in the documents that guide its management. For Health & Safety (H&S) issues, the corporate manager or director responsible for this area and the corporate manager or director for the Environmental Management are the top management representatives. Furthermore, each area has local representatives for Health and Safety management. The responsibilities of the areas participating in the Integrated Management System (SGI) are indicated in their procedures and communicated through training.

In community relations, monitoring of compliance with deadlines and execution of planned actions is performed

with the assistance of an internal system. In addition, local Environment and Community Relations areas work together with the communities to carry out activities related to legal commitments, establishing internal and external partnerships in this process. The company's Executive Sustainability Committees monitor the company's main commitments and critical issues related to communities at a managerial level.

Vale's Executive Board annually defines the objectives and goals for all hierarchical levels and functions, taking into account legal requirements; identified risks and opportunities; significant environmental aspects; technological options; financial, operational and commercial requirements; and expectations of the stakeholders. Once defined, such goals become part of all employees' challenges.

The theme Health and Safety is one of the items that make up the targets of employees both in Brazil and in other countries

Employees during maintenance workshop in Nova Lima (MG, Brazil)
Photo: Marcelo Coelho





Estação Conhecimento,
Serra (ES, Brazil)
Photo: Marcelo Coelho

Mother Church of Nossa
Senhora do Pilar, in
Nova Lima (MG, Brazil)
Photo: RicardoTeles



Some operational units are certified under the standards ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System) and OHSAS 18001 (Occupational Health and Safety Management System).

Vale also maintains an internal audit program to check compliance of its Integrated Management System (SGI) and to promote the ongoing improvement of health, safety, environment and quality processes, when applicable. These audits may be conducted by the actual areas or by the Health and Safety Board, according to defined priority criteria.

The results of all internal audits are compiled, thus generating performance indicators, such as: the SGI evolution curve and the consolidation of identified nonconformities and strengths. All employees acting as internal auditors were trained in the function through specific training.

Relations with local communities close to railroads

Interlocution with communities, including dialogue regarding sensitive issues, is conducted by the Community Relations area. For some specific themes, professionals from other areas are mobilized and charged with responsibilities.

All investments in acquisition or asset maintenance, new technologies and training are directly related to operational safety. In the railroads, the company has implemented derailment detectors over the years, a wagon monitoring system, controls that identify maintenance priorities on the permanent route, and an ultrasound car, which identifies defects in the rails, among other equipment.

To avoid rail accidents involving communities, over the last ten years, Vale has implemented 46.5 km of fencing of the domain strip, as well as footbridges, in Vitória Minas Railroad. Already in the Carajás Railway, the duplication and renovation of the whole railway network is being carried out, directly impacting the mitigation of rail accidents.



Sustainability
committees follow
up commitments
and critical issues

Vale EFVM Passenger Train at Governador Valadares Railway Station (MG, Brazil)
Photo: Marcelo Coelho

Community complaints are registered in a centralized computer system, which records the information, actions to be taken, and current status of Vale's response.

In the specific case of railroads, it is possible to contact Vale through official channels of communication, such as Alô Ferrovias and Fale Conosco, among others, and through Community Relations employees in each municipality where the railroad is present. In communities near the mines, contact numbers are available, operated by Community Relations area.



Case

Sudbury Alerts prevent emergencies in Canada



Nicole Lefebvre, emergency preparedness coordinator, at the emergency management information stand
Photo: Vale collection

With a view to managing risks, the impacts it can cause in areas surrounding its operations, and its community relations, in early 2017 Vale funded and implemented a public mass notification service for the City of Greater Sudbury in Ontario, Canada called Sudbury Alerts. This alert system is particularly relevant to operations there because of the scale and complexity of the operations close to the city. Vale maintains five operating mines, one mill, one smelter, one nickel refinery, and one of the world's largest tailings facilities in the region.

As there are inherent and associated risks arising from its operations, management of these risks aims at a zero rate of adverse impacts on people and the environment. In this context, Vale and the City's emergency preparedness officials identified a communication gap regarding mass notification of emergencies. Sudbury Alerts was created to fill that gap by instantaneously sending messages about potential emergency situations, not only linked to Vale, but to any threat to the public interest.

The system notifies residents about potential hazards or situations that may pose an imminent threat to their safety, and provides instructions on how the population should act. The City, which has a population of 150 thousand inhabitants, grew around Vale's facilities over more than 100 years of operations. Sudbury Alerts was launched with 60,000 subscribed phones from local residents wishing to receive automatic notifications. A comprehensive advertising campaign was executed targeting residents to refine how they received notifications through the service with the slogan, "Sign up, get notified and be prepared."

Residents were able to register telephone numbers and additional means of contact such as cell phones, text messages, faxes or emails. They could also specify places where they prefer to receive emergency notifications, such as at home, at work, at their children's school, among others. The service was extensively communicated to the population through advertisements in local newspapers, radio, television and social media.

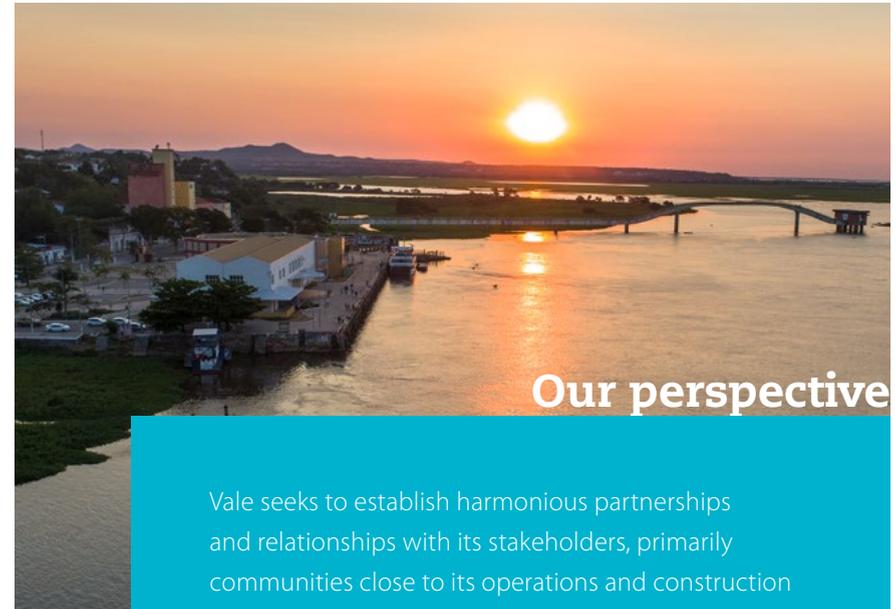
Vale also organized an open event during the Emergency Preparedness Week to encourage residents to sign up and learn how Vale mitigates risks associated with its operations in a responsible manner.



The initial investment in the system was US\$25,000, and over the next five years, US\$75,000 per year will be earmarked for the project. The benefits of Sudbury Alerts were successfully shown during the first use of the system in November 2017 to communicate a gas leak emergency at a local mall. The building was quickly evacuated and residents throughout the city were instructed to avoid the affected area.



Booth on planned improvements to Vale's Central Reject Area in Sudbury



Our perspective

Vale seeks to establish harmonious partnerships and relationships with its stakeholders, primarily communities close to its operations and construction sites and its own workforce. Therefore, Vale operates to continuously improve its performance and dialogue on issues deemed critical for the well-being of these stakeholders, such as impacts on the territory where it operates and the Health and Safety of its workers.

Sunset in the city of Corumbá (MS, Brazil), where there is operation of iron ore
Photo: Ricardo Teles

Our work

Managing social, environmental and economic impacts

203-1

Vale's social and environmental expenditures in 2017 amounted to US\$ 612.8 million. Environmental resources were mainly invested in atmospheric emissions, water resources and residues management, and our social expenditures went towards mainly in traditional communities and indigenous peoples, urban infrastructure and mobility and work and income generation.

Socio-environmental expenditures

(in US\$ million)

	2015	2016	2017
Environmental	572.0	562.3	487.3
Social	173.4	142.1	125.5 ¹
Total	745.4	704.3	612.8

¹11% of this amount refers to social investments made directly by the Vale Foundation.



Vale invests resources in social projects to generate work and income in communities

Informatics course at Casa do Aprender, in Barão de Cocais (MG, Brazil)
Photo: Ricardo Teles

In 2017, the operational risk management plan, that includes social and human rights risks assessments, was updated to ensure that the main risks of all operating and support units were covered. Throughout the year, a map was developed of the main risk centers and new areas were added to the model, highlighting Vale New Caledonia and risk panels in the areas of Energy, Corporate Security and Infrastructure, Capital Projects, Human Resources and Institutional Relations.

Railroads Incidents and Interdictions

All the railroads' operational areas rely on security-focused employees, and eventually new accidents are monitored monthly by the Executive Management.

Monitoring incidents and accidents on railroads is the responsibility of the Traffic Control Center. In case of accidents, the rescue team and the Permanent Accident Investigation Committee (PAIC) are called upon. If the interruption is caused by prohibitions related to social conflicts, several Vale areas – Community Relations, Corporate Security, Legal and Communication, among others – are called upon, according to the Railroad Interdiction Response Plan.

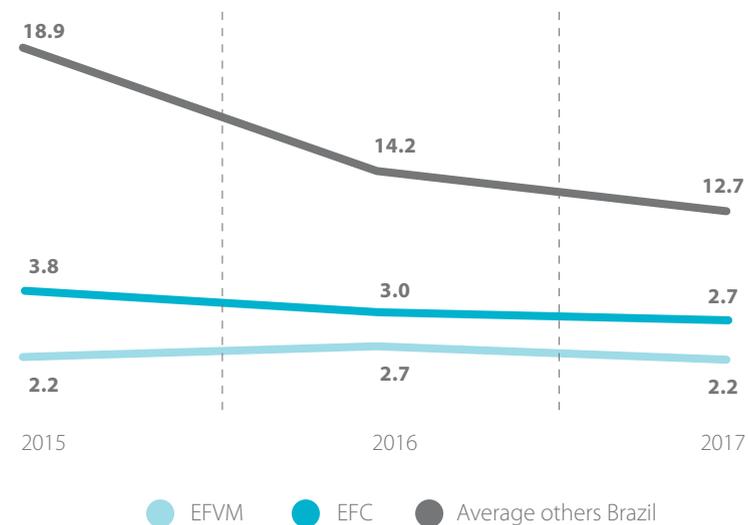
In 2017, the Vitoria-Minas Railroad (EFVM, acronym in Portuguese) was the target of 102 interdiction threats, but only 40% generated impacts to Vale's operation. That is, 60% of the threats were solved by the Community Relations team performance. On the Carajás Railroad (EFC) there was 266 interdiction threats of which 232 were neutralized.

On the EFVM, there were 30 accidents over the year, which caused 38.8 hours of interdiction. Fifteen of the accidents involved people not linked to the company (seven run overs and eight collisions), and there were six fatalities, among a total of 14 victims. There was no accident registration with personal injury to employees.

The EFC (acronym in Portuguese), in the north of Brazil, had a total of 28 accidents, with 153 hours of interdiction. Of this total, 16 accidents (13 run overs and three collisions) involved people not related to the company, resulting in 14 victims, seven of which were fatalities.

The great difference between the total interdiction times is due to the fact that the EFC has not yet been fully duplicated and to the severity of the occurrences that, in 2017, were lower in the EFVM.

Number of accidents
(by millions of trains x kilometers)



At the end of 2017, the EFVM reached the index of 2.2 accidents per million tons transported per kilometer (Ac/Mtkm), its best historic performance. In the EFC, the rate was 2.7 Ac/Mtkm, a reduction of 14.8% compared to 2016, which is also the best result ever obtained by this railroad. Both railroads' accident rates have declined over the years.

Noises and vibration

Vale has a global procedure to guide Operations on managing noise and vibration issues. In 2017, noise intensity monitoring continued to be performed periodically in the various operations. In its railroads, Vale continued to test and implement control equipment, as well as operational improvements for noise mitigation.

The project of the Associação Brasileira de Normas Técnicas (ABNT) referring to NBR 16425 (Brazilian Standard for Acoustics – Measurement and evaluation of sound pressure levels deriving from transportation systems), which deal with railroads, drafted standards between 2013 and 2017; this document was not approved in public consultation. For this reason, the participants of the work group, which included Vale, must develop a new version that addresses the concerns.

Regarding mining activities, most of Vale's mines nearby communities are concentrated in the Quadrilátero Ferrífero region, Minas Gerais. Some of these mines in this region are monitored online by the Environmental Control Center (ECC), installed in Nova Lima (MG). According to the Center's results, the operations are adjusted to mitigate problems identified, including those reported by communities, in real time. The proposal is that all mines in the state of Minas Gerais will be covered by this system.

Involuntary resettlements

MM9

Vale's basic premise is to evaluate alternatives that avoid or minimize the need for resettlement processes. However, when resettlements are unavoidable, in addition to following international standards and local legislation, the company seeks to carry out voluntary social investments for the social and economic development of communities and those that remain around the locations being resettled. We aim to guarantee the affected persons that their conditions and quality of life will be equivalent to, or better than, they were before beginning the resettlement process.

Involuntary resettlement is addressed not only in the company's Sustainability Policy and Human Rights Policy, but also in the Social Performance Guide. There is a specific procedure on the subject, that indicates social dialogue and queries should be the main tools for managing relationships between Vale's specialized teams and the affected communities.

In 2017, there were resettlements in Brazil, in the states of Para - municipality of Parauapebas, to construct the branch southeast railway station; in Maranhão, more specifically in the municipalities of São Luís, Bacabeira and Anajatuba, for the construction of viaducts and improvement of mobility due to the expansion of the Carajás Railroad; and in Goiás, in the municipality of Catalão, for the raising of the tailings dam of the Catalão Mineral-Chemical Complex. There were also resettlements in Mozambique's Nacala Corridor.

Resettlement in Mozambique

For the implementation of the Moatize coal mine, whose operation began in 2011, it was necessary to resettle families who lived in the industrial and mining areas. To this end, in line with best practices in respect of human rights and international standards, Vale developed a resettlement program, which began in 2006 and ended in 2010, to relocate 1,366 families in two communities: Cateme with rural characteristics, and 25 de Setembro, urban.

In July 2012, a Memorandum of Understanding (MoU) was signed between Vale and the Government of Mozambique to establish coordinated actions to maintain existing infrastructures and improve these communities' quality of life.

Among the initiatives carried out, we highlight our implementation of income generation projects involving approximately 900 beneficiaries, the restructuring and maintenance of the water supply and road system, the rehabilitation of 625 homes, and the increasing of 25 September's Health Center capacity.

Other actions are still in progress, such as the rehabilitation of 371 houses in the two settlements, which is still in negotiation with the families, and the implementation of a production and marketing system, with Vale as a commercial partner.

In 2018, the company will begin a new resettlement process related to expanding the coal mine, which will involve removing approximately 1,843 buildings in areas adjacent to the neighborhoods of 25 de Setembro, New Malabwe and Chithatha, meeting the requirements

under international standards and based on the local previous experiences, meeting the requirements under international standards and based on the local previous experiences.

Nacala Corridor

In addition to Moatize, the company carried out involuntary resettlement processes related to the Nacala Corridor Project, which main objective is to guarantee the railway logistics capacity of the coal extracted from the Moatize Mine and its export through the Port of Nacala-a-Velha. To implement the Corridor – which has 912km of extension and is under the responsibility of four concessionaires¹–, 15,884 families were impacted, of which 1,817 were physically displaced and the others, economically impacted.

Given the territorial extension of the logistical corridor, associated with socio-cultural and geopolitical complexity, the process of compensation and resettlement obeyed the specificities of each territory.

For physically displaced and economically impacted families, a participatory income generation program is being implemented to accelerate or improve the subsistence levels of these families, which will be reviewed and adjusted for each socioeconomic diagnosis. The last house of the resettlement was delivered in September 2017, when the process of socioeconomic monitoring began, which will last for at least two years. After this period, if the results comply with international standards, an exit audit will be carried out.

¹Nacala Logistics Corridor (CLN, acronym in Portuguese); Corredor de Desenvolvimento do Norte S.A. (CDN, acronym in Portuguese), Central East Africa Railway (CEAR) and Vale Logistic Limitad (VLL, acronym in Portuguese)



Social dialogue is the
main tool of relationship
with communities

Medical care at the Cateme health center in Mozambique
Photo: Moisés Euzébio de Oliveira

Demobilizing assets and closing mines

MM10

Each unit's business boards are responsible for closing mines. All actions and financial disbursements to be carried out are validated by the corporate area of Environmental Management, through technical opinions and monthly monitoring of the works, and based on the Mine Closure Plan of each operational unit.

Throughout the year, we conducted 30 actions for progressive mine closures and industrial facility demobilizations. The progressive closures consist of the partial demobilization of assets that did not reach their total design or exhaustion capacity. This activity is crucial for good management of closure processes, as it avoids the need for major expenditures when the mine ceases to operate.

Altogether, in 2017, US\$27.6 million was disbursed in asset demobilization and mine closure actions. The provision (ARO – Asset Retirement Obligation) for demobilization of assets at Vale Brazil totaled US\$3 billion in the year, an amount higher than the US\$2.7 billion reported in 2016.

The variation observed is due to the updating and annual review of costs and projects (trenches, piles, dams, industrial facilities, etc.) and to increase the actions of progressive mine closure.

Regulatory changes

Vale sets a high priority on its permanent and constructive dialogue with government agencies and, through sector entities, the company acts in the various stages of elaborating public policies on the mining sector. To regulate its activities in a regulated environment, Vale has important governance instruments, such as its Global Anti-Corruption Policy, Anti-Corruption Manual, Code of Ethical Conduct, Compliance Programs, Institutional Relations Guide, and legal compliance policy.

This work is carried out by technical experts, who promote greater agility in the regulatory decisions and guarantee the company's business continuity.

In this context, the main events of 2017 for the Mining Sector in Brazil were the publication of Law 13,575 / 2017 that created the National Mining Agency, replacing the National Department of Mineral Production (DNPM), acronym in Portuguese), as well as Law 13,540 / 2017, which changed the calculation basis and the Financial Compensation rate for the Exploration of Mineral Resources (CFEM, acronym in Portuguese)¹ for several minerals. In the case of iron ore, the rate of 3.5% of gross revenue was established. Vale participated in the debate on regulatory changes through the Brazilian Mining Institute (IBRAM, acronym in Portuguese).

Health and safety of the workforce and the community

Health in our operations

403-3

Through operational controls and best engineering practices, Vale continuously measures and monitors the incidence of occupational diseases at its units, and to seeks to reduce people's exposure to health risks.

Vale does not present a high incidence of occupational diseases due to the effectiveness of its programs to prevent risks in the work environment and its occupational health medical controls, which mainly consist of controlling risk agents in the work environment, monitoring biological markers, conducting periodic health checks and prevention training sessions, assessing functional capacity, and preventing movements of susceptible employees.

Some sectors, however, have isolated case records. These include workshop activities and work in which the handling of materials or chemicals has greater potential for causing occupational diseases.

To prevent the occurrence of occupational diseases, the company continuously promotes the use of personal protective equipment and collective protection measures, as well as actions to replacement of hazardous materials and chemicals for safer ones.

In 2017, 237 health actions were carried out with the participation of 341.8 thousand employees, contractors and members of local communities, investing US\$2.9 million. The initiatives were focused on preventing or controlling diseases, with 80% focused on prevention and 20% on disease control.

¹Royalties distributed to the states, Federal District, municipalities and organs of the administration of the Union, for the purpose of application in projects in favor of the local community.

At Vale, Occupational Health programs are used both to identify capability for work and to monitor our employees' health. Programs are integrated into primary, secondary and tertiary interventions. In the context of primary interventions, Vale's actions included vaccinating against infectious contagious diseases, and conducting campaigns on topics such as preventing and treating chemical addiction, the importance of healthy food and physical activity, mental health, preventing sexually transmitted diseases, and the adverse effects of smoking, among others. For secondary and tertiary prevention, actions were taken to monitor employees' health, and employees were taken for treatment when necessary.

The company maintains occupational medicine programs, which outline our employee's health. Employees are subject to pre-employment, periodic and change-of-assignment health exams, according to local legislation. Medical surveillance programs aim to diagnose early signs of disease, which are investigated and treated as needed.

Furthermore, in Brazil, Vale takes full responsibility for the costs of AIDS detection tests, when requested by employees visiting the occupational physician. In Mozambique, the company's HIV/AIDS policy aims to set rules,

commitments and principles to promote changes in risk behaviours, provide access to prevention methods, and fight stigma and discrimination among workers.

In Mozambique, malaria is a relevant public health issue, resulting in one of the highest mortality rates in the world, according to the World Health Organization (WHO). The malaria rate in Mozambique's operations in 2017 was 24.18%, which represents a reduction of 9.3% compared to 33.44% in 2016.

At Vale, in 2017 there was a significant reduction (44%) in malaria cases (471 cases in 2016 versus 263 cases in 2017). To further reduce this rate, intervention actions were taken that include spraying in collective areas, distributing mosquito nets and repellents, conducting awareness campaigns, as well as managing early diagnosis and active cases. In 2017, approximately US\$82 thousand was invested to acquire and distribute repellents for our own and third-party employees. The health and safety risks of traveling employees are also mitigated through systematic follow-ups on location tracking with constant health warnings, (such as for epidemics and risk of disease contraction), safety (crimes, protests, etc.). When there is some risk, the traveler is alerted by the local control center so that necessary measures are taken.

To improve and systematize the management of ergonomics at Vale, in 2017 a new process of mapping and classifying ergonomic risks was established through Groups of Exposure to Ergonomic Risks (GERE), which identifies the risks to which workers are exposed while performing their duties.

Genuine Active Care

Life First and Foremost is a value that permeates Vale's entire performance. The company strives to achieve Zero Harm through ongoing investments in developing solutions to prevent injuries and illnesses, standardizing safety procedures, managing risk, and strengthening the culture of Genuine Active Care. Genuine Active Care is summarized by the motto "Take care of yourself, take care of others and let others take care of you." Throughout the year, specific actions such as Health Week, Accident Prevention Week and Reflection Day reinforce the importance of this practice.

Genuine Active Care is measured in the global employee survey through the question "Do I alert my co-worker when I see him taking risks at work?". The result obtained in the latest survey was 96% affirmative answers, the highest among all the questions that make up the health and safety category.

Use of technology ensured more safety to employees at the Carajás S11D Eliezer Batista Complex, in Canaã dos Carajás (PA, Brazil).
Photo: Salviano Machado



The company strives to achieve Zero Harm through investments to prevent injuries and diseases

Awareness programs

403-3

Deviation in work standards and low perception of risk are some of the main factors contributing to incidents with high risk potential at Vale. Upon identifying this aspect, the company developed the educational action “Stop, Think and Care” to encourage employees to observe their activities from a new perspective and see the need to change their attitude.

In November, the company promoted the Reflection Day, a Health and Safety-oriented event held every year, which covers all of Vale’s global operations and units. In 2017, the main theme was Genuine Active Care, and music was the chosen vehicle to carry the message of safety through employee choirs. In more than 1,500 meetings at several Vale units, the Day of Reflection mobilized 68.3 thousand people in 19 countries, equivalent to 61.8% of the company’s staff.

The theme of Health Week was preventing musculoskeletal diseases. The event was attended by nearly 40 thousand people, including own employees and contractors, who participated in activities such as lectures, theatrical performances, labor gymnastics, seminars on ergonomics, bio-impedance tests, group dynamics, ergonomic blitzes, and chats on guidelines for healthy habits, among others.

In the Good Practices Center, there was an activity in which the areas assessed the applicability of the best procedures in their respective tasks. As a result of this work, 102 Health and Safety initiatives were certified in 2017. Ten of them were classified as Q1, that is, having the potential to reduce critical risks and prevent

fatalities as set forth in the Vale Risk Matrix. In all, 36 good practices classified as Q1 have been registered since 2015.

Absenteeism

In 2017, the company’s overall medical absenteeism index was 2.1%, while in Brazil the index was 2.6%. Among the missed days, 89% were for non-occupational reasons, 7% were for occupational illness, and 3% were for occupational accidents.

The innovation project to manage absenteeism in the Brazilian units is a partnership with the Industry Social Service, administered by the National Industry Confederation (SESI/CNI, acronym in Portuguese), through the CNI Notice of Health and Safety Innovation. Its purpose is to structure a management model for the prevention of occupational disabilities, focusing on musculoskeletal, mental and behavioral disorders, considering psychosocial risk factors.

The pilot project serves the employees of the units in Rio de Janeiro, Vitoria, São Luis and Itabira, a total of 16,954 workers, which corresponds to 27% of absent days accounted for in 2015 and 2016, and 33% of the workforce in Brazil.

During 2017, the planned steps were carried out: we planned, prepared and applied diagnoses; we trained employees in disability prevention; and we constructed a management model resulting in more than a thousand hours of training. The phases projected for 2018 are developing guidelines, qualifying multipliers, implementing the model at the pilot units, and assisting operations.

Safety performance: Towards Zero Harm

403-2 | 403-3

In order to consolidate its strategy towards Zero Harm, Vale invests always aiming at the improvement of its equipment and installations, through greater automation and revision of its processes and with this to provide the reduction of risks exposure of its employees. In parallel, the development and implementation of the fatal risk protocols – Critical Activity Requirements (RAC) – defining the compliance items that must be met by operations considering systems, management practices and people complement the initiatives of the journey towards Zero Harm.

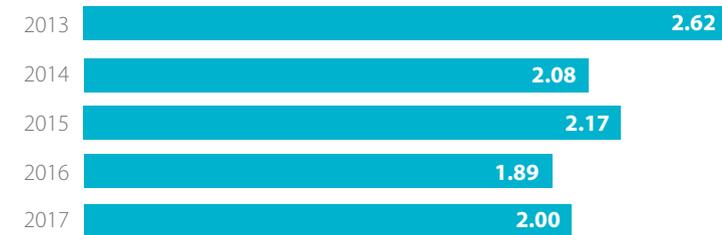
For Vale, another fundamental pillar of this strategy is the Integrated Management System (SGI, acronym in portuguese), considering the environmental, health and safety dimensions. It is defined in the guidelines and criteria that promote the effective management of the impacts and aspects and of the risks and dangers associated to the activities, products and services developed by the operations, availing themselves of the PDCA model allowing continuous improvement.

In the scope of the SGI, Vale's operations working incisively in the Fatality Prevention Programs in which leadership has a decisive role in controlling intolerable risks, as well as in improving its processes, contributing to the maintenance of risks at tolerable levels in the company. In the company's operations, the program also encourages the sharing of information on the incidents in order to generate organizational learning from the lessons learned arising from events, real or potential, classified as critics or Catastrophic.

An extremely relevant aspect of this journey is the involvement of employees and contractors, to ensure the appropriate competencies and skills in the execution of tasks, as well as to provide the development of a culture focused on safe behavior.

Total injury rate

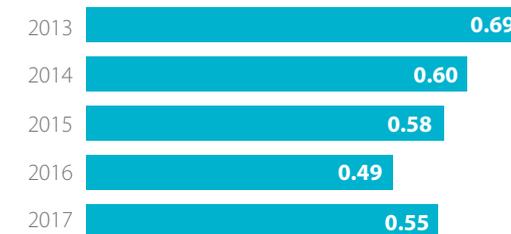
(number of total injuries/MHW x 1MM)



The Total Recordable Injury Frequency Rate (TRIFR) in 2017 was 2.00, slightly higher than that of 2016, which was 1.89. In spite of that, performance has been showing consistent, enabling a 24% reduction in the last five years.

Lost-time injury rate

(number of lost-time injuries/MHW x 1MM)



The Lost Time Injury Frequency Rate (LTIFR) in 2017 was 0.55. In the last five years this rate has dropped 20%.

On the other hand, despite all the efforts, over the 2017 there were 5 fatalities – own and third parties – over which Vale rendered all assistance to the families in an extremely difficult time. For each of these events thorough investigations were conducted aiming to identify the contributing factors, and to establish the due corrective actions, in addition to enabling the improvement of the preventive actions initially identified in the risk analysis.

Although impacted by such events, Vale reiterates that it remains tireless in the pursuit of zero fatality, acting incessantly in the factors under its control, as well as those that have power of influence.

For the sake of transparency, follows a brief description of each of the events:

- During the scaffold assembly activity, two workers who were under the conveyor belt were hit by an ore aggregate that took off from the belt and one of them did not resist the injuries. (contracted, in Brazil).
- A worker who had been hired in Canada was found under the rear tires of the truck that was operating during a tailings removal and transportation activity. (contracted, in Canada).
- During maintenance of a kick, the conveyor belt was triggered remotely, causing the employee who performed the task to be pulled down on the moving belt. (contracted, in Moçambique).

- A vigilante was hit by an accidental gun shot by another at the time he was running the unloading test for a “dry shot”. (contracted, in Moçambique).
- During the repositioning activity of a pressure relief pipe an operator was sucked through its air outlet. (employee, in New Caledonia).

Among the fatalities, one of them occurred in Brazil that concentrated a significant portion of our operations, but that independently of this occurrence presented, in 2017, a fatality rate of 0.004 representing a 70% reduction in front of 2016 besides Be the smallest plateau ever reached since the beginning of our historical series.

During 2017, intense work on incident management, including the environment, was conducted in the operations aiming to ensure that all occurrences and their analyses were duly recorded in a computerized system of their own and with this provide appropriate monitoring, and promote organizational learning.

Seeking to improve the processes, Vale encouraged all its employees and contractors to develop practices for the execution of their increasingly effective and safe tasks, resulting in the identification of 102 health and safety practices that were duly made available to the entire company throughout 2017.

Among the works, three stand out:

- Use of a Pipe Lifting Device, a device that has been developed to eliminate direct contact with the load of tubes.
- Disposal of the electrician’s exposure to arcing arc when in insertion and extraction of high voltage circuit breakers/contactors.
- Creation of a logical system in tipper trucks that determines the braking of the brakes in a secure perimeter and with a redundancy of time and space avoiding the displacement with the lifted receiver.

It is encouraged that all employees and contractors always seek to best practices for the execution of its activities



Employee at the Vale Nova Caledonia Nickel Processing Plant
Photo: Marcelo Coelho

Emergency procedures

As a signatory to the International Council on Mining and Metals (ICMM), Vale is required to develop, maintain and test emergency procedures in collaboration with stakeholders who may be affected by accident occurrences, an obligation also provided in the Integrated Management System (SGI, acronym in Portuguese).

To do this, the company has Emergency Response Plans (ERPs) in each of its operations, which describe the actions to be taken in an emergency, including those by neighboring communities. The plans are aligned to the principles of the United Nations Environmental Program (UNEP).

Periodically, Vale's internal and external resources (teams, communications, equipment and materials) and contacts available for emergency response are evaluated, to check their functionality and readiness for use. In 2017, there were six drills involving mainly fire scenarios in the productive processes, due to leakages or spills of hazardous products.

Innovation

Vale recognizes that innovation is an integral part of its Zero Harm journey and therefore, by 2017, has globally deployed a computerized system that allows operations to conduct a "scoping analysis" considering all high potential incidents recorded and this contributes to the improvement of the proposed preventive actions, besides leveraging organizational learning of the company. The same system has business intelligence capabilities collecting, processing and providing relevant and quality information from the recorded incident data.

Still with regard to incident logging, smartphone and tablet applications have been made available where employees are fully able to register unsafe conditions, conduct security inspections and observations, and record incidents.



Health and Safety Dialogue Meeting at the Carajás Complex in Parauapebas (PA, Brazil)

Vanderson Guerra, safety technician and Fillipe Duarte (left), laboratory technician, at the Laboratory of physical tests, in Itaguaí (RJ, Brazil)
Photos: Ricardo Teles



Employee engagement

403-1

In 2017, Vale achieved significant worker engagement from different hierarchical levels of the formal safety committees. The Internal Committees for Accident Prevention are included in these structures, which consist of an equal number of employee and company representatives, with the employee representatives chosen by direct vote.

The Health and Safety Leadership Committee (HSLC) holds periodic meetings of a tactical and operational nature, in which guidelines are defined and the provision of results made per business unit. Also with routine periodic meetings, the Fatality Prevention Committee, made up of employees from the various areas of the company, monitors the evolving implementation of key accident prevention elements.

In turn, periodic meetings on Health, Safety and Environment (HSE) occur weekly or monthly with leaders and staff who work on the subject, to share actual or potential occurrences and good practices. The Joint Health and Safety Committee (JHSC) is a forum created to bring internal accountability into practice. This group is made up of union representatives and company management, and covers all employees in Canada.



Case



Cellulose cover to minimize impacts particle emissions

One of the main negative impacts of the pelletizing stage and the later storage of iron ore in Vale's yards and ports is the dispersion of particles into the atmosphere. Known as black dust, this material is lifted off piles of ore by the wind and may reach the surrounding operations and nearby cities. In a continuous quest to minimize these impacts, Vale invests in developing efficient and eco-friendly technologies.

An initiative from Oman has been showing good results: they use a biodegradable solution made from cellulose fibers, which has a very particular feature: it forms a white crust over the ore piles, which can be 19 meters high. This material and technology were developed through a partnership with the Dutch company DBD.

Oman has very dry weather and temperatures that reach 50°C. To reduce dust dispersion in the air caused by wind gusts, the piles used to be wet down with recycled water. In addition to the low efficiency, because the heat causes the pile to dry quickly, the water would cause these iron particles to flow into the network of effluents, increasing the environmental risk.

Vale invested US\$245 thousand to build a mixing and distribution station of the material – named Dustcruster – which is diluted in water, stored in tanks, and used in an automatized way, without risks to the operators. The solution goes through a system of pipes in the tanks to the machines installed in the yard, which have a device to trigger pulverization during operational windows. Vale invested US\$ 240 thousand in the cellulose-based material.

In addition to facilitating compliance with legal obligations related to the rate of particulate material emission in the air and the management of operational and environmental risks, the use of the Dustcruster, implemented as of January 2017, brought the following benefits:

- Improvement of the rates of TSP (total suspended particles) due to the use of the product. In November 2017, the emission rate of TSP was lower than 5 kg/h during 83% of the time analyzed; the previous reference data of dust containment with water maintained this rate only 67% of the time.
- Hard crust, unbreakable by the wind gusts, with high resistance to rain water or to water sprinklers.
- White color, which facilitates the tracking of its performance in the application by visual inspection.
- Lasts over a month after it is applied.
- Eco-friendly (natural biodegradable cellulose).
- Reapplication was tested in a pilot project in Brazil's Tubarão (ES) unit.

Partnership

Collaborating to create shared value

Photos: Ricardo Teles

Vale works to generate prosperity, respecting people and the environment. Within its global performance, it seeks to collaborate with society and the communities where it operates, often through partnerships with international and regional organizations and institutions, governments, universities, NGOs and other civil society groups. The company seeks to participate in forums on the subject, actively contributing to discussions on themes such as the environment, commerce, energy, sustainable development and transparency, among others.



Mulheres de Barro
(Clay Women) Project,
Paraupabas (PA, Brazil)



Computer class at the Estação
Conhecimento of Serra (ES, Brazil)



Sustainable performance
is only possible through the
creation and sharing of value
among all audiences

In 2017, Vale advanced its objective to establish and develop an open dialogue with its stakeholders. Major accomplishments include projects aimed at strengthening communities and suppliers, such as developing the Best Practices Guide for Mining and Indigenous Peoples, in partnership with The Nature Conservancy (TNC), a non-governmental organization working on a global scale to conserve the environment and the Instituto Brasileiro de Mineração (Ibram, acronym in Portuguese).

Vale also funds institutes and foundations, as the company believes they are fundamental tools in the process of dialogue, mediation, and legacy creation. These organizations bring about new knowledge, methodologies and expertise in issues that are relevant to company's various stakeholders, especially communities.

► Partnership and the SDGs

Through Partnership theme, Vale aims to mobilize the necessary means to implement the UN's 2030 Agenda in our global joint effort toward Sustainable Development. Our efforts are based on the spirit of enhanced solidarity, and focused particularly on the needs of the poorest and most vulnerable, with participation from all countries taking part in the initiative. The main Sustainable Development Goals (SDGs) relating to partnerships are SDG 8, 9 and 17, which call for, respectively, decent work allied to economic growth; inclusive and sustainable industrialization and innovation promotion; and the implementation of partnerships. By the very nature of its activities, Vale understands that developing partnerships is the best way to achieve its commitment to be a global agent of sustainability.

Our commitment

Sustainable action is only possible when our company creates and shares value among all stakeholders. This means not only dividing wealth but, above all, implementing joint work projects so that each actor can take on their role in the territory and society development process.

Policies and commitments

413-1 | 413-2

The Social Action Guide presents and describes principles and guidelines for this process at Vale, and guides the application of specific procedures and support tools, throughout the life cycle of the ventures, and across the territories where operates. One of its guidelines is adopting the strategic engagement approach with local communities, aligned and integrated with the values of the company and the specific features of the different business areas.

Other documents, such as the Criticality Assessment of Communities Procedure, the territorial relationship and investment plans of the territories, aligned with the methodology of the License to Operate, are also references for the company's social performance and represent the company's commitment to the communities.

Before entering a certain territory, in the development of all its projects, Vale carries out a preliminary identification of risks and impacts arising from its activities in the communities during the environmental licensing process. Recognition and mapping are done during the environmental licensing process. Up to 2017, 76% of our operations carried out updates to these social impact assessments and 86% environmental ones, while about 60% of our operations publicly disclose their assessments

In addition to the studies and socio-environmental diagnoses carried out to measure the extent of the impact on the municipalities and communities directly affected, the Risk Management of Business (GRN, acronym in Portuguese) panels are also periodically updated. Vale's risk analysis process considers, among other aspects, the social impacts of threats and impacts. By the end of 2017, a total of 68 units had carried out a risk analysis, considering the social size.

Responsibilities and resources

Vale uses a variety of resources and means to establish dialogue and partnerships with employees, suppliers, communities, shareholders, governments, academia, civil society organizations, national and international organizations, and companies - within its own and others business sectors.

As an example, the Fundação Vale's social initiatives and programs show how this strategy materializes. They are planned and executed based on the characteristics of each location. In Brazil, the Foundation's actions seek strengthen and improve public's understanding of public policies, allowed their representatives to implant social technologies and to continue their work in the future, independently. This allows local actors themselves to contribute to the developing their cities in a sustainable and lasting manner. The Fundação Vale's action is through technical cooperation, exchange of social technologies, access to information at the national level and promotion of incentivized resources, donations (with its own resources or through external funding), among other mechanisms.

Vale maintains other foundations in countries where it operates. In Oman, the company supports Jusoor, a non-profit social organization that aims to develop the local community by

implementing sustainable social projects. In New Caledonia, social initiatives are carried out through the local Fundação Vale. Launched in 2011, the institution has an annual fund of about US\$1.3 million to finance socio-cultural, educational and economic projects (excluding the mine). In Indonesia, we have a partnership with the Sorowako Educational Foundation and the Mokora Husada Hospital. And in Mozambique, the company works with the Mozambique Foundation.

Launched in 2009, Instituto Tecnológico Vale (ITV) is another of the company's initiatives to help create future options through scientific research and technological development. This non-profit institution for postgraduate research and teaching aims to expand knowledge and the business frontier in a sustainable manner.

The company also develops initiatives based on its Relationship and Social Investment Plans, depending on the communities where it operates. Of Vale's total operations, 68% have these plans developed with priority communities. In 2017, 142 Plans were carried out in Brazil (46 in Maranhão, 20 in Minas Gerais,

16 in Espírito Santo, 35 in Pará and 25 in other states). The main activities of these plans relate to generating work and income, leadership training, and support for local social initiatives, all resulting from dialogue with communities. Operations in Malaysia, Peru, Canada, New Caledonia, Mozambique, Indonesia and the Nacala Logistics Corridor also have structured plans.

With regard to Indigenous peoples and traditional communities, the plans involve voluntary agreements, licensing conditions and public civil actions. In 2017, of total social expenditures, US\$69.3 million was applied in infrastructure and US\$35.6 million in services, as shown in the table below:

In 2017, annual participatory planning, implementation of ethno-development programs, cultural strengthening, supplementary education, supplementary health, and income generation were implemented, among others. Other countries where Vale operates have similar processes, that are suitable to local reality and legislation.

Funds invested in infrastructure (US\$ million)	2015	2016	2017
203-1			
Donation/Transfer	4.8	10.8	4.4
Business engagement (shared infrastructure)	0.4	-	-
Direct implementation – social program/project	47.2	65.1	64.4
Incentive Law	-	0.1	-
Sponsorship	-	0.0	0.1
Services/Materials	29.9	0.3	0.4
Total	82.3	76.3	69.3

Funds invested in services

(US\$ million)

203-1

	2015	2016	2017
Donation/Transfer	7.0	11.1	2.9
Direct implementation – social program/project	27.8	19.6	32.0
<i>Pro bono</i>	0.05	-	-
Incentive Law	-	0.00	-
Sponsorship	0.01	0.02	0.06
Services / Materials	0.1	0.4	0.6
Total	34.9	31.1	35.6

In 2017, Vale recorded approximately 6 thousand demands, of which 92.5% were, or are in the process of being, treated, mostly related to requests for social investments, followed by demands related to irregular accesses and crossings in the railways. Of the 759 commitments made to the community, 56% related to Management and Impact and 44% to Social Investments. In 2017, US\$74.9 million and US\$37.9 million, respectively, were spent in those areas.

The company knows that listening and being heard is only the first step towards establishing partnerships



Tapestry workshop in Barão de Cocais (MG, Brazil)
Photo: Ricardo Teles

Our perspective

Vale has a commitment with institutions and partner organizations to propose and develop initiatives based on dialogue with stakeholders and the sustainable performance of operations. With this, it continues working toward its objective of broadening and reinforcing stakeholder engagement, and establishing common understandings and objectives, resulting in sustainable and productive partnerships for the company, society and the planet.



View of Canaã dos Carajás (PA, Brazil)
Photo: Ricardo Teles

Our work

Relationships with communities and society

413-1

It is Vale's policy to develop ongoing dialogue with communities within our ventures' areas of influence to promote and strengthen relationships and guide its social investments in these areas.

One of the main strategies to achieve this is social dialogue that seeks to establish, through transparent relationships, the involvement and trust of the communities and the Public Authority in the actions proposed by the company.

To increase the effectiveness of this process, as well as the measurement of the results of its actions and the continuity of the process of establishing guidelines for its social activity, in 2017, the company defined normative procedures with technical guidelines for the management of demands and of social relationship and investment plans, and also for the evaluation of their criticality of communities.

An example of an action guided by the Relationship and Investment Plan was the training work, formalized associations and consequent increase of the income of productive groups in the North and Northeast regions of Brazil, under the influence of the Vale Northern Logistics Corridor. Projects of sewing, handicrafts, poultry keeping, fish farming, fruit and vegetable growing and milk production chain promotion, among others, were encouraged.

In the territories where Vale operates, there are also community forums for Relationship Plans and Environmental Education Programs. They are based on a model of participative management structured which involve community leaders, Vale professionals and, sometimes, public authorities and other partners for discussion. They plan and assess environmental relations and educational actions, as well as social investments carried out in the territories.

The forums also address, in compliance with the Environmental Education Programs, the collective construction of actions and activities with the communities affected by Vale's projects. The objective is to draw the community's attention to the local problems and capabilities and to give them the tools to participate in decisions and share in responsibilities.

In all, 67% of our operations have stakeholder engagement plans and 74% work with committees or social dialogue groups with local communities. Of these, 94% involve engagement with vulnerable groups. Some operations work with the Management Committee, which comprises a representative group of the community, considering the generational, ethnic, gender and political representation. The Committee is responsible for monitoring and evaluating the company's actions in the community.

To support the communities where the company operates, Vale also has institutional partners to train and develop young people to work in the labor market. An example of an action taken in 2017 was the partnership signed with the Serviço de Aprendizagem Industrial (Senai, in Portuguese) to provide professional qualifications for about 200 young people living in São Luis and Açailândia, Maranhão, and in Marabá and Canaã dos Carajás, in the Pará, through the Professional Training Program (PPF) – an initiative that aims to supplement and enhance basic training and qualification for work.

Internally, cooperative partnerships help in improving the company's processes and operations. One of the outstanding initiatives in 2017 in Brazil was signing an agreement between Vale and the PUC-Minas to develop a research project focused on port equipment. The action, which involves the company's Operation and Port Engineering professionals and a team of researchers in the areas of Mechanical Engineering, Mechatronics, and Control and Automation from PUC-Minas, aims to increase the understanding of port equipment, from its conception to operation in various conditions that involve design, maintenance and operation. The intention is that this agreement will be the first step towards a larger project involving other academic institutions, which will become the Chair of Port Equipment (chairs are academic mandates to teach and investigate a subject on a permanent basis).



Case



Ocular screening and cataract surgery program in Dompu, Indonesia

In May and September 2017, guided by the Local Development Catalyst pillar of the company's Sustainable Development Policy, Vale promoted two campaigns to identify and address vision problems for the population of Hu'u district and the Dompu municipality.

The project was structured to take into account a diagnosis made from the local community relationship-building and social development program, which identified a large gap in the company's offer of public health programs and a lack

of availability of eye examinations and treatments, causing limitations to life, work and income generation for a large part of the population.

The John Fawcett Foundation in Bali was chosen as the project partner because it has a mobile surgical unit and a trained team of ophthalmologists, nurses and eye specialists. It was necessary to take the treatment to distant communities to expand access to services. The investment in the initiative was US\$80,000.

In addition to directly benefiting members of the affected communities, the program built greater awareness of Vale's commitment to economic and community development in the Dompu municipality and Hu'u district. Vale's Indonesian operations include a nickel mine (Sorowako), three hydroelectric dams and a port for production outflow, as well as a mineral exploration center that aims to map copper deposits in the region and a professional training center that serves 42 villages impacted by the mining operations.

Eye examinations



4,505 people

2,815 children

Glasses distributed



2,913

Medicines dispensed and treatments performed

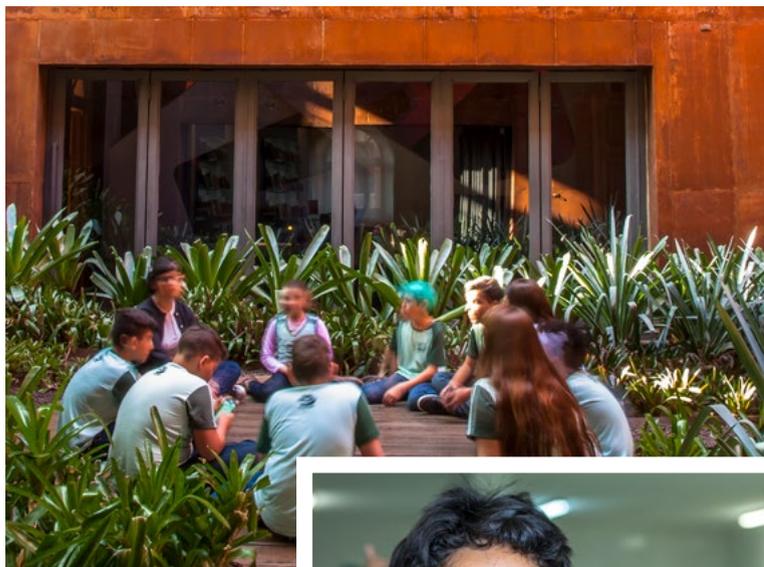


1,526 people

Cataract surgeries performed



284 patients



Above, Memorial Minas Gerais Vale. Right, Estação Conhecimento of Marabá (PA, Brazil)
Photo: Ricardo Teles



Fundação Vale

The Fundação Vale's main objective is to strengthen the legacy that the company leaves in the territories, through actions and structured social programs, focused on bringing together partnerships that contribute to developing the areas under Vale's influence. This is done by strengthening public policies, empowering communities in a planned way, and adapting to each locality's characteristics.

The initiatives involves three axis: **Work and Income Generation**, with a focus on supporting social impact businesses and family farms, stimulating productive linkage and socioeconomic inclusion; **Health** to strengthen the National Primary Care Policy and promote self-care in health for populations of greater social vulnerability; and **Education**, which seeks to improve the quality of Basic Education by training professionals and improving their working conditions through initiatives to support early childhood education, promotion of book and reading, improve learning spaces and strengthen Youth and Adult Education.

Complementing these themes, the Fundação Vale carries out cultural initiatives aimed at expanding access to culture and the preservation of Brazilian material and immaterial assets, as well as the managing of socio-cultural assets, such as the Vale Museum in Vitória, the Minas Gerais Vale Memorial, the Casa de Cultura of Canaã dos Carajás, the Vale Maranhão Cultural Center and the Estações Conhecimento (Knowledge Stations project).

For Fundação Vale, promoting sustainable territorial development requires public and private sector involvement, as well as society's participation. For this reason, its work in the communities prioritizes intersectorial dialogue and collective construction, through strategic alliances, based on the concept of a Public-Private Social Partnership (PSPP).

Another important driver is strengthening community leadership so that, by gathering social technologies, knowledge and shared assets within the framework, they can continue the initiatives independently and increase the impact of these actions on the territories. This allows the development cycle created by the mining activity to continue sustainably.

Currently, Fundação Vale leads a group of study which discusses the integration of voluntary private social investment with the strengthening of the public policies, established by the Grupo de Institutos Fundações e Empresas (Gife, in Portuguese).

The Fundação Vale also supports its sponsor in managing and allocating incentive resources related to the Fundo da Criança e do Adolescente (FIA, in Portuguese), the o Estatuto do Idoso, the Programa Nacional de Apoio à Atenção Oncológica (PRONON, in Portuguese), the Programa Nacional de Apoio à Atenção da Saúde da Pessoa com Deficiência (PRONAS / PCD, in Portuguese) and the Lei de Incentivo ao Esporte. These resources strengthen the work of municipal councils and non-profit institutions that assist people in vulnerable situations, helping to develop these communities.

An important driver of Fundação Vale is the strengthening of the communities' protagonism so that they can continue the initiatives independently

Athletics class at the Estação Conhecimento in Serra (ES, Brazil)
Photo: Marcelo Coelho



Inter sectorial articulation

Develop a local arrangement that minimizes the negative impact of the enterprise and enhances the positive aspects of society. This was the objective of the Vale Foundation's joint development experience in Canaã dos Carajás (PA), which managed to provide a synergy of resources, efforts and integration between private social investment and public policies of high relevance for the city's development. Through partnerships with various stakeholders, the Foundation has created a tool that optimizes investments, aligning city development based on short- and long-term municipal plans. The article "Abordagens de apoio ao desenvolvimento local e comunitário: um modelo de integração corporativa da Vale no Brasil" published at United Nation University, reports the experiment. Read it full in <https://www.wider.unu.edu/sites/default/files/wp2017-80.pdf>

Results

In 2017, the Fundação Vale worked in 65 cities in six Brazilian states (Espírito Santo, Minas Gerais, Mato Grosso do Sul, Pará, Maranhão and Rio de Janeiro) and carried out, along with its working partners, 52 projects related to the themes of work and Income Generation, Health, Education, Culture and Sport with a total investment of US\$14 million.

One of the highlights of this year was reopening the Vale Maranhão Cultural Center in April. Located in the historic center of São Luís, the asset stands out due to its wide and versatile programming, offering visitors the opportunity to see works of Maranhão artists as well as national and international exhibitions. The space programming proposal for this space also includes workshops, performances, audiovisual exhibitions, book launches and musical recordings. Since its opening, the Cultural Center has received more than 75,000 visitors.

Instituto Tecnológico Vale

Created in 2010, Instituto Tecnológico Vale (ITV) is another company initiative to create future options through scientific research and technological development. This non-profit association is located in two strategic cities for Vale, Belém, in Pará, and Ouro Preto, in Minas Gerais.

Its performance is based on the search for innovation in medium and long-term solutions that will contribute to constructing an increasingly sustainable future for mining. The main objective is, to generate, develop and apply knowledge for sustainable mining, reconciling interests and working for the socioenvironmental development of the communities, mainly in the Amazon and in the Quadrilátero Ferrífero.

The Institute counts on a recognized team of researchers who work in the following lines of research: Environmental Geology and Water Resources; Biodiversity and Ecosystem Services; Environmental Geology; Environmental Technology; Socioeconomics and Sustainability; Applied Computation, Control and Robotics; Mining, Extraction Metallurgy and Surface Phenomena; and Tribology, Dams Technology and Reject Disposal.

One of the highlights of ITV in 2017 was its partnership with the Federal University of Ouro Preto (UFOP, acronym in Portuguese), in Minas Gerais, to start the second cohort of the

professional Master's degree in Instrumentation, Control and Automation of Mining Processes. The objective of the course - which began in March 2017 and will last 24 months - is to train people who are capable of developing innovative technological solutions, which will thereafter be applied to the actual mining operations.

In Belém, the Master's degree in the Sustainable Use of Natural Resources in Tropical Regions started the sixth class and, up to the end of 2017, 40 Master's degrees had been awarded since the course was instituted.

Both of the courses, in Ouro Preto and Belém, are accredited by the Brazilian Ministry of Education, and the students are Vale's employees and members of civil society at large.

Other initiatives carried out by ITV:

Communities: Elaboration of a Development Plan for the Carajás Railroad (EFC) communities. The team has studied the socioeconomic conditions and vocations of the EFC communities, and produce a set of maps with the agricultural aptitudes of the municipalities influenced directly or indirectly by the Carajás Railroad.

Moisture reduction of ore by evaporation: This project contemplates studies of moisture reduction in iron ore concentrates with the use of hot and dry air. The technology was initially tested on a laboratory scale to identify the drying mechanisms associated with moisture levels. From there, a pilot scale test was proposed and carried out at a Vale shipping terminal. The positive results led to the implementation of a semi-industrial unit in another terminal, operating directly in the conveyor belts which meant that the conditions were realistic. The measures indicate that it is possible to obtain a percentage of moisture reduction for sinter feed in the order of 1.8%, which results in several positive environmental and economic impacts. The US patent for this technology was granted in February 2018.

Hardpans: In partnership with the Emílio Goeldi Museum (localized in Para State), ITV launched in 2017 three volumes of the publication "Rodriguésia – special edition on the Carajás's Flora", finalizing work surveying about 800 catalogued species. This initiative is part of the Carajás hardpans flora project and has made an important contribution to 2020 Brazilian Flora, coordinated by the Botanical Garden of Rio de Janeiro, which brings together more than 700 collaborators. During the past year, the book "Landscapes and Plants of Carajás" was also published, an illustrated publication that deals with the evolution of the Carajás Mountains and its plants, with emphasis on the Carajás National Forest hardpans. The intention of the research is to construct a rich and systematized study on this important Amazonian biome, aiming to reduce the company's environmental impacts and preserving the local fauna and flora.

Recovery of hematite from iron ore tailings: Two conceptual mineral process projects were designed for concentration plants by direct anion flotation of iron ore for hematite recovery, one for hematite contained in the fine ore of dams and the other for hematite contained in flotation tailings from Vale plants. Implementing the project in a plant allowed a significant increase in hematite recovery and reduction of tailings.



For more information about the ITV go to www.itv.org.

Fundo Vale

Established in 2009 and as a Civil Society Organization of Public Interest (OSCIP), Fundo Vale's mission is to promote sustainable development by inducting, connecting or multiplying transformative solutions for societies, markets and the environment. It operates as a society controlled by Vale, with Vale and Companhia Portuária Baía de Sepetiba (CPBS) as sponsors. In 2017, it received donations from Salobo Metais SA and the Mitsui Foundation and contributed funds to projects in the order of US\$ 376 thousand.

For the Fundo Vale, 2017 ended the cycle of actions and investments, which involved the selection and assistance of 10 projects with socio-environmental organizations, focusing on productive chains in priority territories for Amazonian conservation, totaling contributions of almost US\$ 1.5 million.

Since 2016, the Fund has been redirecting its strategy to strengthen businesses that aim to generate income for local populations and reduce pressure on the forest as a direct contribution to implementing The Eixo 3 of the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDam), of the Ministry of the Environment, which deals with the "Promotion of Sustainable Productive Arrangements".

Another initiative, the result of this movement, was the Fundo Vale adhering to the group of Fundações e Institutos de Impacto (FIIMP), which brings together 22 foundations and institutes to learn, follow and get the results of investments in businesses that have a social and environmental impact. FIIMP started in the Laboratório de Inovação em Finança Social, which is carried out by the Força Tarefa de Finança Sociais, and seeks to increase the leadership of institutes and foundations on the subject. For this, the pool of organizations raised a total of US\$ 220 thousand, from an individual contribution of US\$ 10 thousand.

With the FIIMP apprentices, the Fundo Vale believes that it can help strengthen the social and environmental finance ecosystem in the Amazon by practically and jointly experimenting with financial mechanisms that already exist in the market, focusing on returnable funds, but ones that can be adapted to Amazonian reality.

Also in 2017, the Fundo Vale continued its partnership with Unesco in the Pesca Sustentável project on the Amazon Coast, to support the sustainable development and strengthening the production chains of artisanal fishing, within 30 communities in the states of Amapá, Pará and Maranhão.

For 2018, the intention is to continue the strategy of encouraging financial mechanisms and financing production chains and impact businesses.



For more information about the Fundo Vale go to www.fundovale.org.



Case



Sustainable Fishing on the Amazonian Coast

The inhabitants of the Amazonian coast benefit from different ecosystems – the sea, rivers and streams and mangroves – from which they derive the main source of income. In this region, the Fundo Vale maintains an important partnership with Unesco, focusing on interaction to develop and strengthen sustainable production chains for local fishing.

Started in 2014, the Sustainable Fisheries project on the Amazonian Coast had several advances in 2017. The project supports the sustainable development and strengthening of the production chains of the mangrove uçá crab and palaemonidae, piticaia and branco shrimp, in the states of Amapá, Pará and Maranhão, aiming to provide to local fishermen a fair access to markets and sustainable use of resources.

Benefited by the project are 30 communities in 10 municipalities on the Amazonian Coast, in a geographic area where almost 10,000 families live. The project acts directly with communities of local fishermen and artisanal gatherers, involving diverse social actors (young people and women) and stakeholders involved in fish value chains (producers, sellers, traders, buyers, companies and other entities). In addition, it acts with public managers in the three spheres of government, and NGOs, cooperatives, colonies, unions, universities and research institutes.

Among the main results found were:

- Two diagnostic studies with qualitative and quantitative research to guide the lines of work and support productive fishing chains and communities (socio-cultural, economic and environmental diagnosis and the diagnosis of value chains).
- Workshops in all communities served by the project, to share and validate the results presented by the diagnoses.
- Annual meetings with all project partners.
- 27 workshops of youth leaders, involving about 300 young people in the three states.
- 22 workshops for technical training, strengthening the community and the application of low-cost social technologies, directly and indirectly, benefiting more than 800 people, including fishermen, families and communities.
- Coordinated institutional partnerships (44 partners including public and private sector entities, universities, educational and research institutions, NGOs and community associations).



Photo: GIZ

Signing of a cooperation agreement between Vale and the German government reinforces its position as a responsible mining company

Cooperation agreements and institutional participation

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Vale's signing of cooperation agreements and the company's participation in forums, institutions, initiatives and commitments reinforce our position to cooperate with actors that share our sustainable development goal, allowing for the exchange of good practices.

Among the partnerships agreed on in 2017, Vale and the German government signed a cooperation agreement on sustainability initiatives during the Conference of the Parties to the United Nations Framework Convention on Climate Change (COP 23) in November 2017. The agreement covers issues relating to sustainable agriculture; green markets; renewable energy and energy efficiency; climate changes; innovation and infrastructure; income generation and social affairs; quality education; basic health and well-being; gender equality; and clean water and sanitation.

Vale returns to ICMM

In 2017, Vale returned to the International Council on Mining and Metals (ICMM), the most important association in the mining industry. With this initiative, the company reinforced its position as a responsible mining company, helping to increase its competitiveness in the market.

The Council gathers 23 companies, including Rio Tinto, BHP Billiton, Anglo American and Glencore/Xstrata, and 32 national sectorial associations. It's the main forum for engaging with leaders from the sector, as well as an internationally recognized channel for sharing best practices and addressing issues of interest to the industry.

Institutional participations

Vale also works with and looks to join up with the players and actors from:

- **Global Business Initiative (GBI) on Human Rights:** Vale integrates the initiative with international companies from other sectors. The Global Enterprise and Human Rights Initiative seeks to contribute to ensuring that all companies in all parts of the world respect the dignity and rights of those with whom they interact and can have an impact. GBI works in collaboration with the UN Global Compact Office and the UN Working Group on Human Rights and Business.
- **Columbia Center on Sustainable Investment (CCSI):** Vale is part of this research center, which strives to advance the sustainable development agenda through a partnership between investors, academia and governments, reaffirming the essential role played by responsible investors.
- **United Nations Global Compact:** Since 2007, Vale has been a signatory and respects the ten principles proposed by the Global Compact¹. At the invitation of the United Nations (UN), since 2010 it has been part of the Global Compact Lead platform, which brings together leading organizations on sustainability issues covered in the Global Compact initiative. In addition, it is part of the Swiss and Brazilian networks, forming the Comitê Brasileiro do Pacto Global (CBPG). In addition, in Brazil, Vale actively participates in the Commission on Sustainable Development Goals (SDG) and the working groups on Human Rights, Energy and Climate.
- **Comitê Consultivo de Empresas e Indústria da OCDE (BIAC):** Vale monitors and participates in committees relevant to the sector, such as Raw Materials, Corporate Governance, Sustainable Development, Environment, Energy and Commerce. In addition, it participates

in the Organization for Economic Cooperation and Development (OECD) as an observer of some committees, such as Steel, and is active in working groups such as the Policy Dialogue for Development Based on Natural Resources and the Consultative Group on Stakeholder Engagement and Due Diligence in the mining sector.

- **World Business Council for Sustainable Development (WBCSD):** Vale is involved with the development of the 2020 Action project, which aims to highlight ways that companies can play a role in the challenge for a sustainable planet by 2050. It has also been a member of the WBCSD since its inception in 1995.
- **Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável (CEBDS):** Vale has been associated with the organization as a WBCSD network representative in Brazil since 1997 and participates regularly in thematic chambers and other projects and initiatives.

¹The index of this report presents the correlation of practices and performance with the respective principles of the Global Compact.

Vale is a member of the Leadership Council of the Network of Sustainable Development Solutions, focused on extractive sector contributions

- **Rede de Soluções de Desenvolvimento Sustentável (SDSN):** Vale is a member of the Leadership Committee and participates in discussions of the Good Governance of Extractive Resources thematic group, which brings together key organizations such as the United Nations Development Program (UNDP), the World Economic Forum and CCSI to work on contributing to the mining sector to achieve sustainable development and the Sustainable Development Goals (SDGs).
- **Instituto Brasileiro de Mineração (Ibram):** Vale participates through initiatives and programs conducted by the Institute and its partners to promote sustainable development through studies, manuals, guides, research, innovation and the use of modern technologies.
- **Extractive Industry Transparency Initiative (EITI):** Since 2014, Vale has directly endorsed this voluntary initiative that promotes transparency in financial flows between extractive organizations and the governments of countries in which they operate. The company participates in the multi-stakeholder group in Mozambique, Peru and Indonesia (through the membership to the Indonesian Mining Association). Vale has made an annual voluntary financial contribution to EITI since 2015.

Entities and associations

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Global

- Centre National de Recherche Technologique Nickel et Son Environnement (CNRT Nickel)
- Columbia Center on Sustainable Investment (CCSI)
- OECD Business and Industry Advisory Committee (BIAC).
- Global Business Initiative on Human Rights.
- Global Fund to Fight Aids, Tuberculosis and Malaria (Global Fund)
- Inter-Governmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF)
- International Chamber of Commerce (ICC)
- United Nations (UN) Global Compact
- Reputation Institute
- Sustainable Development Solutions Network (SDSN)
- The Cobalt Development Institute
- The Extractive Industries Transparency Initiative (EITI)
- The Nickel Institute
- Voluntary Principles on Security and Human Rights
- World Business Council for Sustainable Development (WBCSD)

National

- Brazil-China Business Council (CEBC)
- Brazilian Association of Science (ABC)
- Brazilian Business Council for Sustainable Development (CEBDS)
- Brazilian Foreign Trade Association (AEB)

- Brazilian Mining Institute (IBRAM)
- Brazilian Rail Transport Association (ANTF)
- Brazilian Center for International Relations (CEBRI)
- Ethos Institute for Business and Social Responsibility
- Foundation for Studies of International Trade (Funcex)
- Global Compact Brazilian Committee (CBPG)
- National Confederation of Industry (CNI)
- Private Port Terminals Association (ATP)
- Queensland Resource Council
- The Indonesian Mining Association (IMA)
- The Mining Association of Canada (MAC)

Regional

- Brazil Industries Coalition (Bic)
- Brazil-Japan Economic Cooperation Committee (CCE)
- BRICS Business Council
- European Association of Metals (Eurometaux)
- European Steel Association (Eurofer)
- Latin America Iron and Steel Institute (Ilafe)
- Union of the Mineral Industry of the State of Minas Gerais (Sindiextra)
- Union of the Mineral Industries of the State of Para (Simineral)



Appendix

The texts and data related to the indicators of the Global Reporting Initiative (GRI) Standards methodology of this report were verified and assured by SGS ICS Certificadora Ltda.

The scope and nature, as well as the opinion of the assurance, are stated provided by the consultancy and published on the following pages. Subsequently, the disclosure items published in this report, as well as material and non-material topics for Vale, according to its materiality matrix, are indicated in the GRI Content Index.

The introductory text to the index also contains information on the scope and scope of the information contained in the report.

Assurance statement

Statement by SGS ICS Certificadora Ltda. (SGS) Regarding the Sustainability Activities Provided in “Sustainability Report 2017” given to Vale S.A.

Assurance nature and scope

SGS was hired by Vale S.A. to render independent assurance of its Sustainability Report 2017. Based on assurance methodology of SGS Sustainability report, the certification scope includes the text and data related to GRI standard indicators for 2017 provided herein.

The responsibility for information of “SUSTAINABILITY REPORT 2017 (March 2018)” and its presentation lies on management of VALE. SGS does not take part of presentation in any material, including the said report. We are responsible for giving our opinion of the text, data, charts and statement within the certification scope, detailing the intention of informing the stakeholders of VALE S.A.

The SGS group has developed a set of Assurance protocols for communicating the sustainability based on the best practices provided in GRI Sustainability Reporting Standards guide and the ISAE3000 assurance standard. These protocols give different options of assurance level depending on context and capacity of applicant organization.

This report was assured through our protocol for assessing the content legitimacy and its alignment with aspects of requirements of GRI Sustainability Reporting Standards, (Universal Standards 101, 102 and 103), as well as the requirements of Topic-specific Standards (GRI 200, GRI 300 and GRI 400) according to the subject matters identified by VALE S.A. through the process detailed in the said report. Furthermore, the GRI sectorial appendix – Mining and Metals and Sustainable Development Framework: Assurance Procedure of ICMM – International Council on Mining and Metals. Based on such context, “THE SUSTAINABILITY REPORT 2017 (March 2018)” is deemed as Comprehensive Option.

The assurance process suggested by VALE S.A., and deemed as innovative by SGS, has comprised a combination of (i) visits to VALE business unit where the indicator, data and process concerning to sustainability and collection of GRI indicators were reviewed, and the interviews with key personnel were carried out and the operational process were followed up, (ii) reviews of documents submitted by VALE S.A and crosschecking with information placed by company on indicators system – Credit 360 and (iii) review of the issues of the said report in order to align them with GRI standards. The accounting information and/or concerning to “SUSTAINABILITY REPORT 2017 (March 2018) of VALE S.A was not assessed as part of this assurance process.

The Innovation pointed out by SGS in process suggested by VALE S.A. concerns to possibility of following up the company operation against the data collection process for the GRI indicators and how the strategies and practices of organization work. Thus, the assurance team sureness on data reported was widely expanded, making easier to check the data consolidated at VALE head office. Furthermore, the exposure by SGS team to the different VALE realities has also enabled the assurance has provided complementary information to enhance the organization sustainability management system, generating

value to assurance process performed traditionally by companies, where the audit team is restricted to check the data and information of the units. The SGS team had the opportunity to carry out the assurance steps in the following units: Terminal de Ponta da Madeira, Vale Cubatão Fertilizantes, Mina de Carvão Moatize (Moçambique), Complexo Vargem Grande, Corporativo Belo Horizonte and Corporativo Rio de Janeiro. It is important to highlight the visits included verifications of GHG. Another aspect that shall be highlighted was the participation and commitment to data collection for GRI by the key points in every unit visited.

Independence and competence statement

The SGS group is a worldwide leader in inspections, analysis and verifications which operates in more than 140 countries rendering services that includes management system certification, audits and training on quality, environment, social and ethic areas, as well as assurance of sustainability reports and verification of greenhouse gases. SGS reinforce its Independence from VALE becoming cleared from any conflict of interest against the organization, its subsidiaries and stakeholders.

The assurance team was nominated based on knowledge, expertise and skills for this service and was composed of:

- Lead Auditor on Assurance of Sustainability Report, a Lead Assessor of Greenhouse Gases (GHG), Lead Auditor on Socioenvironmental Programs, Lead Auditor on ISO 26.001, Lead Auditor on Ecuador Principles.
- An Auditor on Assurance of Sustainability Report, Lead Assessor of Greenhouse Gases (GHG), Lead Auditor on Socioenvironmental programs, Lead Auditor on Environmental, Quality and Sustainable Events Management System
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gases (GHG) and Climate Change Program, Lead Auditor on Socioenvironmental programs.
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gases (GHG) and Climate Change Program
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gases (GHG) and Lead Auditor on Environmental, Quality and Health and Safety Management Systems.

Assurance opinion

A wide assurance was applied for and the work performed was sufficient and adequate for a solid assurance. Regarding the verification performed against the methodology, process and data provided by VALE S.A., we attest the information and data provided in SUSTAINABILITY REPORT 2017 (March 2018) are reliable and a true and balanced representation of the sustainability activities performed by VALE in 2017. The assurance team has the opinion the report can be used by stakeholders of company as part of its assessment processes. The organization has elected the comprehensive option, which meets its needs.

In our opinion, based on what was found in company units and on documents provided by VALE, the report content meets fully the GRI standard requirements, including those in Sectorial Appendix for Mining and Metals.

Recommendations, findings and conclusions of assurance

The VALE "SUSTAINABILITY REPORT 2017 (March 2018)" is aligned with Sustainability Reporting Standards, (Universal Standards 101, 102 and 103) as well as the requirements of Topic-specific Standards (GRI 200, GRI 300 and GRI 400), Comprehensive Opinion. It is important to highlight the subject matters and its limits were fully set in accordance with the Reporting Principles and indicated over the report and/or reference list.

Concerning to contribution to improvement to development of sustainability reports in future and more effectiveness in assurance process, we recommend to VALE that:

- Despite of having an exclusive report of sustainability, which is not the mains mean to communicate the audience of its practices against this matter. We understand the best way is to use the report as reposition tool of sustainability information, which shall be addressed specifically with each stakeholder, depending on the substantiality related to each stakeholder and on communication channels the company uses with them.
- Develops a continuous process for this matter and prevent to perform this activities in certain periods of the year only. The best practices indicate the subject matters shall be taken from interfacing programs with the stakeholders that are already in place and that are performed over the year. To do so, VALE shall encourage the company interaction means with the different stakeholders take advantage of the subject matters whenever they are related to external stakeholders and place the interface results on SDI that is not used properly in our opinion.
- Promotes a better understanding on importance of GRI indicator management. During the visits, SGS has found a certain understanding level against the reasons for assessing the indicators, as a result a lot of interviewees considered this process as additional task to their activities. We understand that, even with the awareness rendered by company, this shall be enhanced. An efficient way to promote this awareness is to encourage the placement of data on indicators collection system by a higher number of workers, so spreading the information that is concentrated in few people.

Finally, SGS congratulates VALE for innovative way the company has proposed and carried out the assurance, for commitment to sustainability and for the significant developments on this matter it has been reaching over the past years.

Executed by and on behalf of SGS.



Fabian Peres Gonçalves

Business Manager | Sustainability | SGS ICS Certificadora Ltda.



Marcelo Abrantes Linguitte

Lead Auditor on Sustainability Report | SGS ICS Certificadora Ltda. | March 26th, 2018

www.sgssustentabilidade.com.br

GRI Content Index

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Scope

To define the content and scope of this document, in line with the methodology of Material Aspects and Limits, Vale relies on the materiality matrix. The work took into account the expectations and interests of stakeholders representatives in relation to significant economic-financial and socio-environmental impacts¹. The ability of the themes to influence assessments and decisions on investments was also taken into account.

As for coverage, the report includes information on the performance of the companies over which Vale has control and holds a share percentage greater than 50%. References to "Vale" or the "Company" in this report generally are limited to Vale S.A. and to its controlled subsidiaries. Whenever a controlled subsidiary is specifically mentioned in this report, the information provided with regard to such an entity shall be limited to it only.

Due to the sale of part of its assets of Nacala Corridor in Africa (Logistics), the company considers in this document the results of the operation only up to the first quarter of 2017. Although the company has agreed to sell a substantial

part of the fertilizer business and therefore considered the fertilizer operations as discontinued for accounting purposes, the performance of the division is contemplated in full in the numbers, since the sale of the assets took place in 2018 (learn more about this in the 20-F Report and in the Investors section at www.vale.com).

Regarding subsidiaries controls, Vale's aim to ensure their policies and standards are implemented, according to applicable local legislation, aligned to Vale internal policies and standards. In directly or indirectly affiliated companies, of which Vale (i) holds between 20% and 50% of voting capital or (ii) holds more than 50% of shares, but without controlling them, including shared control cases, Vale expects such companies to implement recommended policies and standards in line with its own. Although, due to the lack of control, Vale cannot guarantee that these companies will fully comply with Vale's standards, controls and procedures.

¹ The scope of operations covered in each indicator may vary. In the case of projects, social and environmental expenditures, resettlement, socioeconomic studies, human resources, health and safety and biodiversity are included in the report. The most relevant specificities are presented throughout the report.

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
GRI 101: Foundation 2016				
GRI 102: General Disclosures 2016 – Organizational profile				
102-1 Name of the organization	21			
102-2 Activities, brands, products, and services	21			
102-3 Location of headquarters	21			
102-4 Location of operations	21			
102-5 Ownership and legal form	21			
102-6 Markets served	21			
102-7 Scale of the organization	21		8	
102-8 Information on employees and other workers	39			6
102-9 Supply chain	16			
102-10 Significant changes to the organization and its supply chain	119			
102-11 Precautionary Principle or approach	119			
102-12 External initiatives	158			
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GRI 102: General Disclosures 2016 – Strategy				
102-14 Statement from senior decision-maker	8-14			
102-15 Key impacts, risks, and opportunities	83			
GRI 102: Ethics and integrity				
102-16 Values, principles, standards, and norms of behavior	20		16	10

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
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GRI 102: General Disclosures 2016 – Governance				
102-18 Governance structure	22			
102-19 Delegating authority	22			
102-20 Executive-level responsibility for economic, environmental, and social topics	25			
102-21 Consulting stakeholders on economic, environmental, and social topics	25		16	
102-22 Composition of the highest governance body and its committees	23		5, 16	
102-23 Chair of the highest governance body	23		16	
102-24 Nominating and selecting the highest governance body	23		5,16	
102-25 Conflicts of interest	23		16	
102-26 Role of highest governance body in setting purpose, values, and strategy	23			
102-27 Collective knowledge of highest governance body	23		4	
102-28 Evaluating the highest governance body's performance	23			
102-29 Identifying and managing economic, environmental, and social impacts	23		16	
102-30 Effectiveness of risk management processes	23			
102-31 Review of economic, environmental, and social topics	23			

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
102-32 Highest governance body's role in sustainability reporting	25			
102-33 Communicating critical concerns	25			
102-34 Nature and total number of critical concerns	79			
102-35 Remuneration policies	23			
102-36 Process for determining remuneration	23			
102-37 Stakeholders involvement in remuneration	23			
102-38 Annual total compensation ratio	-	Information subject to specific confidential restrictions: Vale does not disclose the amount of paid salaries.		
102-39 Percentage increase in annual total compensation ratio	-	Information subject to specific confidential restrictions: Vale does not disclose the amount of paid salaries.		
GRI 102: General Disclosures 2016 – Stakeholder engagement				
102-40 List of stakeholder groups	16			
102-41 Collective bargaining agreements	41		8	3
102-42 Identifying and selecting stakeholders	16			
102-43 Approach to stakeholder engagement	16			

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
102-44 Key topics and concerns raised	16			
GRI 102: General Disclosures 2016 – Reporting practice				
102-45 Entities included in the consolidated financial statements	164			
102-46 Defining report content and topic Boundaries	16			
102-47 List of material topics	16			
102-48 Restatements of information	4			
102-49 Changes in reporting	4			
102-50 Reporting period	4			
102-51 Date of most recent report	4			
102-52 Reporting cycle	4			
102-53 Contact point for questions regarding the report	7			
102-54 Claims of reporting in accordance with the GRI Standards	4			
102-55 GRI content index	164			
102-56 External assurance	4			
GRI 103: Management Approach 2016				
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GRI 201: Economic Performance 2016: <i>Non-material</i>				

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GRI 202: Market Presence 2016				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	103-107			
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202-2 Proportion of senior management hired from the local community	39-40		1 e 8	6
GRI 203: Indirect Economic Impacts 2016				
103-1 Explanation of the material topic and its Boundary	16,17,164			
103-2 The management approach and its components	131			
103-3 Evaluation of the management approach	131			
203-1 Infrastructure investments and services supported	130		1,5,7,9 e 11	
203-2 Significant indirect economic impacts	121		1,2,3,8,10 e 17	
GRI 204: Procurement Practices 2016				
103-1 Explanation of the material topic and its Boundary	16, 17, 164			
103-2 The management approach and its components	116-117			
103-3 Evaluation of the management approach	103-106, 117			
204-1 Proportion of spending on local suppliers	114		12	
GRI 205: Anti-corruption 2016				
103-1 Explanation of the material topic and its Boundary	16, 17, 164			

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103-2 The management approach and its components	116-119			
103-3 Evaluation of the management approach	116-119			
205-1 Operations assessed for risks related to corruption	116		16	10
205-2 Communication and training about anti-corruption policies and procedures	116		16	10
205-3 Confirmed incidents of corruption and actions taken	116		16	10
GRI 206: Anti-competitive Behavior 2016: Non-material				
GRI 301: Materials 2016: Non-material				
GRI 302: Energy 2016: Non-material				
GRI 303: Water 2016				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	84			
103-3 Evaluation of the management approach	84			
303-1 Water withdrawal by source	84-87		6	7 e 8
303-2 Water sources significantly affected by withdrawal of water	84-87		6	8
303-3 Water recycled and reused	84-87		6, 8 e 12	8
GRI 304: Biodiversity 2016				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	73-76			
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304-2 Significant impacts of activities, products, and services on biodiversity	73		6,14 e 15	8
304-3 Habitats protected or restored	80		6,14 e 15	8
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	73		6,14 e 15	8
MM1- Amount of land (owned or leased, and managed for production activities or extractive use) disturbed or rehabilitated	80-81		3, 6, 12, 14 e 15	
MM2- The number and percentage of total sites identified as requiring biodiversity management plans according to stated criteria, and the number (percentage) of those sites with plans in place	73-75		6,14 e 15	
MM10 - Number and percentage of operations with closure plans	134			
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103-2 The management approach and its components	89-90, 98			
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305-3 Other indirect (Scope 3) GHG emissions	90-92		3, 12, 13, 14 e 15	7 e 8
305-4 GHG emissions intensity	90-92		13, 14 e 15	8 e 9
305-5 Reduction of GHG emissions	90-92		13, 14 e 15	8

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
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103-2 The management approach and its components	65-66			
103-3 Evaluation of the management approach	65-66			
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GRI 308: Supplier Environmental Assessment 2016: Non-material				
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103-3 Evaluation of the management approach	41			
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401-2 Benefits provided to full-time employees that are not provided to temporary or part-time employees	41		8	
401-3 Parental leave	41		5 e 8	
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103-1 Explanation of the material topic and its Boundary	16,17, 164			

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GRI 403: Occupational Health and Safety 2016				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	135-137			
103-3 Evaluation of the management approach	135-137			
403-1 Workers representation in formal joint management-worker health and safety committees	142		8	
403-2 Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	139		3 e 8	
403-3 Workers with high incidence or high risk of diseases related to their occupation	139		3 e 8	
403-4 Health and safety topics covered in formal agreements with trade unions	45		8	
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103-2 The management approach and its components	43-44			
103-3 Evaluation of the management approach	43-44			
404-1 Average hours of training per year per employee	47- 48		4,5 e 8	

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
404-2 Programs for upgrading employee skills and transition assistance programs	45		8	
404-3 Percentage of employees receiving regular performance and career development reviews	45		5 e 8	
GRI 405: Diversity and Equal Opportunity 2016				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	33-34			
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405-2 Ratio of basic salary and remuneration of women to men	41		5, 8 e 10	
GRI 406: Non-discrimination 2016: Non-material				
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GRI 410: Security Practices 2016: Non-material				
GRI 411: Rights of Indigenous Peoples 2016: Non-material				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	36-37			
103-3 Evaluation of the management approach	36-37			
411-1 Incidents of violations involving rights of indigenous peoples	58		1	

GRI Standard	Page number(s) and/or URL(s)	Omission	Correlated SDG	Global Compact
MM5 -Total number of operations taking place in or adjacent to indigenous peoples' territories, and number and percentage of operations or sites where there are formal agreements with indigenous peoples' communities	57		1,2 e 3	
MM6 - Number and description of significant disputes relating to land use, customary rights of local communities and indigenous peoples	55		1 e 2	
MM7- The extent to which grievance mechanisms were used to resolve disputes relating to land use, customary rights of local communities and indigenous peoples, and the outcomes	55		1,2 e 4	
GRI 412: Human Rights Assessment 2016: Non-material				
GRI 413: Local Communities 2016				
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GRI 415: Public Policy 2016: Non-material				
GRI 416: Customer Health and Safety 2016: Non-material				
GRI 417: Marketing and Labeling 2016: Non-material				
GRI 418: Customer Privacy 2016: Non-material				

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GRI 419: Socioeconomic Compliance 2016				
103-1 Explanation of the material topic and its Boundary	16,17, 164			
103-2 The management approach and its components	119-120			
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419-1 Non-compliance with laws and regulations in the social and economic area	118		16	

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