



Vale Sustainability Report 2018

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About this Report

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Vale's Sustainability Report, which publishes its 12th edition in 2018, has always focused on presenting our challenges, achievements and strategies to address our mission to transform natural resources into prosperity and sustainable development.

However, the failure of Dam I of the Córrego do Feijão Mine in Brumadinho in the state of Minas Gerais on January 25, 2019 made it urgent for us to be accountable and reflect on this event with our stakeholders.

So, unlike what we have done in recent years, our report has been divided into two parts. The first part is fully dedicated to reporting the actions and developments related to the failure of Dam I of the Córrego do Feijão Mine, as well as to the description of the dam management process, incident prevention and emergency response. The actions that are contributing to mitigating the environmental, social and economic damages are also reported.

In the second part, we present the main institutional information¹ of Vale and the report of our material topics, content prepared according to the Global Reporting Initiative (GRI) Standards: comprehensive option and its Mining and Metals Sector Supplement. The disclosures comprise the period between January 1 and December 31, 2018.

The information presented also includes the guidelines and commitments related to the International Council of Mining and Metals (ICMM) and are aligned with the United Nations Global Compact² and the Sustainable Development Goals (SDG).

For questions, comments or suggestions, please Talk to Us at: www.vale.com.

1. Any differences in the total of data and percentages in the charts and tables should be attributed to the rounding of the values. Throughout the Part 2 of this report, the amounts in Reais were converted to US dollars at the rate of R\$ 3.65. Because of the complexity of the activities, there is no single business unit reporting criterion. Therefore, some disclosure items are not presented as a percentage of business unit.

2. Vale requested its withdrawal from the UN Global Compact effective May 2, 2019. The causes of the rupture of Dam I of the Córrego do Feijão Mine are under investigation. However, due to significant environmental and human rights impacts and out of respect for the Global Compact and its members, the company has decided to withdraw. The company's efforts are totally focused on making reparations to those affected and to remediating the environment.

This document includes statements that present Vale's expectations about future events or results. All forward-looking statements involve risks and uncertainties. Vale cannot guarantee that these statements will prove to be fully accurate. These risks and uncertainties include, among others, factors related to: (a) the countries where Vale operates, especially Brazil and Canada; (b) the global economy; (c) the capital markets; (d) the mining and metals prices and their dependence on global industrial production, which is cyclical by nature; and (e) global competition in the markets in which Vale operates. Vale cautions to the fact that actual results may differ materially from the plans, objectives, expectations, estimates and intentions expressed in this document. Vale undertakes no obligation to publicly update or revise any forward-looking statement, whether as a result of new information or future events or for any other reason. To obtain further information on factors that may lead to results different from those forecast by Vale, please consult the reports that Vale files with the U.S. Securities and Exchange Commission (SEC), the Brazilian Comissão de Valores Mobiliários (CVM), the French Autorité des Marchés Financiers (AMF) and, in particular, the factors discussed under "Forward-Looking Statements" and "Risk Factors" in Vale's annual report on Form 20-F.

Message from the CEO

GRI 102-14

This 12th edition of the Sustainability Report is published at the most challenging moment in Vale's history. With the failure of Dam I of the Córrego do Feijão Mine in Brumadinho on January 25 of this year, we lost colleagues, family, friends and community members. This incident negatively impacted people's lives and caused environmental and economic damage. From the first moment it happened, we have focused on serving the population and repairing the damage, but there is still a lot to be done.

Our obligation is to draw lessons from this tragedy to transform Vale into a more humane, safety-oriented and sustainable company. To this end, we will make every effort to rethink our methods and processes, without ever forgetting our responsibilities to Brumadinho. We will work tirelessly to ensure the safety of people throughout our operations.

Among the steps we are taking in this direction, I highlight two:

- We have implemented the Special Department of Repairs and Development, which will report directly to me, to coordinate all our efforts to repair the socio-environmental and economic impacts caused in Brumadinho and the region, accelerate the process of

paying indemnities, restore dignity to the victims' families and others affected, and encourage the resumption of economic activities in the community. In addition, this department will support and bring transparency to the investigation as it identifies the causes of the tragedy.

- We have created the Executive Board of Safety and Operational Excellence, which we have just approved, to ensure in an effective manner and unrelated to the context of the operational units, the qualified management of these issues, which are extremely relevant to the company:

- Accelerating the decommissioning plan for all upstream dams;
- Giving greater impetus to the Vale Production System (VPS) to reinforce the company's operational excellence; and
- Coordinating the Centre of Operational Risk Management and Asset Integrity with independence of conduct.

Message from the CEO

The Sustainability Report is part of Vale's commitment to provide information transparently. Thus, we present here the 2018 results and address the failure of Dam I, which makes clear our need to place a higher priority on ensuring the safety of people, the reliability of our operations and our protection of the environment.

As can be seen in detail on the pages of this report, in 2018 we increased some of our sustainability actions. We defined the Water Goal, which was created to reduce consumption and increase reuse, and we continued our actions aimed at mitigating and adapting to climate change, focusing on reducing atmospheric emissions and improving air quality indicators.

In order to expand our work with communities close to our operations, we are committed to the following variable remuneration goals the development of 46 relationship plans, 37 of them in Brazil, during 2018.

Altogether, US\$116.5 million was spent on social actions, for the most part to boost urban infrastructure and mobility, traditional communities and Indigenous peoples, and opportunities to generate work and income. Of this total, US\$13.4 million was contributed directly by the Vale Foundation, which has completed 50 years of work in Brazil contributing to territorial development by promoting initiatives for work and income generation, health and education.

Now, given the circumstances we face, we are determined to accelerate and further deepen this constant search for improvement, honouring the commitment that Vale has always maintained with transparency in its management and operations: to actively participate in initiatives and associations that strive for sustainability in business, compliance in procedures and clarity in actions and relationships.

As an example, we highlight Vale's association with the International Council of Mining and Metals (ICMM) and its presence in the Novo Mercado index of the Brazilian stock exchange B3, focused on the best practices of transparency in relationships with shareholders.

Today, our commitment is to do even more than we have done so far to transform Vale into a company that is as recognized for its respect for life and the environment as it is for its market value. This is the objective that we will pursue from now on.

Eduardo Bartolomeo
Chief Executive Officer

Message from the Board of Directors

GRI 102-14

The rupture of Dam I of the Córrego do Feijão Mine presented a scenario unprecedented in Vale's history. For the first time, our safety standards were questioned by government institutions and society in general. Faced with this situation, we sought to take measures that were expected of a company like ours: we gave full priority to helping the people and communities affected, while fully supporting specialized agencies as they worked to investigate the causes of the rupture.

At the same time, with the support of the international consulting firm Korn Ferry, we created Extraordinary Independent Consulting Committees (CIAEs) composed of independent and experienced members with unblemished reputations to collaborate in identifying the causes of the incident and in planning actions to support reparation efforts and prevent recurrences. We also hired a panel of experts to deepen the search for understanding of the technical causes that led to the failure of the dam.

The coming months and years will bring a major challenge for Vale, as well as for the entire mineral sector. We must rethink our operations and safety standards in light of the events in Brumadinho and their consequences. For the Board, this represents a call to continue improving our governance and to create mechanisms reinforcing prevention and safety in our operations, so that situations of this nature never occur again.

On behalf of this Board of Directors, we extend our condolences to those impacted by the failure of Dam I and their families, as well as to all those who, from the moment the incident occurred, have devoted themselves without limit to search for survivors and to support the victims – especially our firefighters and Civil Defense organizations.

José Maurício Pereira Coelho

Chairman of the Board of Directors

Timeline

Jan

25/01/2019

Collapse of Dam I of the Córrego do Feijão Mine in Brumadinho

At 12:28 p.m. on January 25, 2019, Dam I of the iron ore tailings of the Córrego do Feijão Mine collapsed, spread over approximately 295 hectares.

Immediate Response Group and Humanitarian Aid Committee

Actuation focus in the emergency actions and assistance to the victims and families, through specialized teams.

Blocking of Resources

Vale was summoned by preliminary shutdowns handed down in early protection petitions filed by the Prosecutor's Office of the State of Minas Gerais.

Tailings Retention Measures

Five days after the failure of Dam I, Vale starts an action plan in three stretches along the Paraopeba River.

Financial support for affected families

Vale began registering the people eligible to receive funds from the emergency donation.

Creation of Advisory Committees

Vale's Board of Directors created Extraordinary Independent Consulting Committees: investigation, support and repair.

Feb

Hiring Health Professionals

Almost 150 professionals hired to integrate the health and social assistance teams of the city of Brumadinho.

Rescue and Care of Animals

More than 240 professionals worked to track, rescue, monitor and assist the local fauna.

Timeline

Feb

Creation of Extraordinary Independent Consulting Committee for Dam Safety and Panel of Experts

Vale's Board of Directors decided to create the Dam Safety CIAE and hires experts to reinforce the investigation of the causes of dam rupture.

Recognition of firefighters challenging performance

Vale donates R\$ 20 million to the Firefighters of Minas Gerais as a way of thanking the heroic work of these professionals in the rescue of the victims.

Mar

Executives temporary removal

Company executives are temporarily removed from their duties.

Creation of Special Department of Reparation and Development

Structure was created to guarantee the repair of damages caused by the rupture of the I Dam and the socioeconomic and environmental restoration of the region.

Apr

Vale and the Public Defender of the State of Minas Gerais formalized an agreement

The agreement ensures that those affected by the rupture of Dam I can receive compensation for material, economic and moral damages, including indemnity of victims.

Alberto Flores Road Bridge

The two-way traffic of the bridge installed on the Alberto Flores road was reinstated on 10th of April.

May

Fluvial Water Treatment Station

Installation of a Fluvial Water Treatment Plant in the Ferro-Carvão Stream, with the capacity to treat approximately 2 million liters per hour, which is already in operation.

Creation of Safety and Operational Excellence Department

Structure was created to operate independently in the areas of Safety, Operational Risks, Asset Management and Operational Excellence, being a technical and normative nucleus.

2018 Sustainability Report

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We Are in Mourning

January 25, 2019 will be forever recorded in Vale's history and in the memory of our employees, our partners, the population of Brumadinho, Minas Gerais, and Brazilians in general. We had complied with all procedures related to the safety of our operations, including conducting periodic onsite audits. But even so, due to causes that are being duly cleared, Dam I of the Córrego do Feijão Mine in Brumadinho failed.

We know that our efforts will never be enough to bring back the lives that were lost, to compensate the people who have lost everything or almost everything, and to erase the impact on our employees and the communities neighbouring our dams, we are in mourning.

We have mixed emotions between consternation for the victims and families and our commitment to attend to them as quickly as we can and in the best way possible. Immediately after the rupture of the dam, we began providing assistance in the form of shelter, psychological help, medical care, infrastructure repair, transport to move displaced people at risk to shelters and hotels, rescue of and veterinary care for animals. In addition, we monitored the Ferro-Carvão Stream and the Paraopeba and São Francisco Rivers, and made financial contributions to institutions participating in these efforts.

The Collapse

At 12:28 p.m. on January 25, 2019, Dam I of the iron ore tailings of the Córrego do Feijão Mine collapsed. In just over three minutes, most of the 11.7 million cubic meters of tailings spread over approximately 295 hectares, reaching the operational and administrative areas of the mine, where about 600 of our own employees and those of third-party suppliers worked. Offices, maintenance workshops, locker rooms, refectory, mill, and loading terminal, among other structures, were impacted by the tailings. Also, the road access from the mine to the Córrego do Feijão village and the concierge road to the access ramp of the Alberto Flores Road were also reached.

The torrent of tailings followed in the southwest direction, impacting along its way part of the communities of Córrego do Feijão and Parque das Cachoeiras, closer to the mine, and other structures, such as the Nova Estância Inn. Some of the material arrived at the Ferro-Carvão Stream, and then the Paraopeba River, immediately increasing turbidity (the amount of suspended solid particles present in the water) and the concentrations of metals in the first kilometers of the river.

As of the closing date of this report³, there was a total of 245 confirmed fatalities and 25 missing persons. The work conducted by the Fire Brigade and Civil Defense resulted in the location and rescue of 395 people alive who were in the region affected by the collapse.

History

Built in 1976 by Ferteco Mineração, a company acquired by Vale on April 27, 2001, Dam I of the Córrego do Feijão Mine was made to dispose of iron ore tailings from its production. However, the dam has been inactive since 2016; that is, it was not receiving tailings and had no other type of operational activity in progress. The height of the dam was 86 meters and its crest length was 720 meters. Disposed tailings occupied an area of 249.5 thousand m² and the volume was 11.7 million m³. The Córrego do Feijão Mine belongs to the Paraopeba Complex of the Southern System and in 2018 produced 8.5 Mt, equivalent to 31% of the total production of the Complex.

The dam was constantly monitored and received biweekly field inspections, all reported to the National Mining Agency (ANM). It also had a video monitoring system, siren alert system and downstream population registration. A total of 94 piezometers (46 of them automated) and 41 water level indicators were used to monitor the structure, with periodic information gathering and analysis by the geotechnicians responsible for the dam. External and internal emergency simulations were also carried out periodically – the last external simulation took place on June 16, 2018, under Civil Defense coordination. The last recorded inspection occurred on January 22, 2019.

The dam had a Stability Condition Statement issued by TÜV SÜD do Brasil, a company specializing in Geotechnics, dated June 13 and September 26, 2018, related to the Periodic Safety Review of Dams and Regular Safety Inspection of Dams, respectively, as determined by DNPM decree 70.389/2017.

According to the legislation, the Mining Dam Emergency Action Plan (PAEBM in Portuguese) for Dam I of the Córrego do Feijão Mine was filed at the City Hall of Brumadinho and municipal, state and federal Civil Defenses in July, August and September of 2018. The sound warning system, which is part of the PAEBM, was manually operated from a 24-hour Emergency and Communication Control Centre located outside the mine area. Before that, in October 2018, employees had participated in an internal simulation for emergency procedures.

At the date of the failure, Dam I was not under construction and the project to modify the structure was under development. At the time the failure occurred, there were professionals at the dam performing data collection to comply with legal requirements determined by the National Mining Agency. The presence of people in dams is routine; measures must be taken to ensure the basic safety and maintenance of these structures, even when inactive; for example, reading instruments, performing inspections, and evaluating the need to cut the grass in these places.

3. May 31, 2019

Dams

Immediate Assistance and Emergency Actions

Since the failure of Dam I, all our efforts have been focused on supporting those affected and working together with the Fire Department and Civil Defense, both of which have continued up to the publication of this report. To speed up actions, on the day of the dam's collapse, we created an Immediate Response Group responsible for consolidating all emergency actions. Subsequently, a Humanitarian Aid Committee was set up, with a team of social workers and psychologists to provide assistance to victims and families. The top priority at that time was to receive the families, support the rescue, and assist all employees, both our own and those of third-party suppliers, and the local population. For this we mobilized all the necessary resources.

We provided 40 ambulances, backhoes, a rescue helicopter, communication radios, 15 lighting towers, and balloons equipped with infrared technology and wi-fi for aerial monitoring. Partnerships with hospitals in the region made available 800 beds and medical and psychological care. About R\$ 1.3 billion was spent to purchase medicines, water, equipment and other logistical resources.

Services for the community and the families of those affected were carried out in seven Service Stations (PAs in Portuguese): Estação Conhecimento de Brumadinho, Centro Comunitário Córrego do Feijão, Escola Municipal Carmela Caruso Aluotto (Casa Branca), Ginásio Poliesportivo, Associação Comunitária Parque da Cachoeira, in addition to Legal Medical Institute (LMI) and Intercity Hotel, in Belo Horizonte.

At these services stations, professionals such as doctors, nurses, psychologists, social workers and volunteers directed their full attention to those affected and their families 24 hours a day. We

registered and referred homeless people and victims' family members to hotels and provided them with food, transportation, clothing and hygiene supplies, among other supports. Documents such as birth and marriage certificates and Identity Cards were issued by the Civil Police of Minas Gerais, with Vale's support. We hired a team of professionals from the Albert Einstein Hospital based in São Paulo, which included specialists in trauma, mourning and catastrophe response, to provide psychosocial care at the service stations and telephone channels.

In PAs, we also provided 407,000 liters of mineral water to the community, up to 9,000 meals/snacks per day, animal feed, as well as personal hygiene kits, medicines, fuel and construction material.

Since the dam failure, we have made available toll-free numbers to enable the population to request assistance (Alô Brumadinho, Alô Indenizações, Alô Ferrovia, Alô Animal and the Vale's Ombudsman). In the first week after the collapse, more than 3,000 calls had been answered.

Rural producers with activities in fifteen municipalities received water supplies for human and animal consumption and irrigation – we have so far provided about 145 million liters of water. Water service was directed to the cities of Betim, Brumadinho, Curvelo, Esmeraldas, Florestal, Fortuna de Minas, Juatuba, Maravilhas, Mário Campos, Pará de Minas, Papagaios, Paraopeba, Pompéu, São Joaquim de Bicas, São José da Varginha, and also to farmers and families mapped by Vale, the Secretaria de Agricultura de Brumadinho and the Minas Gerais State Technical Assistance and Extension Company (Emater-MG).

We also provided transportation for community relocations between the Córrego do Feijão Community Centre, Casa Branca Community and

the Brumadinho Bus Station to respond to demands arising from access interruptions caused by the rupture. Transport service was offered all days of the week, including Saturday and Sunday, with departures every two hours.

Voluntary Financial Support to Affected Families

On January 31, 2019, we began registering the people eligible to receive funds from the emergency donation of R\$ 100,000 offered by Vale to support families who have had deceased or disappeared due to the collapse. The official list of beneficiary families has been validated by the Civil Defense and is available on Vale's website. To date, 276 payments have been made.

We also financially supported people living in the Self-Rescue Zones⁴ (ZAS in Portuguese) of Dam I: R\$ 50,000 per property located in the ZAS; 101 payments have been made. In addition, we have given R\$ 15,000 per family household of rural producers or merchants who have productive activity in the area; 95 of these payments have been made.

These voluntary donations from Vale are not tied to the indemnities that will be negotiated individually with those affected, with the support of the Public Defender or private lawyers, as well as indemnities that may be paid according to what is determined in future through collective bargaining and authorities.

4. Self-rescue Zone (ZAS in Portuguese) is the valley region downstream of the dam, which is within 10 km or 30 minutes of the point where the dam broke down and in which there is insufficient time for competent authorities to intervene in the event of an emergency.

Dams

Other financial support provided to those affected has included:

- Funeral assistance to the victims' families, in the amount of R\$ 3,928.34, in addition to payments to cover notary fees, body transfers, urns, ornaments, graves, burial services and other expenses.
- Vale entered into an agreement with the city of Brumadinho to donate to the city approximately R\$ 80 million over the next two years. We have also signed an agreement to donate R\$ 100 million to the Association of Mining Cities of Minas Gerais (AMIG in Portuguese) and agreements to donate to other institutions a total of R\$ 114 million. The agreement signed with the AMIG will cover ten municipalities: Barão de Cocais, Belo Vale, Congonhas, Itabirito, Mariana, Nova Lima, Ouro Preto, Rio Acima, São Gonçalo do Rio Abaixo and Sarzedo.

Preliminary Agreements and Emergency Indemnifications

In order to take action to repair the damage caused by the rupture of Dam I in a fast and efficient way, on February 20, 2019, we signed a Preliminary Adjustment Agreement (TAP in Portuguese), which allowed us to anticipate the payment of emergency compensation for all residents in the city of Brumadinho on the date of the breach, and up to one kilometer from the Paraopeba River gutter, from Brumadinho to the city of Pompéu, at the Retiro Baixo Dam.

In an hearing at the Court of Justice of Minas Gerais (TJMG in Portuguese), the preliminary agreement was signed with the General Law Office of the State of Minas Gerais, the Public Prosecutor's Office of the State of Minas Gerais, the Public Defender's Office of the State of Minas Gerais, the Federal Public Prosecutor, and the Federal Public Defender's Office, as well as representatives of those affected. The agreement established, among others, the following measures:

- Payment of a monthly minimum wage for each adult, half (1/2) the monthly minimum wage for each teenager and one quarter (1/4) the minimum wage for each child of families living in regions located up to one kilometer from the Paraopeba River, from Brumadinho to the city of Pompéu, at the reservoir of Retiro Baixo, beginning on January 25, 2019, for a term of one year. More than 76,000 people have received payments so far.
- Provision of a basic food basket for each household in the communities of Córrego do Feijão and Parque da Cachoeira for 12 months. The value of the basic basket will be determined by the Inter-union Department of Statistics and Socioeconomic Studies (Dieese in Portuguese).
- Provision of independent technical advice so that those affected can negotiate their individual indemnities.
- Reimbursement for or direct funding of the extraordinary expenses of the State of Minas Gerais, its direct agencies and its indirect administration, including the cost of transport, accommodation and food for the employees involved in rescue work and other emergency actions.

- Maintenance of 2/3 of the salaries of all employees, both our own and those of third-party suppliers, who died, until a definitive indemnification agreement is formalized.
- Maintenance of the salaries of employees who are missing.
- The guarantee of employment or salary for Vale employees in Brumadinho, including those of our third-party suppliers, until December 31, 2019.
- Maintenance of the medical plan for family members of the victims, both our own and those of third-party employees, under the accreditation regime, covering the entire state of Minas Gerais. Widows or companions are covered for life and dependents are covered up to 22 years of age.
- Psychological assistance to workers until they are medically discharged.
- A day-care centre allowance of R\$ 920.00, to care for children up to three years old of deceased workers.
- An educational allowance of R\$ 998.00 for children of deceased workers until the date they become 18.

These commitments are independent of the donation of R\$ 100,000 that Vale already made.

We provided a Call Centre, Alô Indenizações, available Monday to Saturday, 8 a.m. to 8 p.m., through which residents can schedule a service and ask questions. More than 800 people were mobilized to work at the Call Centre, at the Service Posts and in records analysis.

Dams

So far, about 100,000 people have been registered, and more than 76,000 payments have been made, related to preliminary agreements and emergency indemnifications.

On April 5, 2019, Vale and the Public Defender of the State of Minas Gerais formalized an agreement by which those affected by the rupture of the Brumadinho Dam may enter into an individual or family extrajudicial agreement to indemnify material, economic and moral damages, including compensation for victims.

This agreement establishes the criteria for a wide range of indemnity payments, which have been defined according to the best practices and jurisprudence of the Brazilian courts for each damage.

Vale estimated a provision in its 1Q19 result, published on May 9, 2019, of R\$ 9.3 billion, related to preliminary agreements and emergency indemnifications. At the date of the result's publication, it was not possible to

reasonably estimate the size of possible losses or settlements or the time of total value related to collective damages and environmental obligations due to the initial stage of negotiations with relevant authorities.

Hiring Health Professionals

At the beginning of February 2019, representatives of the Public Prosecutor's Office of Minas Gerais, the Public Defender's Office of Minas Gerais, the Federal Public Defender's Office, the State Department of Social Impact, the Municipal Secretariats of Health and Social Development of Brumadinho and the Movement of People Affected by Dams (MAB in Portuguese) signed a commitment with Vale, which paid the costs of hiring 142 professionals to integrate the health and social assistance teams of the city of Brumadinho for the initial term of six months. In all, R\$ 2.6 million was transferred to the municipal administration.

At the same time, the City Hall of Brumadinho launched a call to recruit 132 professionals, including doctors, nurses, psychologists, physiotherapists, occupational therapists, social workers and agents, to combat endemics, as well as administrative and operational personnel. During the selective and mobilization processes, the population affected by the rupture of Dam I was attended by health professionals made available by Vale, who were gradually replaced by professionals from the City Hall of Brumadinho, in compliance with the commitment signed.

Support to Traditional Communities and the Pataxó People

Vale signed an agreement on April 5, 2019 with the Federal Public Ministry, the National Indian Foundation (Funai) and the chiefs of the Indigenous Pataxó communities Hã Hã Hã e Naô Xohã, located in the city of São Joaquim de Bicas, about 22 km away of Brumadinho, Minas Gerais. The agreement provides:

- Emergency payments to 150 indigenous from 46 families.
- Monthly payments of a basic food basket per family unit.
- Partnership with the Special Secretariat of Indigenous Health (SESAI in Portuguese) and the Indigenous Special Sanitary District of Minas Gerais and Espírito Santo (DSEI-MGES in Portuguese) to diagnose the health situation in the Indigenous community.

- Independent socio-economic advice to assess possible damages and impacts to the indigenous community.
- Independent technical assistance.

In addition, Vale has also hired professionals with Indigenous professional qualifications and experience to dialogue with Indigenous peoples, who have supported the community in various institutional actions and access to public policies.

We are also assisting about 600 quilombola residents of Marinhos, Sapé, Ribeirão and Rodrigues. We provide ambulance services for 24-hour assistance and school transportation for children with disabilities and maintain constant dialogue with the community through a dedicated anthropologist.

Dams

We also started using fumigations to prevent the proliferation of vectors that transmit diseases such as dengue fever, yellow fever and others. This action was initiated 15 days after the failure, in a preventive way and at the request of the Civil Defense and the Public Prosecutor's Office of Minas Gerais. The application took place periodically in Brumadinho, and in the districts of Córrego do Feijão and Parque da Cachoeira. We also carried out disinfection and rat removal in the three localities.

Rescue and Care of Animals

More than 240 professionals worked to track, rescue, monitor and assist the local fauna along the affected area in the Ferro-Carvão Stream and on the two banks of the Paraopeba River, covering both domestic and wild species. The teams also had technical advice and support from volunteer veterinarians of the Conselho Regional de Medicina Veterinária (CRMV) and the Universidade Federal de Minas Gerais (UFMG).

We set up two structures to receive large, medium and small rescued animals, including birds, reptiles, horses, cattle, cats, dogs and wild animals: Veterinary Hospital and Abrigo de Fauna Farm, located near the city of Brumadinho. A specialized helicopter was also used to rescue animals.

The Veterinary Hospital was prepared to provide hospitalization and emergency surgeries. Abrigo Farm had an outpatient clinic for emergency care and an appropriate structure to house recuperating fauna. More than 630 animals were cared for in these structures. In addition, a service channel, Alô Animal, was created to assist in returning rescued animals to their owners, and a photo list of all animals under our

responsibility was posted on Vale's website and at the service stations (PAs, in Portuguese) in the community.

The initiative was coordinated by Vale's team of biologists, in partnership with the Veterinary Medical Regional Council (Conselho Regional de Medicina Veterinária), to mobilize veterinarians to assist in rescues and assemble treatment centres to welcome the rescued animals. In addition to these structures, the action had a mobile unit to provide animal first aid.

These fauna protection actions are the objective of a Preliminary Commitment Agreement signed by Vale and the Minas Gerais State Public Ministry on April 5, 2019.

Work of the Firefighters

Tireless and resilient, military firefighters worked to rescue the victims of the Dam I failure in uniquely difficult conditions. The task proved very challenging even for the most experienced professionals. From the arrival of the first team, moments after the rupture of the dam, until the closure of this report, these professionals have continued working as an effective task-force in their continuous search for disappeared persons. The Military Fire Brigade of other states and other rescue teams joined the Military Fire Brigade of Minas Gerais (CBMMG, in Portuguese) and the local Civil Defense in searching for those affected.

To recognize the heroic work of these professionals, Vale made a donation of R\$ 20 million to the CBMMG, of which R\$ 15 million was allocated to

purchase equipment, improve infrastructure and provide professional training for the corporation, and R\$ 5 million was dedicated to training in the Firemen's Academy. The more than 7,000 items of equipment donated and extra training will benefit all 6,000 military firefighters in the state.

The equipment purchased included operational vehicles (two buses, four trucks, one all-terrain vehicle), rescue and intervention devices (excavators, chainsaws, generators, etc.), personal protective equipment, office material, tools and decontamination accessories (respiratory protection, chemical protection boots, etc.).

Tailings Retention Measures

Five days after the failure of Dam I, Vale presented to the Public Prosecutor's Office and to environmental agencies a plan of action in three stretches along the Paraopeba River, with an emergency-level urgency:

Stretch 1 – Up to 10 km from the site of the dam failure: taking into account the strategic geographic position to optimize tailings containment in the Ferro-Carvão Stream, located downstream of the dam break, avoiding the flow of material to the Paraopeba River. We plan to construct containment structures, such as rockfill dikes, hydraulic barriers and a metal curtain, as well as to install a Fluvial Water Treatment Plant in the Ferro-Carvão Stream, with the capacity to treat approximately 2 million liters per hour, which is already in operation.

Dams

A 50-meter metal and concrete bridge was built to restore access to the communities of Parque da Cachoeira and Córrego do Feijão to the central area of Brumadinho. The bridge allows dual-vehicle traffic and includes pedestrian walkways.

Stretch 2 – Ranging between 10 and 30 km, on the Paraopeba River, to the municipality of Juatuba: a region where fine material such as silt and clay is concentrated and dredged for adequate disposal. Equipment will be installed to dredge the coarser material such as sand and rocks to clean and desorb the Paraopeba River channel. The material will be collected by dredgers and conditioned for proper disposal outside the Permanent Preservation Area (PPA) of the river.

Stretch 3 – Ranging from 30 to 170 km, on the Paraopeba River between Juatuba and the Hydroelectric Plant of Retiro Baixo. We put in operation five antiturbidity barriers (membranes); three in the region of Pará de Minas and another two at the height of the municipalities of Juatuba/Betim, before the Thermoelectric Plant of Igarapé. Specific monitoring to this end has shown, to date, that the efficiency of the installed barriers reduces the turbidity of the river water by 10% to 15%.

An environmental monitoring program was prepared to evaluate the impacts of these emergency engineering works, which is being implemented as the work progresses.

According to the guidance of the competent agencies of the state of Minas Gerais, raw water abstracted directly into the Paraopeba River should no longer be used for any purpose until restrictions are lifted by

the same agencies. Therefore, the populations who used this water were identified and started to receive drinking water provided by Vale; we had distributed more than 145 million liters of water in the region at the time of this report's publication.

We are committed to building a 50-km pipeline that will capture water from the Pará River (not reached by the sediments of Dam I) until the first half of 2020 to provide direct service to the municipality of Pará de Minas. The flow to be captured will be 284 liters per second, exactly the same amount that the city captured on the Paraopeba River before the structure collapsed. In the future, with the recovery of the Paraopeba River, this pipeline will allow the city to have twice the capacity to capture water for supply. Emergency works were carried out to revitalize artesian wells, immediately increasing the availability of water to the city, as well as installing new water withdrawals (currently underway) in other streams.

Regarding the great Belo Horizonte, discussions are being conducted with the local water supply company, and measures are being considered to avoid any possibility of a future water shortage problem.

Environmental Monitoring

Four months after the Dam I failure, it was possible to evaluate, with data from approximately 1.5 million analyses of water, soil, tailings and sediment, that the Paraopeba River can be recovered. Its environmental recovery depends on a set of actions, among them the containment of solid wastes

near the place where the dam was located. The evaluation was conducted by specialized laboratories and consultancies contracted by Vale, involving approximately 250 professionals.

Vale maintains 67 monitoring points where collection takes place of daily samples for water and weekly samples for sediment. In addition, Vale continuously monitors turbidity at five points in areas that have not suffered the consequences of the Dam I failure in Brumadinho: in the Ferro-Carvão Stream, in the Paraopeba and São Francisco Rivers, in the Retiro Baixo and of Três Marias Reservoirs, as well as nine other tributary rivers of the Paraopeba. The results of the surface water quality of the Paraopeba River obtained so far demonstrate that the greatest metal contaminations were identified within a 70-kilometer radius of the dam rupture, linked to the physical presence of tailings in the river water.

We also have collected 66 tailings samples at 46 points in the Ferro-Carvão Stream basin (including within B1 dam) and 28 samples along the Paraopeba River. The purpose of monitoring is to evaluate the effects of the failure and mitigation actions in progress and to act more effectively to reduce the impacts of the failure. The results obtained characterize the waste as non-hazardous.

In addition to the physical and chemical tests that have been carried out on water and sediments, evaluations of potential tailings effects on aquatic biota are being conducted, through ecotoxicity studies on organisms present along the Paraopeba and São Francisco River basin and at their mouth at the Atlantic Ocean.

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Ecotoxicity tests are being conducted to verify that the chemical elements present in water and sediments are bioavailable at levels capable of causing adverse effects to aquatic organisms. Tests are also underway to analyze the impacts of bioaccumulation of metals on fish and plant species. Tests with bacteria, crustaceans and fish showed no change in the toxicity parameters for these organisms to date. Other analyses on domestic animals and agricultural crops around the river that have had contact with water are under development.

Other programs to monitor air quality, flora and fauna are underway to assess potential impacts along the Paraopeba River basin.

The Coordination of Graduate Programs in Engineering at the Federal University of Rio de Janeiro (Coppe-UFRJ in Portuguese) was hired to review and validate all data and results presented by the Company.

Extraordinary Independent Consulting Committees

In the context of the rupture of Dam I of the Córrego do Feijão Mine, Vale's Board of Directors created Extraordinary Independent Consulting Committees (CIAEs in Portuguese). These coordinated committees are composed of external, independent, reputable and experienced subject matter experts on the topics at hand.

They were selected with support from the international consulting firm Korn Ferry and appointed by the Board.

Extraordinary Independent Consulting Committee for Investigation (CIAEA in Portuguese)

To determine the causes of the collapse of Dam I as efficiently as possible, on January 27, 2019 the Board of Directors established the Extraordinary Independent Consulting Committee for Investigation (CIAE of Investigation). This committee, coordinated by the retired Minister of the Federal Supreme Court Ellen Gracie, is also composed of José Francisco Compagno and Manuel de Almeida Martins.

Extraordinary Independent Consulting Committee for Support and Recovery (CIAEAR in Portuguese)

On January 27, 2019, Vale's Board of Directors established the Extraordinary Independent Consulting Committee for Support and Recovery (CIAE of Support and Recovery), dedicated to monitoring the measures to assist those affected and recovering the areas affected by the collapse of Dam I. The committee is coordinated by Leonardo Pereira, former President of the Brazilian Securities and Exchange Commission (CVM in Portuguese), and also includes Ana Cristina Barros and Márcio Gagliato.

Extraordinary Independent Consulting Committee for Dam Safety (CIAESB in Portuguese)

On February 15, 2019, Vale's Board of Directors decided to create the Extraordinary Independent Consulting Committee for Dam Safety (CIAE of Dam Safety), to advise it on issues related to the diagnosis of safety conditions, management and mitigation of risks related to Vale's dams and dikes. The committee also aims to recommend, if necessary, measures to be taken to strengthen the safety conditions of dams. The CIAESB, coordinated by Flávio Miguez de Mello, Honorary President of the Brazilian Committee of Dams, is also composed of Willy Lacerda and Pedro Repetto.

According to the institutional guideline of absolute transparency, the Company also submitted a formal statement to the Public Prosecutor's Office of the State of Minas Gerais, the Federal Public Prosecutor's Office and the Federal Police Superintendence in Minas Gerais, reiterating all their best and greatest efforts with maximum urgency to gather all possible information about the failure. As part of this effort, all of Vale's employees were instructed to collaborate fully with the authorities to address their requests, as well as to keep all available documents and information, including telematics, up to date to contribute to fact assessments.

These are examples of relevant resolutions taken by the Board of Directors after January 25, 2019:

- On January 27, approved the creation of two Extraordinary Independent Consulting Committees (Investigation and Support and Recovery), composed and active after eight days, and

Dams

determined the suspension of the Shareholders Compensation Policy and the variable remuneration of executives.

- On January 29, approved the Emergency Plan for decommissioning upstream dams and making the necessary investments for an estimated amount of R\$ 5 billion. On January 30, approved the appointment of the retired Federal Superior Court (STF in Portuguese) Minister Ellen Gracie Northfleet to act as Coordinator of the Independent Investigation Committee. On February 15, created the Extraordinary Independent Consulting Committee for Dam Safety.
- On February 20, supported Vale's decision to sign an unprecedented Preliminary Adjustment Agreement (TAP in Portuguese) to accelerate emergency payments for all people registered in Brumadinho until the date of the rupture, in addition to the communities that live up to 1 kilometer from the Paraopeba River bed, from Brumadinho to the city of Pompéu, in the region of the Retiro Baixo Dam.
- On March 1, the Council received a recommendation from the Federal Public Prosecutor's Office, the Public Prosecutor's Office of the State of Minas Gerais, the Federal Police and the Civil Police of Minas Gerais to remove certain employees from performing their activities in the Company and for others to cease performing activities related to risk management and/or monitoring of dam safety. On Saturday, March 2, 2019, the Council received requests to place four executives on temporary leave. All were immediately accepted.

- Subsequently, the Board met and recommended that the Executive Board follow the recommendation for temporary removal of employees in its entirety and define how to execute it. It was up to the Executive Board, to whom the other employees respond, in a meeting on March 7, to comply with the recommendation of the Task Force, removing and relocating the other employees listed.
- On March 2, the Board of Directors temporarily appointed Eduardo de Salles Bartolomeo (then Executive Director of Base Metals) as CEO of Vale, Claudio de Oliveira Alves (then Director of Pelletizing and Manganese) as Executive Director of Ferrous and Coal and Mark Travers (then Legal, Institutional Relations and Sustainability Director of Base Metals) to replace Bartolomeo as Executive Director of Base Metals.
- On April 29, confirmed Eduardo de Salles Bartolomeo as Vale's CEO.

Panel of Experts

To reinforce the determination of the causes of the failure of Dam I of the Córrego do Feijão Mine, Vale contracted, through the US office of Skadden, Arps, Slate, Meagher & Flom LLP (Skadden), four external experts (collectively called the Panel of Experts) to provide an assessment of the technical causes of the failure of Dam I: Dr Peter K. Robertson, Chairman of the Panel of Experts; Dr. Lucas de Melo; Dr. David J. Williams; and Dr. G. Ward Wilson. Skadden was contracted to provide legal advisory services and began working with the Panel of Experts.

Blocking of Resources and Imposition of Administrative Sanctions

Three days after the rupture of Dam I, Vale was summoned by preliminary shutdowns handed down in early protection petitions filed by the Prosecutor's Office of the State of Minas Gerais. The judges on duty in the counties of Belo Horizonte and Brumadinho complied with requests to block and make unavailable Vale's total amount of R\$ 11 billion and determined that the Company would adopt the necessary measures to guarantee the stability of Dam VI of the Córrego do Feijão Mine (which was affected by the tailing that leaked from Dam I), and to take responsibility for rescuing and assisting those affected, among other obligations.

Vale paid administrative fines imposed by the State Secretary for Environment and Sustainable Development (SEMAD MG in Portuguese), in the approximate amount of R\$ 100 million. We were also notified of the imposition of administrative fines by the Brazilian Institute of the Environment and Renewable Natural Resources (Ibama in Portuguese), in the amount of R\$ 250 million, which may be converted into to environmental projects.

Moreover, Vale was notified of a daily fine of R\$ 100,000 applied by Ibama for alleged irregularities in the fauna rescue plan. In addition, the Brumadinho Municipal Environment Secretariat also imposed administrative fines, which together totaled approximately R\$ 108 million. We are defending ourselves administratively against these sanctions, which may also be devoted to environmental projects.

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New blockings of resources were requested by the Public Prosecutor's Office in legal suits, as a result of possible impacts to the environment and communities due to elevated risk levels at other Vale dams, such as the South Upper Dam of the Gongo Soco Mine in Barão de Cocais, the dams of Vargem Grande and B3/B4 in Nova Lima.

The total amount requested in judicial blocks was about R\$ 17.6 billion.

Temporary Removal of Executives

During the process of determining the causes and responsibilities for the failure of Dam I of the Córrego do Feijão Mine, some Company executives were temporarily removed from their duties. This scenario came about on March 1, 2019, when our Board of Directors received Recommendation No. 11/2019 to remove executives and employees at various organizational levels of the Company from the Federal Public Prosecutor's Office, the Public Prosecutor's Office of the State of Minas Gerais, and the Federal Police and the Civil Police of the State of Minas Gerais, *(read more in the chapter Vale, on [page 17](#)).*

Special Department of Repairs and Development

With a mission to guarantee a focus on structural remediation to repair the damage caused and to re-establish the socioeconomic and environmental integrity of Brumadinho and its impacted municipalities, we created the Special Department of Repairs and Development. Governance was established for direct reporting to the president and special weekly participation in Executive Board meetings, to provide ample review and support for the progress of the initiatives. Direct reporting will ensure the speed and flexibility required for remedial actions.

This new department will be responsible for all social, humanitarian, environmental and structural recovery actions to be carried out in Brumadinho and in the 16 municipalities along the Paraopeba River, up to the Retiro Baixo Dam in Minas Gerais. It also has the responsibility to coordinate actions with communities in Self-rescue Zones (ZAS) and Secondary Security Zones⁵ of dams that have had their emergency levels elevated to 2 or 3.

The following executive management projects are within the jurisdiction of this department:

- Brumadinho and Paraopeba Basin Repair
- Development of other actions to support municipalities.

Both projects are supported by dedicated matrix teams that act in integration with the corporate areas.

In the 2019 variable remuneration program, the Chief Executive Officer and Executive Officers of our Company will have 40% allocated to structural actions to repair damages caused by the rupture of Dam I, in order to engage and reinforce such actions. Employees of the Executive Department of Sustainability and Institutional Relations and other Executive Managers and Directors will have 20% linked to the program.

5. Secondary Security Zone (ZSS in Portuguese) is the region that is more than 10 km or 30 minutes from the point where the dam ruptured, in which there is sufficient time for people with adequate training to rescue themselves and retreat to designated meeting points for assistance.

Summary: Numbers and Main Actions since the Failure of Dam I

Humanitarian actions

- Donation of R\$ 100,000 for each of the affected families that have victims from the failure: 276 payments made.
- Donation of R\$ 50,000 per property to those who resided in the Self-rescue Zone in the PAEBM of the Córrego do Feijão Mine: 101 payments made;
- Donation of R\$ 15,000 for those whose businesses were impacted in the PAEBM of the Córrego do Feijão Mine: 95 payments made.
- Donation of R\$ 5,000 to people residing and/or developing productive or commercial activities in ZAS in the PAEBM of B3/B4, Sul Superior, Forquilhas and Vargem Grande Dams: 237 payments made.
- R\$ 580,000 distributed in more than 600 clothing cards and 400 drugstore cards for hygiene items.
- 237 families placed in social rental furnished houses according to their profile and way of life, besides 60 families in hotels and inns.
- R\$ 1.3 billion used to purchase medicines, water, equipment and other logistical costs.
- More than 76,000 pharmacy items purchased.
- More than 145 million liters of water for human and animal consumption and for agricultural irrigation distributed to 15 municipalities.
- R\$ 2.6 million transferred to the City Hall of Brumadinho to purchase emergency equipment and to hire professionals in health and psychosocial services, to increase the municipality's humanitarian aid to those affected.
- R\$ 20 million for the Military Fire Brigade of Minas Gerais to purchase equipment, structural improvements and professional training for the corporation.
- R\$ 5 million to be invested in equipment for Civil Defense and R\$ 4 million for the Military Police.
- R\$ 11.4 million in state-of-the-art equipment for the Legal Medical Institute (IML) in Belo Horizonte.
- R\$ 4 million to be invested in state-of-the-art equipment for the Institute of Forensics of Belo Horizonte.
- More than 1,500 professionals working in Service Stations (PAs in Portuguese) in Brumadinho.
- Approximately 9,000 medical and psychological caregivers.
- 10 hospitals and health units mobilized to attend those affected.
- Psychosocial support for families, in addition to financial education, support for permanent housing (purchase/regularization of documents), support for the productive recovery of local economic and rural activities, as well as technical assistance to resume small and medium businesses.

We are also investing in actions that seek to rejuvenate community spaces with the active participation of the communities involved, aiming to strengthen local autonomy and development, to articulate the partners that have a stake in the territory and the existing actions being taken, and to promote community resilience.

Relocation Actions

- Brumadinho: 372 people allocated in temporary housing, hotels, inns or the houses of friends and relatives.
- Barão de Cocais (Upper South Dam of the Gongo Soco Mine): 458 people allocated in temporary housing, hotels, inns or the houses of friends and relatives.
- Macacos (Dams B3/B4 of the Mar Azul Mine): 328 people allocated in temporary housing, hotels, inns or the houses of friends and relatives.
- Nova Lima (Vargem Grande Dam of the Vargem Grande Mine): 49 people allocated in hotels or the houses of friends and relatives.
- Ouro Preto (Forquilhas I, II and III Dams and Fábrica Mine Group): 4 people allocated in inns.
- Rio Preto (water dam of Mello Small Hydroelectric Power Plant (PCH in portuguese): 11 people in friends and relatives or rented houses.

Dams

All the initiatives adopted by Vale aim to repair the impacts on the people and communities affected, whenever possible restoring them to their situation prior to the break-up, through actions of compensation, rehabilitation and restitution.

These objectives will be broken down into indicators and targets that help us to evaluate the compliance of each department and to direct the necessary efforts to achieve them.

Environment actions

- 67 daily points for water and weekly sediment collection along the Ferro-Carvão Stream, the Paraopeba River and its nine tributary rivers, Retiro Baixo and Três Marias Reservoir, and the São Francisco River.
- Soil and tailings analysis.
- Installation of a hospital and wildlife shelters.
- Rescue of about 630 animals.
- About 240 professionals (veterinarians, biologists and technicians, among others) acting to rescue the local fauna.
- Implementation of solutions for rural supply in the riverine population and urban water supply.

Control and Management of Dams

With the failure of Dam I of the Córrego do Feijão Mine, procedures for monitoring the structural conditions of all dams were intensified, causing emergency actions to be taken for Dam VI, which was impacted by the tailings flow from Dam I, since its results demonstrated the anomalies predicted in the Level 1 alert. In parallel preventive efforts, the alert level of structures located in other municipalities was raised to three according to the Emergency Action Plan for Mining Dams (PAEBM in Portuguese), resulting in the evacuation of residents in the Self-rescue Zone (ZAS). In addition, simulations were performed, reinforcing siren-activated evacuations to the residents of the Secondary Security Zones (regions not defined as ZAS).

Altogether, four Vale structures in Minas Gerais had their alert level raised to three: the B3/B4 Dam of the Mar Azul Mine, in Macacos/Nova Lima (on February 16), the Sul Superior Dam of the Gongo Soco Mine in Barão de Cocais (on March 22), and the Forquilha I and Forquilha III Dams of the Fábrica Mine in Ouro Preto (on March 27).

The decision to raise the alert level to three of the PAEBM was taken after external safety audits concluded that the structures did not meet the new technical ordinance established by the National Mining Agency (Agência Nacional de Mineração or ANM) on February 15, 2019⁶, to certify their physical and hydraulic stability. In municipalities where preventive evacuation was necessary, operations are paralyzed as a safety measure until the soundness of their structures meets the new technical criteria.

In all Vale structures, the frequency of monitoring safety variables and stability inspections were intensified to strengthen preventive and corrective actions in a timely manner. We anticipated the implementation of the Geotechnical Monitoring Centre (CMG) at the Águas Claras Mine in Nova Lima, Minas Gerais, responsible for monitoring 24 hours, seven days a week all upstream and some conventional dam structures by means of big screens.

The table below shows the position of Vale's activities in relation to the dams, based on our monitoring:

6. Resolution No. 4, of February 15, 2019: Art. 6 - It is up to the designer, a professional legally qualified by the CONFEA / CREA system and with proven experience, to establish the minimum safety factors for the mining dams inserted in the PNSB, regardless of the method construction, based on ABNT NBR 13.028 / 2017, on international standards and on good engineering practices, with a value of less than 1.3 being prohibited for stability analyzes and studies of susceptibility to liquefaction, considering parameters of undrained resistance.

Vale dams in Minas Gerais



- Sul Superior (Gongo Soco Mine)
- B3/B4 (Mar Azul Mine)
- Forquilha I (Fábrica Mine)
- Forquilha III (Fábrica Mine)



- Forquilha II (Fábrica Mine)
- Grupo (Fábrica Mine)



- | | | |
|-------------------------------|--|---------------------------------|
| • Dam VI (Córrego do Feijão) | • Doutor (Timbopeba Mine) | • Taquaras (Mar Azul Mine) |
| • Sul Inferior (Gongo Soco) | • Marés II (Fábrica Mine) | • Maravilhas II (Pico Mine) |
| • Pontal (Cauê Mine) | • Capitão do Mato (Capitão do Mato Mine) | • Dam 5 (Águas Claras) |
| • Campo Grande (Alegria Mine) | • Dique B (Capitão do Mato Mine) | • Vargem Grande (Abóboras Mine) |



- Vargem Grande Complex
- Fábrica Complex
- Alegria, Timbopeba, Brucutu (parcial) Mines



- | | | |
|-------------------|-----------------------------|-------------|
| PAEBM | | PAE |
| • Barão de Cocais | • Honório Bicalho | • Rio Preto |
| • Santa Bárbara | • Rio Piracicaba | • Valença |
| • Itabirito | • São Gonçalo do Rio Abaixo | |

Level 1 - Declaration of commencement of emergency with the competent bodies, carrying out actions to restore normality and reinforced monitoring.

Level 2 - Intensification of the mitigation and monitoring actions carried out in Level 1, however, even if there is no finding of impending disruption, the Alert for evacuation of the population in the Self-rescue Zones is carried out in a preventive manner.

Level 3 - It is understood that the population located in the area where there would be no time for intervention by the Civil Defense organs (ZAS) is already evacuated. Communities that have a longer evacuation time are advised on how to proceed, in the event of a real rupture, by these same organs.

The severity of the event enabled a global discussion of the standards, references and criteria used to ensure the stability of dams and the revision of technical criteria and damping methodologies, notably the upstream structures. Given this scenario, we decided by accelerating the process of modification of our upstream dams. An example of this movement was the "International Technical Seminar on Reject Dams and the Future of Mining in Minas Gerais" promoted by the Brazilian Mining Institute (IBRAM) which was attended by some of the largest technical specialists in tailings dams in Brazil and abroad and by high-level authorities. Tom Butler, the executive director of the International Council on Mining and Metals (ICMM), said the agency will announce a minimum international standard for the management of mineral tailings dams by the end of 2019.

Dam Decommissioning

Following the actions taken after the failure of Dam I, we presented to the Brazilian authorities our plan to anticipate the decommissioning of all our dams damped by the upstream method. The plan aims to declassified the structures to reintegrate them into the environment, in compliance with new federal and state laws, in the specific case of Minas Gerais:

- Two dams will be completely disposed of within three years.
- Five dams will be dismantled, also within a three-year period, after their tailings are removed. In other words, a landfill will be made downstream

Dams

of the structures to eliminate the liabilities of upstream dams and, subsequently, the tailings will begin to be removed.

- Two dams will not be dismantled in the three-year period, but will have their structures reinforced to raise the safety factor. After this period, their tailings will be completely removed.

The provision for decommissioning⁷ these dams is R\$ 7.1 billion, from which are excluded amounts intended to compensate for environmental and moral damages, as well as amounts intended for decommissioning the dams of subsidiaries and affiliates and other Vale structures, with studies still in progress.

In addition to the abovementioned upstream structures, four other Vale structures did not have their Stability Condition Declarations (DCE, in Portuguese) renewed due to heightened safety factors established by the National Mining Agency (ANM in Portuguese), leading to the paralysis of these structures.

External experts reviewed all available information from the structures, adopting new, more conservative interpretations to determine safety factors. To guarantee the stability of these structures, we are working to conclude, based on the parameters adopted by these specialists and following the determinations mainly issued by ANM, whether Vale

will need to adopt any measure to increase the safety factors or to decommission these four structures. We also identified levees that were built by the upstream damping method, which are part of the structure of some downstream dams. Vale is evaluating whether these dikes should be decommissioned as well. At the current stage of study and analysis, it is not yet possible to estimate the additional potential provision related to them.

To ensure safety and agility in the modification of upstream dams, we temporarily halted the production of the units where the structures are located, including the pellet plants of Fábrica and Vargem Grande.

This process is aligned with the goal to ensure greater control and efficient dam management and the directive to reduce our dam portfolio. In January 2018, we had 150 dams and dikes designed to contain tailings, sediments and water in Ferrous operations. By the end of the year, that number had fallen to 133 structures registered at the National Mining Agency (ANM). This work was possible after evaluating the structures that could be decommissioned, through a process of modification, duly certified by the competent agencies. Dam I of the Córrego do Feijão Mine was among those that would be modified and has been inactive since 2016; in other words, it did not receive any tailings.

Investments and Management

GRI 103-1 | 103-2

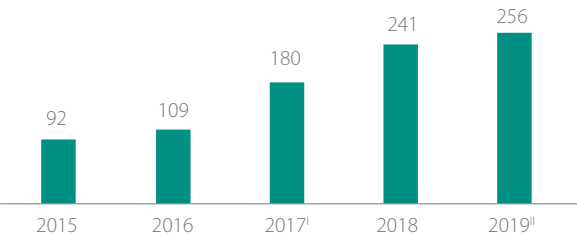
We are actively working to increase ore recovery in processing and reduce tailings generation, to implement new tailings disposal technologies and to improve operational controls and dam safety management. Our objective is to invest in initiatives aimed at sustainable mining, reduce environmental impacts, and work with society in a transparent way to mitigate even more the risks associated with our operations.

Since 2015, when the Fundão Dam collapsed in Mariana, Minas Gerais, the Ferrous business, responsible for managing iron ore dams in Brazil, increased investments in managing all their structures. In December 2015, the Geotechnical Risk Management area was created, with a specific focus on dams. In 2016, we applied R\$ 109 million to improve dam control and reinforce our commitment to continue mitigating the consequences of the Fundão Dam failure. In 2017, we invested approximately R\$ 180 million in maintenance services, monitoring, improvement works, audits, risk analysis, revisions of Action Plans for Emergencies of Mining Dams (PAEBM) and warning system implementation, among others.

7. Decommissioning is the process of definitive closure of the use of a dam, i.e., the structure no longer has the characteristics of a dam and is totally reincorporated to the landscape and the environment.

Dams

Investments in dam management
(In US\$ million)



I. The correct amount for the year 2017 is R\$ 180 million, as shown in the chart above, not US\$ 180 million as published in the 2017 Sustainability Report.

II. Budget approved by the Company in 2018.

In 2018, one of our goals was to increase the efficiency of the processes and keep the dam management in permanent alignment with updated international practices whose standards exceed national legal requirements. Therefore, we are working hard on new management plans, including upstream dam modification, with investments that should reach R\$ 256 million in 2019, according to the budget approved by the Company in 2018. This is an increase of about 180% in relation to the R\$ 92 million invested in 2015.

In 2018, we also supported Civil Defense in executing nine simulations in nine municipalities: seven in Minas Gerais, one in Pará and one in Mato Grosso do Sul, mapping out approximately 80% of the population for participation. In 2019, emergency simulations were carried out in eight municipalities: Barão de Cocais, Santa Bárbara, Itabirito, Honório Bicalho, Rio Piracicaba, São Gonçalo do Rio Abaixo, and Rio Preto e Valença.

In addition to the Decommissioning processes, we have invested in implementing new monitoring technologies such as radars, automated instruments and systems integration, the installation of sirens, Civil Defense external simulations, and studies to increase our knowledge of the structures and improve the safety process and projects to develop new tailings disposal technologies.

We work to ensure the physical stability and hydraulic safety of structures and to ensure compliance with legal requirements, inspections, monitoring and regular external audits. In 2018, all of our dams classified as high and medium Associated Potential Damage (DPA in Portuguese) have undergone periodic dam safety reviews, obtaining all Stability Condition Declarations (DCEs) of their respective structures.

In addition, the dams that fall under Law 12.334/2010 undergo external audits every six months through the regular safety inspection report in March and September 2018, with the respective DCE. In the September inspection, even the dams that do not fall under said legislation were also externally audited. In March 2019, we went through the external audit process and 18 of our dams did not issue the Stability Condition Statement. To guarantee the stability of the structures, given the new parameters and new provisions established by National Mining Agency (ANM in Portuguese) Resolution No. 04/2019, we will carry out complementary investigations to ensure that the model used by the external auditors is adequate and adopts actions to increase the safety factors of these structures.

To support the management processes of Ferrous dams, we have two IT systems. One of these is called Geotec and it is specific to the routine activities of our geotechnical structures, such as monitoring and maintenance; the Vale's Integrated Geotechnical Risk Management System (GRG) is where technical information, such as the Dam Safety Plan, are stored.

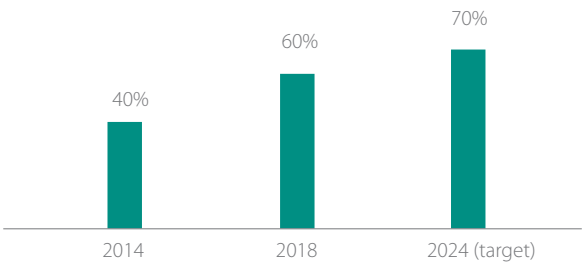
Innovation

In parallel to emergency work to mitigate impacts on communities and the environment, the Company's leaders and technicians have been mobilized to rethink, discuss and propose solutions for the future of the business. Among the immediate actions evaluated is the project of filtering and stacking tailings as an alternative solution to building new dams.

In the search for disposal alternatives to replace tailings dams, the Company had already been developing conceptual waste disposal projects using new technologies aim to reduce dependence on dams for our operations in the future.

Vale invested nearly R\$ 66 billion (US\$ 17.5 billion) over the last 10 years to install and expand the use of the dry process – or natural moisture – of the iron ore produced in its operations in Brazil. By not using water in the process, the dry method does not generate tailings and, therefore, does not use dams. Over the next five years, we will apply an estimated additional R\$ 11 billion (US\$ 2.5 billion) in similar processing facilities. Today, about 60% of Vale's production is dry and the goal is to reach 70% by 2024.

Dry process– Vale brazilian operation



Natural moisture processing is used in the mines of Carajás, Serra Leste and S11D Eliezer Batista Complex in Pará, and in several plants in Minas Gerais. In Pará, about 80% of the almost 200 million tons produced in 2018 were dry processed. The main Carajás plant, Plant 1, is in the process of converting to natural moisture: of the 17 plant processing lines, 11 are already dry and the remaining six wet lines will be converted by 2022.

Serra Leste's treatment plants in Curionópolis and S11D in Canaã dos Carajás also use no water in treating ore. In S11D, for example, a processing route using natural humidity reduces water consumption by 93% compared to conventional iron ore production. The water conserved equals the annual supply for a city of 400,000 inhabitants.

In Minas Gerais, dry processing was increased from 20% in 2016 to 32% in 2018. Today, this type of processing is present in several units, such as Brucutu, Alegria, Fábrica Nova, Fazendão, Abóboras, Mutuca, Pico and Fábrica. In the coming years, the objective is to use dry processing in other locations in Minas Gerais, such as the Apollo and Capanema projects, which are currently under environmental licensing.

Dry processing improves the quality of iron ore extracted from the mining front. In Carajás, as the iron content is already high (above 64% iron), the material is only crushed and sieved, to be classified by size (granulometry). In Minas Gerais, the average content is 40% iron, contained in rocks known as itabirites. To increase the content, the ore is concentrated by water processing. The tailings, composed basically of silica, are deposited with water in the dams. The high-grade ore resulting from the process can then be transformed into pellets at the pelletizing plants, increasing the added value of the product.

The dry mills in Minas Gerais depend on the availability of ore with higher levels – about 60% – still found in some mines in the state. To achieve the necessary quality and be incorporated into Vale's product portfolio, it is necessary to blend the ore with ores from the North System mines, carried out at Vale's distribution centres in China and Malaysia. The process allows Vale to offer an ore of excellent quality in line with our clients' needs.

Another solution that has been studied is the dry magnetic concentration of iron ore based on the innovative technology developed by New Steel, a company acquired by Vale at the end of 2018 – for more information, see [page 32](#).

Dry Stacking

The blending of the product with natural moisture does not eliminate the need for humid concentration of the low-grade itabirite used in pellet production. However, to reduce the use of dams, Vale plans to invest approximately R\$ 1.5 billion (US \$390 million)

to implement dry stacking technology in Minas Gerais between 2020 and 2023. The technique filters and reuses waste water and allows the latter to be stacked, thus reducing the use of dams. The goal is to dispose up to 70% of the waste in the coming years, but success depends on improving technology and external issues such as environmental licenses.

Today there is no dry stacking operation on the Vale production scale and in a region with high rainfall rates such as the Quadrilátero Ferrífero in Minas Gerais. The available dry stacking technology is used on a small scale in the world – up to 10,000 tons of tailings produced per day – in desert regions or those with low rainfall. In Minas Gerais, Vale's tailings production scale is, on average, 50,000 tons/day per unit. In 2011, the Company developed a pilot project on the Cianita stack in Vargem Grande, with an investment of R\$ 100 million. The studies were completed in 2018 and the technicians evaluated the geotechnical behaviour of the pile under rainy conditions. The next tests will be applied on an industrial scale at the Pico Mine in the municipality of Itabirito.

Dams

Mining Waste

MM3

The mineral activity from mining and processing generates waste classified as waste rock or tailings. These wastes are currently disposed of in structures called piles and dams, in addition to trenches, which need special care to ensure safety.

In Brazil, the Ferrous area ended 2018 with 133 dams and dikes intended to contain tailings, sediment and water, registered at the ANM.

In Vale's Basic Metals operations, 356 dam structures, including 56 tailings dams and 14 inactive dams, are being managed under a specific model of governance. Most of these tailings dam (53) are located in Canada, where

public performance is reported according to the Canada Mining Association's Tailing Dams Management Guideline.

In Base Metals operations in the South Atlantic, in Brazil, 16 hydraulic structures are administered. Of this total, two are large tailings dams, in the operations of the Sossego and Salobo Mines in Pará.

All structures are subject to regular stability inspections as well as a rigorous audit program by internal and external consultants and specialists. At inactive Basic Metals dams, there are 12 tailings structures associated with old operations in Ontario, Canada and two inactive structures at the Igarapé Bahia Mine in Pará, Brazil.

Incident Prevention and Emergency Response

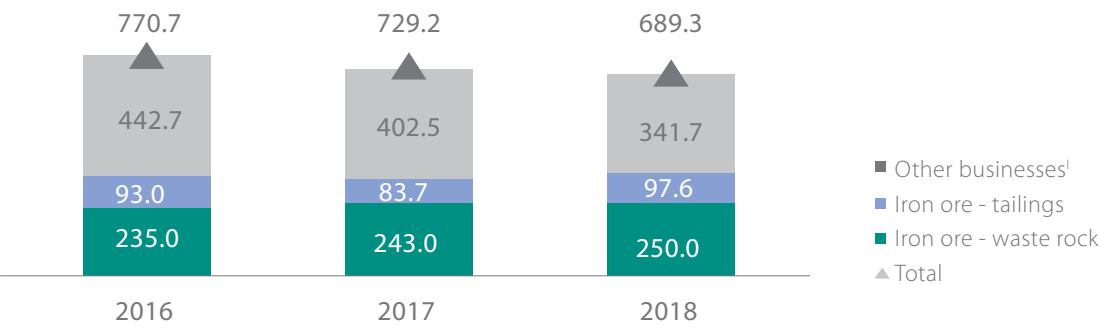
GRI 102-11 | 102-15 | 103-1 | 103-2

People's safety is the top priority in all our activities, and, to achieve this, technical policies and standards are developed and implemented at our operations to establish minimum procedures that keep operational risks at tolerable levels. Our efforts always aim to prevent fatalities and changed lives and to minimize impacts on communities and the environment in which we operate.

The Vale Integrated Management System (IMS or SGI in Portuguese), aligned with the principles of the International Council of Mining and Metals (ICMM), sets procedures to identify and evaluate hazards and risks, and to define preventive controls to minimize risks and mitigate actions within global emergency management guidelines. In addition to supporting the preparation of local emergency plans, this guideline establishes minimum technical requirements for equipment and materials, as well as criteria for executing drills that will potentially impact stakeholders, aligned with the Awareness and Preparedness for Emergencies at Local Level (APELL), part of the United Nations Environment Program (UNEP). In addition, the emergency response plans consider joint actions in response to large-scale incidents, mapping relevant actors (Civil Defense, Firefighters, Hospitals, Environmental Agencies), whose resources are shared and periodically tested. Also within

Total of mining and metallurgical waste

(In millions of tons)



¹ Other businesses include tailings and waste rock from nickel, potassium, manganese, coal, copper, slag (manganese alloy) and fertilizer by products for 2016 and 2017.

Dams

the scope of the IMS are Critical Activity Requirements (RACs in Portuguese), which define the critical controls capable of preventing and mitigating risks arising from activities that have been statistically proven to be precursors of fatalities or incidents that change lives.

To support the safety of communities and strengthen our emergency response, Vale signed an agreement with the Government of the State of Minas Gerais, through which R\$ 5 million was donated to be invested in Civil Defense equipment, R\$ 4 million of which is designated for the Military Police.

Over the last few years, several investments were made in other community safety initiatives. One of the examples began in August 2018 – the construction of a new tailings pipeline connecting the pumping station CB3 to Arm 5 of the Pontal Dam. This new layout will keep the Itabira community out of the impact zone in the event of an incident.

The new pipeline, which passes through the Pontal dam, is more than 90% complete. Construction was scheduled to be complete by August 2019; however, the judicial embargo occurred in February of that same year and interrupted its progress. Construction will resume as soon as the operation of the Pontal Dam is authorized by the appropriate agent.

In parallel, crisis management procedures define the criteria for treating, minimizing and containing the impacts arising from major incidents, with clearly defined roles, responsibilities and autonomy of the various internal actors. This routine goes beyond legal compliance; following the Brumadinho event, we responded with temporary shelters, humanitarian

assistance and efforts to re-establish essential services such as provision of drinking water.

To manage operational risks, we follow the concept of Defense Lines (*see more in Vale, Business Risk Management, p. 45*) and, in the case of Brazil dams, we have the Emergency Action Plan for Mining (PAEBM), as established by Ordinance 70.389/17 – DNPM. This main guideline for actions related to dam emergencies provides information and establishes a set of procedures to identify and classify situations that could endanger the integrity of the dam. Through this framework, immediate actions are defined to mitigate the impacts of emergencies, including the flow of communication between and notifications to the various actors involved. The PAEBM is shared with the Civil Defense and local public powers to provide technical information pertinent to the emergency. In case of an incident, operations are co-ordinated and centralized by the Civil Defense, according to Brazilian legal regulations.

In 2018, the Emergency Action Plan for Mining were reviewed and duly filed with Civil Defenses and City Halls. In all, 71 dams/dikes in the Ferrous area were attended by PAEBM, revised in 2018. As part of this update, new registrations with the communities of ZAS were done, and feedback was provided by communities in meetings with community leaders at city halls and other related agencies.

In Base Metals operations in Brazil, in addition to PAEBM, there are the General Guidelines for the Preparation and Management of the Emergency Response Plan (ERP), which complements emergency actions and provides specific procedures for crisis

management. For operations outside Brazil, due to specific legal requirements, other items are considered, while preserving the fundamental premises of performing simulations, preparing a communication flowchart, and having the appropriate materials, equipment and criteria for defining an emergency.

Dams

New Global Structure for Safety of Operations

After the failure of Dam I of the Córrego do Feijão Mine, we implemented a global structure of Asset Integrity and Geotechnical Risks (dams, dikes and waste rock dumps) and Operational Risks. This structure is responsible for ensuring the best management practices and specialized technical knowledge in the most critical disciplines, defining standards and technical norms to be implemented by operations.

This new structure will become part of a new executive board called Safety and Operational Excellence, whose main responsibility will be to act as a technical and regulatory resource, and to act independently in matters of Safety, Operational Risk, Asset Management and Operational Excellence, ensuring that the Company's operations are executed only after an

analysis that ensures risk is quantified and within defined limits of acceptability. This board will allow the Company to further reinforce the concept of lines of defense, especially at its second level.

The evolution of the risk management model incorporates more robustly the concept of process safety, prioritizing the integrity of assets, and applying good design principles and engineering, operation and maintenance practices, all with the primary objective of avoiding high-magnitude incidents resulting from Vale operations.

Details of the responsibilities of the Defense Lines are described in the Business Risk Management chapter on [page 45](#).

The following describes the main roles and responsibilities of each line of defense:



Renova Foundation

Renova Foundation (Fundação Renova) was created to manage and execute programs to repair and compensate areas and communities affected by the rupture of the Fundão Dam, owned by Samarco Mineração S.A., in Mariana, Minas Gerais, on November 5, 2015. Vale, together with BHP Billiton and Samarco, sponsors the Foundation, whose commitment is to implement the actions set forth in the Term of Transaction of Adjustment of Conduct (TTAC in Portuguese) signed between Samarco and its shareholders (Vale and BHP Billiton Brasil), the states of Minas Gerais and Espírito Santo and other Brazilian governmental authorities. In 2018, Renova was formally recognized as executor of the TTAC by the Public Defender's Offices and Prosecutor's Offices of the Union and the two states impacted by signing, on June 25, the TAC Governance legal term. The document principally provides for popular participation in the decision-making structures of the programs, besides the initial formation of 19 local commissions of affected locations, involving the 39 municipalities impacted.

The Foundation works through 42 programs contemplated by the TTAC to guarantee access to information, promote an open and constant dialogue with its stakeholders and to stimulate social participation and engagement of populations affected by dam rupture. In 2018, 1,114 meetings were held, with a total of 28,589 participants. Since the failure of the structure, there have been 3,322 dialogue forums, which gathered 90,137 participants.

The programs are distributed in three areas: Land and Water, People and Communities; and Reconstruction and Infrastructure. Below are some examples of the programs considered to be a priority, according to their size and scope. To know more about the other programs and their main results and achievements, visit the Renova Foundation website (fundacaorenova.org).

The first step to identify and confirm impact is Program 1 – Registration, which serves as the basis for the other Renova Foundation programs and is constantly improving. By the end of 2018, there were 28,000 active family registers, which includes about 92,000 people and 32,000 properties. Until 2018, registrations were made through a detailed questionnaire in which the affected party indicated the impacts suffered. By 2019, a digital registration platform will be adopted, which should simplify and streamline the process.

Program number 2 – the Mediated Indemnity Program (PIM in Portuguese) is the main instrument of the Renova Foundation aimed at pecuniary reparation for impacts to individuals, micro businesses and small businesses affected. In 2018, more than 323,000 indemnifications were paid for Water Damage (for individuals affected by shortages due to the dam failure), totaling R\$ 262 million. Another 8,000 indemnifications were paid for General Damage (related to loss of assets or income, totaling R\$ 338 million).

The resettlement is related to Program 8 – Reconstruction of Villages. About 432 families will be assisted in three collective resettlements (Bento

Rodrigues, Paracatu de Baixo and Gesteira). It will be a challenge to replace houses and public goods and also to bring back these communities' ways of life. In Bento Rodrigues, the first community affected by the tailings, the process is more advanced. Permits and permissions have been granted, land chosen, urban design approved and registered, construction sites completed, vegetable suppression carried out, and earthworks and drainage put into motion.

The Emergency Financial Aid (AFE in Portuguese) is Program 21. It aims to attend to those who have lost income in their economic and productive activities. As of December 2018, there were 11,576 active cards, benefiting more than 26,700 people – about 11,500 holders and 15,100 dependents. The value corresponds to a minimum wage, plus 20% per dependent and the value of a basic basket (Dieese reference). In total, AFE payments have injected more than R\$ 800 million into the local economy.

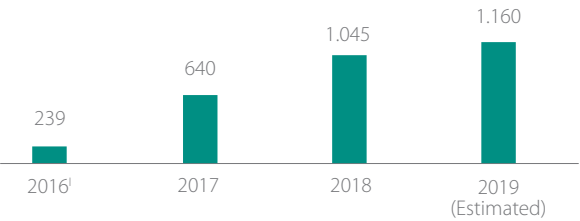
The Foundation's work happens through programs fully funded by its funding entities. Since November 2015, approximately R\$ 5.3 billion has been invested in the programs agreed in the Term of Transaction and Adjustment of Conduct (TTAC), of which R\$ 4.8 billion has been devoted to reparatory actions (including R\$ 1.3 billion in indemnifications and R\$ 420 million in compensatory actions), which represents more than 26,700 people attended. Specific to 2018, the amount invested in these actions amounts to R\$ 2.1 billion, which represents an increase of about 20% compared to 2017 (R\$ 1.7 billion).

Dams

Samarco transferred most of its reparation and compensation programs to the Renova Foundation upon its creation. Therefore, the contributions of the maintainers, Vale and BHP, are now made directly to Renova Foundation. The amounts contributed by Vale are shown in the following chart.

Vale's investment in Renova Foundation

(in R\$ million)



¹ Values from August, when the Foundation began its activities, until December.

Sustainable Future

The rupture of Dam I of the Córrego do Feijão Mine has put us in an extremely challenging situation. In addition to supporting those affected and mitigating the impacts on society and the environment, Vale must reinforce its commitments to improve its operations and seek to become a benchmark in sustainability.

This process will be long, but despite much that needs to be done, Vale has not measured its efforts over the last few years to establish itself as a partner to the populations in the territories in which it operates.

Security, People and Repair are Vale's three priorities. The first is security, because our Company is made of people and connects with people: people from communities close to our operations, who must experience security and tranquility as our neighbours. We also prioritize care for our assets, which is related to the safety of people and our processes.

In addition, we will spare no effort to repair quickly and fairly the damages we cause to families, to the infrastructure of communities and to the environment.

In the coming months, as well as in the next Sustainability Reports, we will continue to share with stakeholders our actions taken and results achieved in relation to these priorities, with transparency and openness to inspire dialogue.

We will spare no effort to repair quickly and fairly the damages we cause to families, to the infrastructure of communities and to the environment.



Vale

Institutional
information and
material aspects

Organization Profile

GRI 102-1 | 102-2 | 102-3 | 102-4 | 102-5 | 102-6 | 102-7 | 102-8 | 102-16

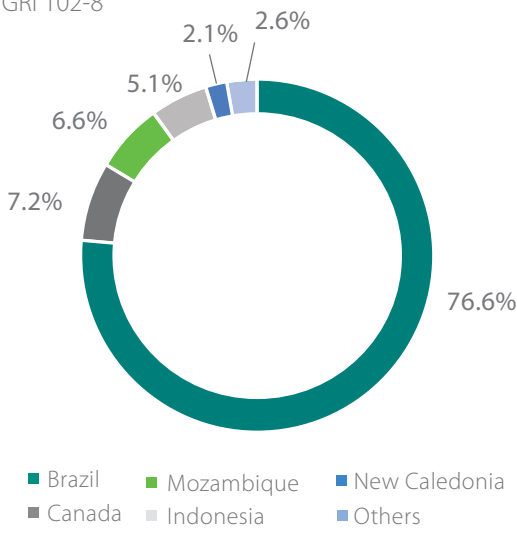
Vale S.A. is a global leader in iron ore, and iron ore and nickel pellets. We operate in 27 countries on five continents producing manganese, iron-alloys, copper, platinum group metals (PGMs), gold, silver, cobalt, and metallurgical and thermal coal. The infrastructure to operate these various services includes mineral exploration facilities, administrative offices and operational units connected by modern integrated logistics systems, which include railroads, maritime terminals and ports.

To ensure transport of the minerals produced, from the extraction of minerals to the delivery of finished products to customers, we have distribution centers (DCs) and carry out maritime chartering activities. Through our affiliates, joint ventures or direct participation, we also have participations in relevant assets in the energy, steel and bauxite segments. We produce raw materials to serve a variety of industries worldwide, such as steel and automotive, among others.

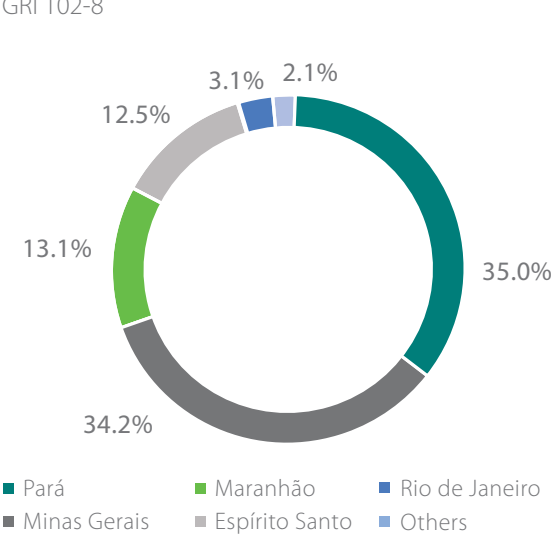
We are incorporated as a publicly-traded private company; maintain corporate headquarters in the city of Rio de Janeiro, Brazil; and trade in the New Market of the São Paulo Stock Exchange (B3). We are also present in the financial markets of New York

(NYSE), Paris (Euronext) and Madrid (Madrid Stock Exchange). In 2018, we ended the year with 124.9 thousand employees¹ (70.3 thousand are our own and 54.6 thousand are employees of third-party suppliers), of which 95.6 thousand were allocated in Brazil.

Distribution of own and third-party employees by country
GRI 102-8

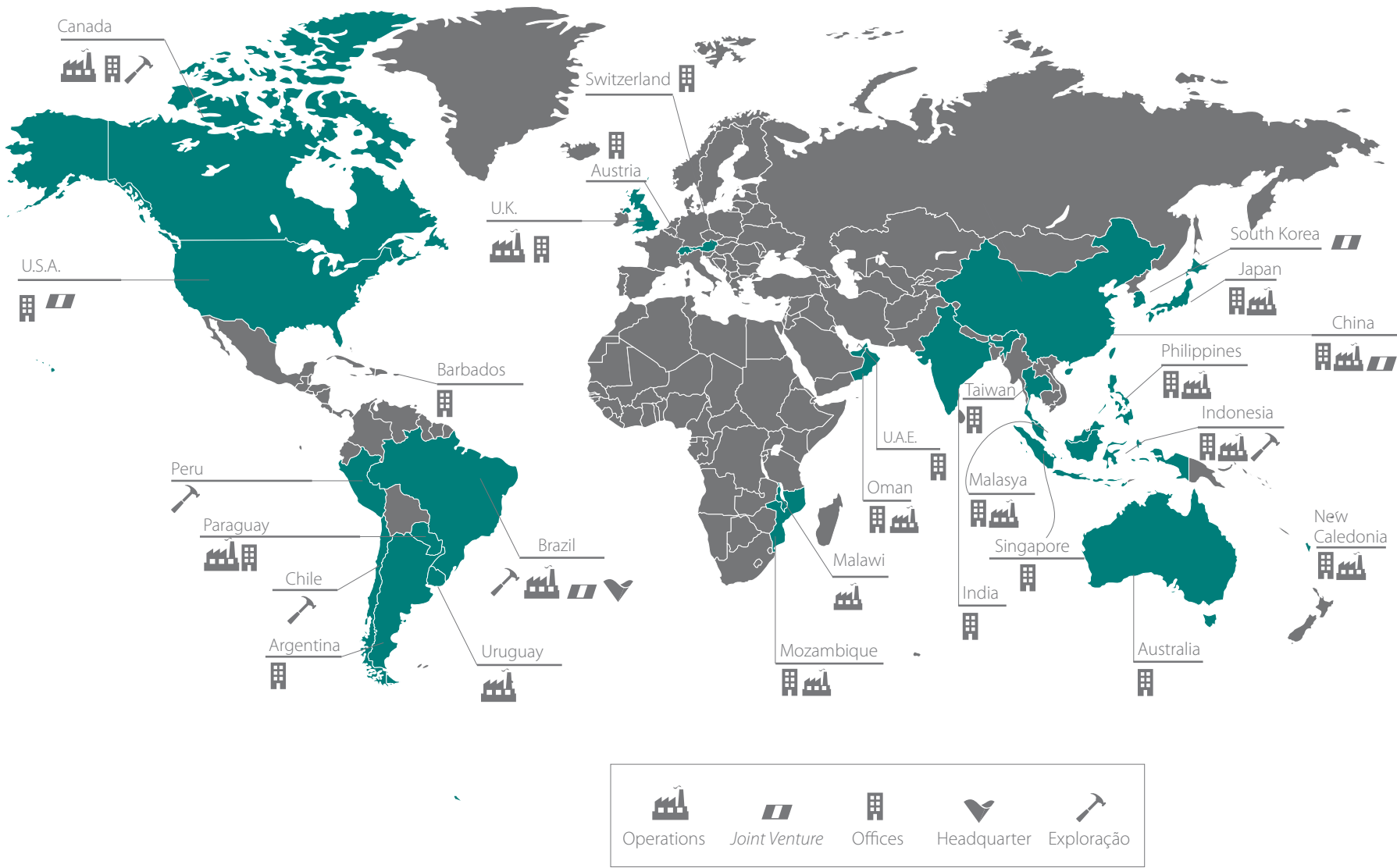


Distribution of own and third-party employees by Brazilian state
GRI 102-8



1. In 2018, Biopalma and Tecnored companies became part of the global consolidation.

Global operations



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.

Strategic Pillars		
	Safety and Operational Excellence	To transform the way we operate in regards to three interconnected themes: (i) safety and risk management, (ii) assets management, and (iii) organization, processes and culture (VPS ¹)
	New pact with society	New pact with society - To positively impact society, going beyond taxes, social projects and reparation in Brumadinho, becoming a development enabler in the areas we operate and fostering a safer and more sustainable Brazilian mining industry
	Basic Metals Transformation	Basic Metals Transformation – To keep on track the transformation of the Base Metals business unit, applying best practices throughout all its operations
	Discipline in Capital Allocation	Discipline in Capital Allocation - To keep focus on value creation and safety of assets, investing in the sustainability of productions and in the protection/increase of margins
	Maximize "flight to quality" in Iron Ore	Maximize "flight to quality" in Iron Ore – To leverage our strengths in Vale's world-class reserves, assets and logistics to maximize the value in our premium portfolio of products

 from 2019 onwards
I. Vale Production System

Vale and Governance

GRI 102-18 | 102-19 | 102-26

Our model of governance aims to establish the principles of clearly-defined roles, transparency and stability that guide our actions. They help us to align with market practices and public sector regulations and legislation, the Sustainability Policy, the Climate Change Mitigation and Adaptation Policy, the Anti-Corruption Policy, the Human Rights Policy, Vale's Code of Ethical Conduct, and others. All of these documents are available on our website www.vale.com

The general guidelines and policies that guide our business are established by the Board of Directors, which monitors the implementation of these initiatives through reports from the Executive Directors. The Board receives advice from technical and consulting committees , as shown next.

I. Eduardo Bartolomeo assumed the position of interim director-president of Vale on March 1, 2019. To date, Fabio Schvartsman has held the position. Subsequently, Eduardo Bartolomeo was confirmed as chief executive officer on April 29, 2019.

II Marcello Spinelli, who had been acting since 2010 as CEO of VLI Logística assumed on May 27, 2019 the position of Executive Director of Ferrous and Coal, temporarily occupied by Cláudio Alves from March 1 and until this date by Gerd Peter Poppinga.

III Mark Travers, former Legal Director of Institutional Relations and Sustainability of Basic Metals, temporarily assumed the position of Executive Director of Base Metals on March 1, 2019.

IV. Carlos Medeiros assumed on June 5, 2019 the newly created Safety and Operational Excellence Department.



Board of Directors

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

The Board of Directors deliberates on strategic guidelines and strategic plans proposed by the Executive Board, monitors and evaluates the Company's economic and financial performance, deliberates on its corporate and financial risk policies, and elects and evaluates the Executive Officers and sets their duties, compensation and goals, among other duties. In all, the Board had 12 members in 2018, two of whom were independent and one represented Vale employees. Of this total, three were women. The members of the Board shall meet monthly and may be convened for extraordinary meetings by its chair or, in the chair's absence, by the vice-chair or by two joint councilors. In 2018, 16 meetings were held.

As of April 30, 2019, the Board now has 13 members, three of whom are independent and one represents Vale employees. Of this total, three are women. For more information, visit [Corporate Governance section](#) at www.vale.com

Vale currently does not have yet a nomination policy approved by its Board of Directors regarding the appointment of members of the highest governance body and its committees. However, the appointment of Board members follows criteria for qualification and technical experience, as well as legal and reputational aspects related to best corporate governance practices. This allows the Company to benefit from a plurality of arguments and a decision-making process with quality and safety.

In 2018, the Board of Directors structured and implemented the process of evaluating the performance of its Board. To this end, it hired specialized international consultants with experience in the subject to develop the procedures for evaluating the Board of Directors and Advisory Committees, with the support of the People Committee. The functioning of each body is diagnosed; the results are used for comparative analysis of the composition and functioning in relation to organizations with a high level of corporate governance in Brazil and abroad. The evaluation was completed by the end of 2018.

Fiscal Council

The Fiscal Council is responsible for overseeing management activities and financial statements and reports directly to shareholders. Vale has established a permanent Fiscal Council that may have three to five members. Holders of the special class preferred shares, or golden shares, may elect and remove a tax advisor and his or her respective alternate.

Advisement Committees

GRI 102-21 | 102-32 | 102-33

Advisement Committees advise the Board of Directors during the decision-making process. They are currently divided into five areas: People and Governance; Compliance and Risk; Financial; Audit (not installed); and Sustainability. Each committee advises the Company on all relevant matters related to its subject. The Sustainability Committee underwent a restructuring process in February 2018 to strengthen the search for License to Operate, as well as to strengthen our relationship with society. Committees also direct the Company's actions to conduct ongoing dialogues with its stakeholders, establishing a relationship of mutual trust and partnership, enabling conflict remediation, risk mitigation, and advancement in positive community agendas.

In the context of the failure of Dam I of the Córrego do Feijão Mine in Brumadinho, Minas Gerais, the Board of Directors, with the support of the international consulting firm Korn Ferry, has created three Independent Advisory Committees, as follows: the Extraordinary Independent Consulting Committee for Investigation (CIAEA), Extraordinary Independent Consulting Committee for Support and Recovery (CIAEAR), Extraordinary Independent Consulting Committee for Dam Safety (CIAESB) (*read more information on page 17*). Any critical concerns or demands can be quickly directed to the highest governance bodies to anticipate and prevent risk situations.

Executive Office

GRI 102-20

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

Due to the failure of Dam I of the Córrego do Feijão Mine in Brumadinho, Minas Gerais, on January 25, the Board of Directors received from the Federal Public Prosecutor's Office, the Public Prosecutor's Office of the State of Minas Gerais, the Federal Police and the Civil Police of the State of Minas Gerais Recommendation nº. 11/2019, which contained considerations and recommendations on removing some executives and employees at various organizational levels of Vale.

During a series of discussions, the Board received requests for temporary removal from office from executives Fabio Schvartsman (CEO), Gerd Peter Poppinga (Executive Director of Ferrous and Coal), Lucio Flavio Gallon Cavalli (Director of Planning and Development of Ferrous and Coal) and Silmar Magalhães Silva (Director of Operations of the Southeast Corridor), which were immediately accepted.

The Board of Directors then acted on the previously discussed interim plan: it appointed Eduardo de Salles Bartolomeo (then Executive Director of Base Metals) as interim Chief Executive Officer of Vale from March 1 until April 29, when he was confirmed as Chief Executive Officer². Claudio de Oliveira Alves (then

Director of Pelletizing and Manganese) as Executive Director of Ferrous and Coal and Mark Travers (then Legal Director, of Institutional Relations and Sustainability of Base Metals) temporarily occupies the position of Executive Director of Base Metals.

The current management team is formed by a CEO and six executive directors: Finance and Investor Relations, Ferrous Minerals and Coal, Sustainability and Institutional Relations, Base Metals, Business Support and Safety and Operational Excellence³. In addition, there are four non-statutory directors who report directly to the CEO: People Director; Strategy, Exploration, New Business and Technology Director; Reparation and Development Special Director; and the General Advisor.

Vale and Sustainability

GRI 103-2

We are constantly evolving, working to transform natural resources into prosperity and sustainable development. This goal is achieved when our business, and in particular our mining activities, generate value for shareholders and other

2. Fabio Schvartsman remains executive director statutory, but in a temporary removal situation.

3. Created in May 2019, the mission of the Safety and Operational Excellence Executive Board is to ensure the acceleration of the decommissioning plan for all upstream dams, drive Vale Production System, reinforcing the company's operational excellence and to coordinate the Operational Risk Management and Asset Integrity independently.

stakeholders, while supporting social empowerment, the development of regional economic vocations, and environmental conservation and recovery through conscious and responsible management, voluntary business actions and partnerships with various levels of government, public institutions, other companies and civil society.

Among our strategies in this area is the performance of the Executive Board for Sustainability and Institutional Relations. One of its priorities is to strengthen the search for Social License to Operate and Vale's relationship with society. Our actions are focused on improving our sustainable performance, prioritizing safe operations and broadening our dialogue with communities and other stakeholders.

Policies and Procedures

In our Sustainability Policy, a document reviewed in 2016 to establish guidelines and principles for the theme, Vale's activities are divided into three dimensions: Sustainable Operator, related to the responsible performance throughout the life cycle of our projects; Catalyst of Local Development, focused on collaboration for the socioeconomic and environmental development of the territories where we have activities and establishing intersectoral partnerships to leave a positive legacy; and Global Sustainability Agent, which contributes to dialogue and the search for solutions to sustainable development challenges shared by various regions and countries in which we are present.

Other important references to our strategy and sustainable performance are The Code of Ethical Conduct and the Policies for Delegation of Authority, Human Rights, Mitigation and Adaptation to Climate Change, Anti-Corruption (including the Anti-Corruption Manual), and Socio-Environmental Investments.

Actions

Throughout 2018, Vale continued to operate in the area of Sustainability through initiatives to mitigate and compensate the impacts of its activities, and by developing environmental actions and creating value for communities. In this context, certain activities stand out, such as recovering degraded areas, conserving green areas, conducting research on the ecosystems in which we operate and making social investments in the communities neighbouring our operations. In 2018, we contributed US\$ 576.4 million in social-environmental expenditures; 34% of this amount was paid on a voluntary basis.

Environmental resources were mainly applied to managing atmospheric emissions, water resources and waste, and 33% of these resources were contributed on a voluntary basis. Social resources were mostly used to invest in urban infrastructure and mobility, traditional communities and Indigenous peoples, and generating work and income; 39% of these contributions were voluntary.

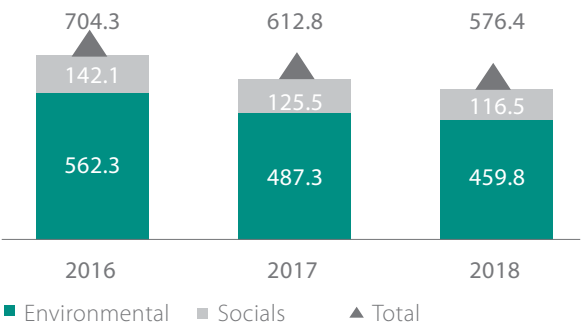
Global Sustainability Goals

1302-2 | 103-3

In 2018, Vale updated its sustainability goals for the coming years, in line with the Sustainable Development Goals (ODS in Portuguese) of the United Nations 2030 Agenda. Our environmental goals are global and prioritize three themes: Greenhouse Gas emissions (GHGs), recovery of degraded areas and water resources. Our social goals prioritize local income generation, basic health and education in Brazil.

Socio-environmental expenditures

(in US\$ milhões)



In 2018, we contributed US\$576.4 million in social-environmental expenditures; 34% of this amount was paid on a voluntary basis. Environmental resources were mainly applied to managing atmospheric emissions, water resources and waste. Social resources were mostly used to invest in urban infrastructure and mobility, traditional communities and Indigenous peoples, and generating work and income.

Vale's Socio-environmental Goals

Target	Previous Target	New Target (2030 deadline)
Carbon reduction	Reduction of GHG emission intensity by 5% by 2020 (base year 2012)	Emission intensity (tCO ₂ /t equivalent iron ore) reduced by 16% in 2030 (base year 2017)
Recovery of Degraded Areas (RDA)	Recovery of 2,000 hectares in 2018	Recovery of 100,000 hectares
Water	-	Reduction of 10% in new water collection (base year 2017)
Energy	-	100% self-generation of clean energy in Brazil
Income generation	-	Doubling the average income of 12,000 entrepreneurs
Basic Health	-	To benefit 8,400 families with the supply of drinkable water and/or dry "compostable" toilet, implying the reduction incidence of waterborne diseases and infant mortality.
Basic education	-	Enable full literacy for children up to eight years of age in 23 municipalities of the [spell out in full before abbreviating (EFC)

Sustainability KPIs

103-3

In addition to setting environmental and social goals, we seek to align the sustainability performance of various business areas' teams to their variable compensation, while also taking into account economic and operational factors.

In the year 2018, energy efficiency indicators were incorporated into the new greenhouse gas (GHG) reduction indicators in the environmental dimension.

In addition to encouraging 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 partially achieved the proposed objective to make adjustments to comply with the program in the next year.

All goals are negotiated, defined, registered and monitored in the CSP system – Career, Succession and Performance. The KPIs are part of the variable remuneration of all Vale employees and impact all hierarchical levels, including the CEO.

Business area	Indicators	Size	Evaluation Metrics	2016 Results	2017 Results	2018 Results
Iron Ore, Pellets and Manganese	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned			
	Water Resources	Environment	Volume/Production			
	Hazardous Waste Generation	Environment	Mass/Production			
	Atmospheric Emissions	Environment	Mass/Time; No. of Overruns of Established Standards			
	Energy Consumption (Fuels and Electricity)	Energy	Consumption/Production			- ¹
	Significant Social Initiatives	Social	Completed Actions			
	GHG Emissions	Environment	Mass/Production	-	-	
Base Metals	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned			
	Waste Management	Environment	Generation/Production			
	Water Resources	Environment	Volume/Production			
	Environmental Incidents	Environment	Total Significant Environmental Incidents		-	-
	Atmospheric Emissions	Environment	Mass/Production; Overruns of Established Standards			
	Energy Consumption (Fuels and Electricity)	Energy	Consumption/Production			- ¹
	Significant Social Initiatives	Social	Completed Actions			
	GHG Emissions	Environment	Mass/Production	-	-	
Coal	GHG Emissions	Environment	Mass/Production		-	-
	Waste Management	Environment	Mass		-	-
	Atmospheric Emissions	Environment	Mass/Production; Overruns of Established Standards	-		
	Water Resources	Environment	Volume/Production	-		-
	Energy Consumption (Fuels and Electricity)	Energy	Consumption/Production			- ¹
	Significant Social Initiatives	Social	Completed Actions			

Business area	Indicators	Size	Evaluation Metrics	2016 Results	2017 Results	2018 Results
Fertilizers	Hazardous Waste Generation	Environment	Mass	●	●	- II
	Waste Generation	Environment	Mass/Production	●	●	- II
	Waste Disposal	Environment	Mass	●	●	- II
	Water Resources	Environment	Volume/Production	●	●	- II
	Energy Consumption (Fuels and Electricity)	Energy	Consume/Production	●	●	- II
	Significant Social Initiatives	Social	Completed Actions	●	●	- II
Logistics	Water Resources	Environment	Volume/Production	●	●	●
	Atmospheric Emissions	Environment	Mass/Production; Overruns of Established Standards	●	●	●
	Hazardous Waste Generation	Environment	Mass	●	●	●
	Energy Consumption (Fuels and Electricity)	Energy	Consume/Production	●	●	- I
	Significant Social Initiatives	Social	Completed Actions	●	●	●
	GHG Emissions	Environment	Mass/Production	-	-	●
Supplies	Waste Disposal	Environment	%; Mass; Mass/Production	●	●	●
Mineral Survey	Recovery of Degraded Areas (RDA)	Environment	Adherence in% to the planned	-	●	●
	Significant Social Initiatives	Social	Completed Actions	-	-	●

- Challenge overcome
- Goal partially achieved
- Goal achieved
- Goals not achieved

I Indicators treated in conjunction with GHG emission indicators
II Assets sold at the beginning of 2018

Vale and its Stakeholders

GRI 102-42 | 102-43 | 102-44

We understand that establishing respectful relationships centred on dialogue with Vale's stakeholders is fundamental to our ability to transform natural resources into prosperity. Therefore, we use a variety of resources and means to engage employees, suppliers, communities, investors, governments, academics, civil society organizations, national and international organizations and companies – from our and other business sectors. We seek that our relations with business partners are guided by the same practices and respect for human rights that we adopt.

Stakeholder engagement is guided by internal policies and procedures and is structured on the permanent and transparent dialogue in partnership relationships based on mutual trust. We maintain permanent dialogue forums for community participation in decision-making related to managing impacts as well as to executing projects and actions for the socio-environmental development of the territory, enabling conflict remediation, risk mitigation and advancing positive agendas for the community.

Mechanisms for Dialogue and Listening

GRI 103-2 | 103-3

To meet the demands for information and facilitate claims and complaints related to our activities, we provide structured channels, such as the Ombudsman, Contact Us and 0800 telephone lines. Relationship teams communicate directly with their publics, allowing greater speed and efficiency in the processes of mitigating and resolving potential conflicts. Vale has its own system for registering and handling demands, complaints and grievances – the Stakeholders, Demands and Issues System (SDI), which registered 5,563 community demands in Brazil in 2018. Of these, 2,650 were related to impact management, mainly issues of access and irregular

crossing, infrastructure and urban mobility; and 891 were related to social investments, such as requests for social projects support. Of all registrations, 4,871 have been processed and 692 are in progress or were not Vale's responsibility.

Vale values the respect, non-obstruction or retaliation to the users of the company's dialogue and listening mechanisms, whether they are employees or society in general.

Concerning situations of potential human rights violations, there is a specific normative that facilitates, through a clear and predetermined flow, the collection and investigation of evidence.

Stakeholders, Demands and Issues (SDI) system - 2018 records

Total demands: 5,563

Impact Management: 2,650

Social investments: 891

Treated: 4,871

In Progress: 692

Stakeholder engagement is guided by internal policies and procedures and is structured on the permanent and transparent dialogue

Channels	Public audiences (stakeholders)						
	Stakeholders, 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	●	●	●	●	●	●	●
www.vale.com Portal	●	●	●	●	●	●	●
Visits to operations	●	●		●	●	●	●
E-mail: vale.ri@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	●						●
Satisfaction surveys		●		●			
Contact us		●	●	●	●		
Electronics newsletters of communication with employees			●				
Intranet			●				
Global Employee Survey ^I			●				
Communication Committee			●				
Social Networks			●	●	●		
Structured meetings and collaboration workshops		●	●	●	●	●	●
Vale Supplier Portal (Nimbi platform) ^{II}				●		●	●
Vale Procurement Global Services ^{III}				●			
Conference call	●	●	●	●		●	●
Telephones and e-mails		●	●	●	●	●	●
Supplier area on www.vale.com				●			
Committees for communication inter-change					●		
Socio-economic diagnoses					●	●	
Public hearings				●	●	●	

Channels	Public audiences (stakeholders)						
	Stakeholders, debenture holders and investors	Clients	Employees	Suppliers	Communities	Government & civil society	Press
Social dialogue process					●		
Leadership Meeting Program					●	●	
External disclosures - 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 Interview			●	●		●	●
Pressroom	●						●
Webcast				●	●		●
Visits to the newsroom							●
Conversation circles			●	●	●		●

I. Quantitative study conducted by the Human Resources area for Vale employees.

II. The Vale Supplier Portal (Nimbi platform) is a virtual space for the sale of products and services that provides the interface between the company and its suppliers, increasing the integration of purchasing processes, from quotation to payment.

III. Vale 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 for services.

Management of Business Risks

GRI 102-11 | 102-34

In our operations and in project feasibility analyses, we seek to identify and assess risks associated to the environmental, social, reputational, financial, human rights and health and safety dimensions of our operations, to characterize the causes of these risks, and establish necessary preventive and mitigating actions to maintain the risks at tolerable levels. The risk identification and assessment process involves all of Vale's activities, products and services and its consequences both internally and externally.

As one of the main risk mitigation mechanisms of our operations, we have adopted the concept of Defense Lines:

First Line of Defense:

- Is formed by the risk owners and process executors of the business, project, support and administrative areas. They are directly responsible for identifying, evaluating, managing, monitoring and managing their risk events in an integrated manner. They must maintain the risks within the defined tolerance levels, implement and enforce effective prevention and mitigation controls, ensure adequate definition and execution of action plans, and establish corrective actions to continuously improve risk management.
- Should periodically assess the applicability of Integrated Risk Map risks to the activities and geographies under its responsibility.

- Should anticipate to the Board of Executive Directors and the Board of Directors the potential impacts that are imminent to occur, following the current governance to address the treatment of the risks mapped, and present the risks under its responsibility to the Executive Risk Committee, Executive Board, Board of Directors or one of its Advisory Committees, whenever necessary.

- Is responsible for establishing and implementing Crisis Management protocols and Business Continuity plans for the risk events under its responsibility, whenever applicable. For events with significant impacts, simulation should be performed to verify the efficiency and effectiveness of Crisis Management protocols. The frequency of the simulations should be defined by the First Line of Defense according to the level of critical risk, observing local rules and legislation.

- Must meet the guidelines defined by the Second Defense Line.

Second Line of Defense:

- Includes the areas of risk management, internal controls, standardization, legal compliance and specialists. It should supervise and support the work of the First Line of Defense, providing training and instrumentation for risk management. It must identify and monitor new and emerging risks, ensure compliance with laws, regulations and internal standards, and promote continuous improvement in risk management.

- The Board of Directors is responsible for defining the responsibilities of the Governance, Risk and Compliance (GRC) area, including, but not limited to:

- developing and implementing policies, methodologies, processes and infrastructure for integrated risk management;
- reporting to Vale's Executive Risk Committee periodically on the risks to which the Vale System is exposed, within the defined scope of action, and how these risks are being monitored, controlled and treated;
- ensuring the compliance environment, addressing legal issues and also including compliance with internal policies and standards;
- ensuring compliance with the risk governance model.
- For specific risks, areas such as Environment, Health and Safety, Social, Corporate Integrity and Information Security act as the second specialist defense line, performing risk and control monitoring and ensuring compliance with external regulations, policies and standards. Vale's Executive Risk Committee defines which areas of the organization will act as the second specialist line of defense.
- The Executive Board will define the scope and the model of action of the area of GRC from the Risk Matrix, considering the severity and probability that may hinder the achievement of the organization's objectives.

Third Line of Defense:

• Is composed of areas with total independence from the administration; that is, Internal Audit and the Ethics and Conduct Office. They monitor their respective areas of operation, evaluations and inspections by executing controls tests, risk analyses and complaint investigations, assuring the effectiveness of risk management, internal controls and compliance.

Continuing the evolution of our Business Risk Management model initiated in 2017 to understand the maturity level for proposing adjustments, we adopted in 2018 a series of initiatives, including a review of our Corporate Risk Management Policy. In this context, we defined the Integrated Global Map of Vale's Risks and its classification, treatment and prioritization criteria. We also reviewed the risk governance framework based on the Defense Lines model. In addition, revisions were made to the Risk Matrix, which tables the severity of impacts and probabilities.

We carried out a study on the risks associated with climate change through the Vale Technological Institute (ITV in Portuguese) to prospect the rainfall scenario in the coming years. The initiative made it possible to create analytical tools to structure plans of action for the future treatment of this risk. On the impact of human rights violations, in 2018 work was underway to standardize cases or complaints of human rights violations and their causes, impacts and controls globally.

Materiality

GRI 102-9 | 102-40 | 102-42 | 102-43 | 102-44 | 102-47 | 103-1

In 2018, Vale continued to study the materiality of the socio-environmental and governance issues most closely related to its business, in compliance with the four principles of the GRI Standards that define the content of a Sustainability Report: the inclusion of stakeholders, context of sustainability, materiality, and completeness.

To define the material themes, those that reflect the significant economic, environmental and social impacts of an organization, or that substantially influence the evaluations and decisions of stakeholders, the Company reserved five material themes based on its strategic and Sustainability agenda that would have already reported their progress:

- Labour Health and Safety;
- Impacts On and Investments In the Local Community;
- Recovery of Degraded Areas;
- Water Resources and Effluents;
- Mitigation, Adaptation and Resilience to Climate Change.

In addition to this definition, we conducted a series of consultations with internal and external stakeholders, considering a menu of other issues identified based on sectoral studies and trends of the mining sector beyond knowledge of the Company's performance.

Internal and external stakeholders were invited to participate in the consultation process. They included clients, suppliers, representatives from government and national and international entities, academics, class and community associations, NGOs, journalists, shareholders, and employees in Brazil and other countries where the Company operates. These participants have been mapped by their direct or indirect involvement in Vale's business and the economic, social and/or environmental impact and influence each of them has on the Company's activities.

The consultations were conducted through online surveys and face-to-face and telephone interviews, revealing six other themes for the 2018 cycle:

- Ethics and transparency, combating corruption and illicit practices;
- Incident prevention and emergency response;
- Biodiversity and ecosystem services;
- Atmospheric emissions;
- The organization's strategic and economic performance;
- Respect for human rights and business approach.

In addition to the 11 material themes defined in relation to the failure of Dam I of the Córrego do Feijão Mine in Brumadinho, Minas Gerais, on January 25, 2019, the theme of Mineral and Non-mineral Waste was incorporated into the report, given its relevance and the socio-environmental impacts generated. Mining Waste are reported in Part 1 and Non-mineral Wastes in Part 2.

Labour Health and Safety

GRI 403-1 | 403-2 | 403-3 | 403-4

The failure of Dam I of the Córrego do Feijão Mine in January 2019 was the worst incident in Vale's history. Because it is an extreme situation, the event resulted in a robust and critical review of current safety protocols and tools to eliminate and reduce our employees' exposure to risk.

In spite of having guidelines to identify and evaluate risks in our processes and tasks, within the scope of the Integrated Management System (SGI in Portuguese), we initiated a review of all procedures associated to our critical activities (activities capable of generating fatalities and changing lives). These procedures include the definition of controls (preventive and mitigatory, minimum and compulsory) as well as periodic and systematic evaluations of their effectiveness, reliability and robustness through specific protocols. The review of process safety management following incidents with catastrophic consequences, notably the improvement of risk analysis, will be another strategic process. Annually, audits are carried out by operations using their own risk criteria to assess their conformity and identify possible relevant gaps that may compromise Vale's Environmental Health and Safety management to achieve zero fatalities in a sustainable manner. Their results are presented to the local leadership, which defines the corrective actions, establishes the necessary resources and implements them.

Periodically, the corporate Health and Safety area monitors these actions' implementation and acts whenever necessary in case of delay.

One of the fundamental pillars in managing occupational health and safety is having programs focused on the behavioural aspects of leadership and employees. Active Genuine Care, based on the premise of caring for one another, caring for others, and caring for ourselves, is a program that allows us to raise the level of employee commitment and stimulate an environment in which safe behaviour is a constant. In addition, campaigns such as Health Week, Incident Prevention Week and Reflection Day reinforce through presentations, videos, and other platforms current themes about the need to consider Health and Safety as a pillar of Vale's operational integrity.

All incidents involving our employees are duly registered and treated according to a specific methodology to identify the main contributing factors and corrective and preventive actions necessary to prevent a recurrence. This process is carried out through a computerized system dedicated to promoting the scope of the proposed preventive actions in all operations, optimizing the Company's organizational learning.

Also, in the process of reviewing the Health and Safety strategy, we started a process of identifying and evaluating precursors of high-risk events capable of causing employee injuries, fatalities or life-changing incidents. The timely treatment of these precursors allows us to act more assertively by focusing on activities and tasks that still require preventive or mitigating improvements in their controls.

Another fundamental pillar for the success of our incident prevention program is involving contractors in our distinct safety practices and routines. It is up to Vale to set a minimum standard when qualifying, hiring, mobilizing, monitoring and demobilizing suppliers to align them with our Zero Fatality strategy.

The Day of Reflection is Vale's engagement strategy based on direct communication through leadership. It is a day when we stop our activities around the world and promote a conversation about Health and Safety with the goal to raise awareness about attitudes that affect our everyday lives. The Day of Reflection 2018 was attended by more than 70,000 employees and contractors and addressed the theme "Preventing incidents at work is a war that can be overcome." The event was held in 15 countries and involved almost 2,000 meetings.

Fatalities

GRI 403-2

Year	Contractor	Employee
2016	3	2
2017	4	1
2018	1	1

In 2018, unfortunately, two fatalities occurred in Brazil involving an employee and a contractor: one in our mine and one in our railroad operations. Investigation processes were carried out and enabled us to identify significant contributing factors. In the case of the mine, this led to the removal of a hazard by automating the activity. In the case of the railroad, an improvement was made to barriers on level crossings.

The fatalities related to the failure of Dam I of the Córrego do Feijão Mine have not been taken into account in this disclosure because they occurred in 2019. They will therefore be reported in the next year's report.

Health Awareness Programs

In 2018, we carried out initiatives to promote employee health and comply with local legal requirements, considering the themes published on the global agenda of the World Health Organization (WHO). The initiatives included flu vaccination campaigns, a physiotherapy program in the workplace, an employee assistance program, campaigns on sexually transmitted diseases, a program for monitoring pregnant women, rehabilitation for employees on leave, and awareness campaigns on men's and women's health, obesity, hypertension, diabetes, smoking and mental health.

The Global Internal Health Week focused on the importance of demystifying the mental health issue, reinforcing the Active Genuine Care. The main objective of the actions, which included lectures,

workshops, theatrical presentations, and assistance from professional mental health specialists, was to fight the stigma and prejudice associated with mental disorders and to promote self-care for those who suffer and to boost the understanding, empathy and support of those who do not suffer. More than 100,000 of our own employees and those of third-party suppliers from all global operations participated in the initiative.

In Brazil and Mozambique, we are working to reduce the epidemics of AIDS, malaria and other neglected tropical diseases. The actions taken include spraying insecticides in collective areas, distributing mosquito nets and repellents, and initiating awareness campaigns to prompt early diagnosis and treatment of cases.

In 2018, the incidence of malaria in Mozambique's operations was 71.7%, a reduction of 20% compared to 2017, when it was 51.4%. However, in 2018, we included Nacala in our follow-ups, adding 147 cases of malaria, which represents 27% of the total cases presented in the same year. For comparison purposes, when we remove Nacala data, 2018 presents a rate of 36.3%, with a reduction of 15% compared to 2017.

The Workplace Risk Prevention and Occupational Health Control Program is another risk management initiative of the Company. It involves periodic health checks, prevention training, functional capacity assessments, and preventive measures against susceptibility. We also follow global guidelines for health risk management, covering occupational

hygiene and ergonomics. We are also monitoring work environments and conducting biological analysis of our workforce.

For 2019, our goal is globally reducing the number of employees exposed to noise and materials such as silica, trichlorethylene and diesel particulates in our operations.

In addition to programs to raise awareness of employee health, we also maintain initiatives aimed at communities in situations of socioeconomic vulnerability where we operate in Brazil, through the Vale Foundation. The Vale Foundation's focus in the area of health is to strengthen primary care, contributing to the improved services to the population via public health systems, and carrying out actions of self-care and health promotion. Learn more about the work of the Vale Foundation on [page 54](#).

Frequency Rate of Recordable Occupational Injuries (TRIFIR) and Frequency Rate of Occupational Injuries requiring Time Off Work (LTIFR)
(number/HHT x 1 MM)
GRI 403-2

	Frequency Rate of Occupational Injuries requiring Time Off Work (LTIFR) (number of incidents requiring time off work/HHT x 1 MM)			Frequency Rate of Recordable Occupational Injuries (TRIFIR) (number of injuries/HHT x 1 MM)		
	2016	2017	2018	2016	2017	2018
Vale	0.5	0.6	0.6	1.9	2.0	2.3
Brazil	0.5	0.5	0.4	1.2	1.3	1.4
Mozambique ¹	0.3	0.2	0.3	1.9	1.7	1.0
Malaysia	0.0	1.0	1.0	1.0	1.5	1.4
Canada	0.8	1.0	1.4	10.3	11.9	12.7
Peru	0.4	0.4	0.0	0.6	1.0	5.7
Indonesia	0.1	0.2	0.1	1.0	0.9	0.6
Australia	6.8	0.0	0.0	10.8	0.0	0.0
Paraguay	0.0	0.0	1.8	1.4	0.0	3.7
Japan	5.7	0.0	0.0	17.1	0.0	0.0
Oman	0.0	0.7	0.2	1.1	1.7	0.5
United Kindom	0.0	2.6	2.3	0.0	6.4	2.3
New Caledonia	3.0	1.8	5.6	6.8	5.1	9.9

¹ In 2016 and 2017, some work incidents in Mozambique were not considered in calculating injury rates (TRIFR and LTIFR) due to divergences in the understanding of the accounting of events involving third-party assaults on watchmen. This is because Mozambican legislation does not require such a registration, even though Vale standards (in line with the OSHA guidelines) do require them. Therefore, the results of 2016 and 2017 were increased to 15 and 8 incidents, respectively.

Absenteeism

GRI 403-1

One of our absenteeism management projects aims to prevent early disability due to chronic non-communicable diseases (NCD). Our partner in this initiative is the Social Service of Industry, with the participation of the Centres for Innovation in Health and Safety of the National Industry Confederation (SESI/CNI in portuguese). More than 20 occupational health, human resources and leadership professionals, as well as employees of the SESI Innovation Centre, directly participate in actions that promote mental health and well-being and help reduce premature mortality due to non-communicable diseases through prevention and treatment. We act, mainly, to prevent disabilities for those with osteomuscular diseases and mental and behavioural disorders, considering psychosocial risk and biomechanical risk factors.

The pilot project serves the employees of the units in Rio de Janeiro (RJ), Vitoria (ES), São Luis (MA) and Itabira (MG) – a total of 16,954 workers. This portion of worker corresponds to 27% of absent days accounted for in 2015 and 2016, and 33% of the workforce in Brazil. In 2018, we developed program guidelines, trained the multipliers, and started the model deployment and assisted operation phase.

In 2018, 100% of our employees were represented by formal Health and Safety committees composed of employees of different hierarchical levels. In the two previous years, the representation was the same.

Impacts On and Investments In the Local Community and Respect for Human Rights

GRI 103-1 | 103-2

Valuing human rights and minimizing the impacts caused to communities neighbouring our operations are priorities for Vale. In 2018, we reinforced this Social Management strategy through: preventing risk, remediating impacts and promoting social legacy, in accordance with the UN International Bill of Human Rights. The rapid response given in the case of the failure of Dam I of the Córrego do Feijão Mine in Brumadinho, Minas Gerais, emphasized the importance of this work and also the need to constantly reevaluate and improve it. Our Social Management strategy allows us to understand the best way to avoid repeating an event like this, which damages the environment, costs lives and impacts homes, drinking water and work, among other fundamental rights.

We believe that many of the initiatives taken during the process to restructure the Social Management area, which has been taking place since 2018, will allow continuous improvement in adopting strategies to increase risk predictability, improve impact management and reinforce a culture that respects human rights, which will be disseminated to all performance areas in the Company.

We also support recognized initiatives that seek to improve social, economic and environmental conditions related to mining activities, including

those related to Health and Safety, resettlement and artisanal and small-scale mining. We seek to participate in and contribute to the international debate on these issues and seek to adopt and promote best practices.

We actively participate in the International Council on Mining and Metals (ICMM) and commit to its 10 Principles of Sustainable Development, in addition to the Voluntary Principles on Security and Human Rights. We are also aligned with the United Nations Global Compact, in a commitment to help secure fundamental human rights in line with the UN Universal Declaration of Human Rights.

Structure

The Social Management area aims to maintain the operability of our assets and standardize the Company's social performance, together with the Community Relations teams present in the territories, increasing the visibility of this theme inside and outside Vale. This means, above all, ensuring that Social Management has a more intense dialogue with the business and is committed to the performance and evolution of results in managing impacts.

Our work seeks more and more consistency in the performance of Vale's sustainability strategy and more effectiveness in resource allocation. By anticipating risks and opportunities with greater predictability of events, we expect to manage social impacts more effectively. The restructuring of the area also aims to contribute to obtaining the License to Operate.

Based on the Code of Ethical Conduct, the Human Rights Policy, the Social and Environmental Investment Policy and the Integrated Management

System (SGI in Portuguese), Social Management ensures the implementation of these guidelines for the Company's global performance, with responsibility for implementing the social dimension into the SGI. The Social action plan also includes training and technical support for professionals, broader orientation on allocation of social expenditures, respecting and promoting of human rights, and encouraging ethical development of Indigenous peoples and traditional communities. The work is aimed at ensuring social action throughout the entire mining cycle.

In addition to following our Sustainability Policy, we also consider the current public policies in each region and develop actions to be shared with the public and private sectors, as well as with civil society organizations.

To guarantee the continuous and inclusive involvement of the communities located in our areas of operations, we offer structured channels for dialogue in 100% of the operations, such as the Ombudsman, Contact Us, "Alô Ferrovia", among other toll-free lines, as well as specialized professionals and an own system for registration and handling of demands, complaints and claims - the Stakeholders, Demands and Issues System (SDI).

The SDI is operated by a professional's team of Community Relations area to address the community demands, complaints and claims. This relationship management makes it possible that many issues be resolved without the need for a lawsuit.

However, if necessary, we cooperate with authorities in investigating any incidents involving allegations

of human rights violations throughout our production chain with a view to non-obstruction or retaliation against human rights defenders.

In Brazil, we maintain a Social Performance Panel, through which we monitor community engagement indicators and carry out internal audits, the results of which identify opportunities to evolve and develop actions, programs and projects. In one year, between 2017 and 2018, we recorded a reduction of the average response time to communities of 33% and an increase of attendance of 46%, as well as a decrease of 69% in the number of shutdowns on Vale's operations.

Impacts On and Investments In the Local Community

GRI 102-15 | 413-1 | 413-2

Throughout the life cycle of an enterprise, Vale works to identify risks and socioeconomic impacts on the communities resulting from our activities, to recognize actual and potential risks and minimize or mitigate impacts caused by operations. We follow impact management goals, which include, without limitation: implementing projects to improve the community's quality of life, increasing job creation and income, strengthening basic education, increasing access to health, reducing emergency response time and handling community demands.

It is Vale's policy to develop ongoing community dialogue in areas influenced by our ventures to

promote and strengthen our relationships and guide our social investments. Through social dialogue and transparent relationships, we seek to establish community and government involvement and trust in our proposed actions.

We understand that we still has much to evolve when it comes to relationships with local communities and understand that Social License to Operate is a key issue for our business success. Our Social Management team is growing in size and expertise to satisfactorily meet all the demands that must be met to achieve a harmonious coexistence, gain wide acceptance of our communities and generate value in the territories where we operate.

In addition to the studies and social and environmental diagnoses carried out to identify and measure our direct impact on municipalities and communities throughout the life cycle of our business, the Risk Management of Business (GRN in Portuguese) panels are also periodically updated. Vale's risk analysis process considers, among other aspects, the social consequences of the impacts. By the end of 2018, a total of 40 units or management teams had carried out a risk analysis, considering the social dimension of their activities.

In 2018, 63% of our operations carried out social impact assessments and 78% carried out environmental impact assessments. About 38% of the operations publicly disclosed the results of social impacts and 50% of the results of environmental impact assessments. In the same year, 72% of our operations implemented local development programs based on the local communities' needs, and 75% of them encouraged the creation of committees or social dialogue groups.

We developed more than 350 Relationship and Investment Plans with local communities during 2018, linked to impact management or local development.

Some examples are the Pará and Indonesia Plans, with a focus on training local producers in communities close to our operations, an investment in the economic development of the territories.

In Indonesia, since 2017, the Hu'u project, in the Province of Nusa Tenggara Barat, has introduced local farmers to agricultural techniques focused on zero pesticides, in a region where chemical pesticides are culturally common in rice fields. In addition, the project introduces a system capable of improving farmers productivity.

Community empowerment and improved productivity are also the objectives of the rural community project of Juazeiro, in Carajás (Pará). For four years, the program has been helping farmers to become autonomous, through technical assistance and support for soil improvement through mechanization in the field, while also contributing to increased productivity - the production of vegetables, for example, accounts for about 20% of the municipality's production. Another example is the production of corn, with more than 100 bags per hectare, which is the largest production in the municipality. In the third year of the project, the community acquired agricultural equipment in the amount of US\$ 39.1 thousand through its own investments, which demonstrates the high level of management of local producers, who have become a reference in the region.

The results obtained by the impact assessments in the territories indicate that Moatize in Mozambique is one of the places that requires more attention to potentially negative impacts on communities neighbouring the mine due to the town's high socioeconomic vulnerability. Vale began a more detailed study on structures in the town and the possibility of pulmonary

and ocular diseases; it is expected to be concluded in 2019. For more efficient management of impacts, new environmental controls and procedures are being implemented to reduce operational impacts on neighbouring communities due to dust, noise and vibration.

Relief to Those Affected by Cyclone Idai in Mozambique

Mozambique and other African countries were hit by Cyclone Idai in March 2019, the strongest to hit the region since 2008. According to the United Nations, about 1.85 million people were affected in Mozambique alone. In solidarity with the victims and in the context of our social responsibility, Vale and other companies in the corridor are supporting those affected by the cyclone and its heavy rains in Mozambique.

Our initiatives include emergency donations to the National Institute for Disaster Management (INGC in Portuguese), exemptions from port tariffs at the Port of Nacala for shipments of food containers from the World Food Programme and the United Nations and its agencies for Beira and Malawi, and donation of health and hygiene products to more than 2,000 families in Moatize, including 9,600 bottles of water purifier, granular chlorine, 2,000 units of plastic buckets and 1,000 boxes of soap. In addition to providing emergency support, we have contacted NGOs and other agencies to identify new priorities and continue to contribute effectively. In May, Vale signed a memorandum of understanding with the Red Cross of Mozambique (CVM, acronym in Portuguese) that ensures the application of donated funds by the company to the victims of cyclones Idai and Kenneth (which hit the region in April).

Company workers joined the effort through the Volunteer Program to assist those affected. So far, they have gathered non-perishable food products, clothing, hygiene products and household items for donation.

In 2018, US\$ 116.5 million was spent on social actions mostly destined to support urban infrastructure and mobility, traditional communities and Indigenous peoples, and work generation and income. Of this total, 39% were voluntary actions, representing US\$ 13.4 million that was contributed directly by the Vale Foundation.

By seeking legitimacy and acceptance of the Company by society, especially by local communities, we apply the concept of License to Operate. We understand that legal compliance alone is not enough to obtain social legitimacy; it is crucial that we obtain Social License to install new projects and continue operations.

As Social License to Operate is an intangible and dynamic asset, it must be managed and monitored. In this context, we also address socioeconomic constraints linked to environmental licensing processes and our relationship with communities. These constraints are a legal consideration linked to our projects' environmental licenses.

Vale Foundation

In our mission to contribute to developing the territories where Vale operates by supporting education, health and local income generation businesses, the Vale Foundation celebrated its 50th anniversary in 2018. Over this time, the Foundation's

Social Expenditures

GRI 203-1

Funds invested in infrastructure (US\$ million)	2016	2017	2018
Donation/Transfer	10.8	4.4	3.8
Business engagement (shared infrastructure)	-	-	-
Direct implementation - social program/project	65.1	64.4	40.5
Incentive Law	0.1	-	-
Sponsorship	-	0.1	-
Services/Materials	0.3	0.4	0.1
Total	76.3	69.3	44.4

Funds invested in services (US\$ million)	2016	2017	2018
Donation/Transfer	11.1	2.9	1.1
Direct implementation - social program/project	19.6	32.0	25.8
Pro bono	-	-	-
Incentive Law	-	-	-
Sponsorship	0.02	0.06	-
Services/Materials	0.4	0.6	0.8
Total	31.1	35.6	27.7

work has improved. It is currently based on the same pillars as the Company's strategic sustainability agenda – supporting education, health, employment and income generation.

This mission is accomplished through social programs planned and executed in each of our territories based on their unique characteristics, a policy of listening to the needs of the local population, and a commitment to strengthen and disseminate existing public policies. Thus, the Vale Foundation seeks to strengthen the knowledge of each locality and local actors capable of promoting development actions in their cities in a sustainable and perennial manner.

The Vale Foundation also manages the activities of four cultural centres: Casa da Cultura de Canaã dos Carajás in Pará, Vale Centro Cultural Maranhão, Memorial Minas Gerais Vale and Museu Vale in Espírito Santo. Through these places' programming, the Vale Foundation seeks to democratize access to culture, preserve Brazilian material and immaterial heritage, and to expand and value cultural activities in the areas where Vale operates. These four cultural spaces held 821 exhibitions and programs throughout the year, showing the work of 2,892 artists to more than 398,000 visitors, including itinerant shows.

The Vale Foundation is also the main sponsor of six independent socio-educational spaces: the Knowledge Stations, located in the municipalities of Arari, Maranhão; Brumadinho, Minas Gerais; Serra, Espírito Santo; Marabá and Tucumã, Pará; and the Deodoro Training Centre, Rio de Janeiro. In these spaces, social development activities are offered to 4,777 children and adolescents from six to 17 years of age and their families.

With the collapse of Dam I in January 2019 in Brumadinho, the Knowledge Station of this city became the main Service Point (PA in Portuguese) for affected communities and families. For more than 60 days, the Knowledge Station issued documents, registered victims and enabled people to check lists. The site also served as a distribution centre for hygiene and pharmacy supplies, food baskets, meals, water and other immediate needs for the community. The socio-educational activities of Brumadinho Knowledge Station were resumed in April.

In 2018, the Vale Foundation invested US\$ 13.4 million in its sociocultural programs and spaces. With these initiatives, the Foundation operated in 67 municipalities in Pará, Maranhão, Minas Gerais, Espírito Santo and Rio de Janeiro. To learn more about the work of the Vale Foundation, visit www.fundacaovale.org.

Amazon Biopalma

One of the initiatives in communities where Vale operates in Pará is a Family Agriculture Program administered by Biopalma, a company controlled by Vale that sustainably produces palm oil and derivatives in seven municipalities with the lowest human development index (HDI) in Brazil.

The Family Agriculture Program involves 675 families and almost 7,000 hectares planted with oil palm - best known in Brazil as "dendê". Farmers are periodically given technical assistance, phytosanitary guidelines to improve and increase productivity, stimulating ideas and improvements, and support to improve their quality of life.

It is recorded that, during harvest periods, these families' incomes could reach up to US\$ 3,000; before entering the program, many of them received only government aid in the amount of US\$ 136.80.

In 2018, Biopalma's investments in generating employment and income were in the order of US\$ 36.6 million, an increase of 8% compared to the previous year. Biopalma generates, in the municipalities where it operates, more than 5,000 direct and indirect jobs.

Biopalma has an environmental management system with procedures and environmental programs implemented. It generates clean energy for self-sufficiency operations, is concerned with fully reusing effluents and waste from the process, promotes environmental education in the community where it is present, discourages the use of fire, and protects local fauna and flora, among performing other environmental benefits.

In 2018, Biopalma's investments in generating employment and income were in the order of US\$36.6 million, an increase of 8% compared to the previous year

Potential and Actual impacts of Vale Operations on Communities

GRI 102-15 | 413-2

Potential impacts	Actual impacts
Incidents involving community members	Change in mobility conditions (restriction or interruption of access, mainly due to railroads and construction works, intensification of traffic of vehicles, etc).
Increased immigration flow with population growth	Overburden of public services and equipment (education, health, sanitation, security, transportation, electricity, etc.)
Resettlement	Reduction in the number of jobs in the demobilization phase of projects and operations
Suppression or reduction of arable land	
Increase in real estate speculation with effects on the housing deficit	Increase in the price level and cost of living
Greater fragility of public security, with increased crime and prostitution rates (and risk of child prostitution)	
Changes in the quality of life and health of neighbouring communities due to the Company activities and/or related environmental impacts (e.g., effluent and material leakage in water bodies, slips of batteries, dam failure, particulate matter emissions and/or toxic and polluting gases, access to public facilities, migration, etc).	Interference in the quality of life of neighbouring communities, Indigenous peoples and traditional communities (impacts of noise, dust and vibration; access to local modes of production; water availability; cultural heritage; resettlement; etc).

Significant direct and indirect economic impacts

GRI 203-2

Main Direct Economic Impacts	Main Indirect Economic Impacts
Increase in the local cost of living	Revitalization of the local economy through the generation of direct and indirect jobs, payment of taxes and fees and increase in the income level of the population
Land-related impacts such as real estate speculation, territorial conflicts and resettlement, affecting people and/or groups in conditions of greater socioeconomic vulnerability, which may cause reduction of local productive activities	Development and contracting of labour, suppliers and purchases of local products and services, generating an increase in tax collection and investment capacity of the government
Migration due to the presence of the enterprise, which may cause changes in the development indices of the municipalities	Development of programs, social investment and local development actions
Increased demand for infrastructure, services and products	Strengthening of the community organization based on social participation in the Company's initiatives and its value chain
Increase in the cost of living, increase in the housing deficit and the demand for public health services, education, social protection and public security	Improvement of job opportunities, qualifications of the local workforce, schooling conditions and generation of scientific knowledge and technological innovation
	Increase in the income level of the population, stimulus to expand the service sector, commercial activities and greater formalization of the economy

Resettlements

MM9

Resettlement is a social management process that seeks to manage actions to minimize the impacts of involuntary physical and economic displacement caused by Vale on people, families, communities and social groups in vulnerable socio-economic situations. The objective is to prevent violations of human rights and to ensure that people and families are provided with living conditions at equivalent or better levels compared to those found before the start of the resettlement process.

Before implementing or expanding projects, we seek alternatives to avoid or minimize the need for resettlement. If necessary, we define eligibility criteria and elaborate Resettlement Assistance Plans with the participation of impacted persons and other interested parties. Housing projects and the Resettlement area are designed with families to ensure greater adherence to their expectations. After people are relocated to the resettlement, programs are carried out to restore their means and ways of life in their new residences. During the process, indicators are monitored to assess program effectiveness and take corrective action whenever necessary. We act according to international guidelines and best practices, establish mechanisms for handling complaints and concerns, and guarantee the necessary resources to fulfill our commitments.

In 2018, 943 resettlement processes were carried out. In Brazil, ten resettlements were carried out: nine related to constructing viaducts for transposition of the Carajás Railroad and one to expand the Brucutu Mine in Minas Gerais. To expand the Moatize Mine in Mozambique, a resettlement of 933 producers was

carried out in which, after a dialogue process, the community opted for simple compensation. In the same year, Vale conducted a socioeconomic study of households that occupy the concession area north of the village of Moatize, which will allow the Company to evaluate the possibility of resettling 1,381 households. Similarly, studies were begun to evaluate the resettlement of the Ntchenga and Mphandwe communities occupying the southern area of the concession, a total of 162 mapped buildings.

Indigenous Peoples and Traditional Communities

GRI 411-1 | MM5

We seek to build a relationship of autonomy and trust with Indigenous peoples and traditional communities in the areas influenced by the Company. The technical area that manages this dialogue, which features professionals with Indigenous business experience, carries out work to support fundamental and human rights and respect for the cultures, customs and values of Indigenous peoples and communities. The Company maintains an active relationship with 24 Indigenous peoples and 43 traditional communities and entered into agreements with 39 of these populations, 31 of them in Brazil.

Through forums and Committees for Relationships with Communities and Environmental Education, we also work with the priority of engaging people and families in socio-economically vulnerable situations. In this regard, we promote structured and qualified participatory processes that aim to engage communities in making decisions that affect them, such as impact management programs and social investment initiatives.

In the case of Indigenous peoples and traditional communities, we work to ensure free, prior and informed consultation, establish voluntary agreements aimed at ethnodevelopment, and guarantee the rights of these communities, to generate shared gains. We conduct free, prior and informed consultation processes with the Awa, Guajajara, Kaapor, Gavião and Kayapo peoples and with the surrounding quilombola communities due to the licensing processes of the Carajás Railroad (EFC in Portuguese). We are in the process of implementing the Basic Environmental Plan with the Awa, Guajajara, Kaapor, Kayapo, Tupiniquim and Guarani peoples, the EFC quilombolas and the EFC's Support Program for traditional communities.

Land Use Disputes

MM6 | MM7

To acquire and maintain land use rights, Vale recognizes the specific sociocultural aspects of each people or community, supports the local legislation of each country and region, and respects human rights. Many of our projects and operations are located in remote areas where there are Indigenous, traditional and rural communities for whom land access and resources are essential for maintaining livelihoods, or in regions where real estate pressure and land restructuring leads to irregular occupation of the Company's worksites and the surrounding areas.

In these situations, we pay special attention to people/families in situations of socioeconomic vulnerability that depend on natural resources located in areas of the company or that occupy them irregularly. We strengthen our relationships with the

parties involved through dialogue and management of expectations, seeking peaceful solutions to conflicts based on current legislation, whenever possible in partnership with public agents. In cases of occupations, depending on the presence or absence of risks to the communities and our operations, we proceed with land regularization despite the occupation or, in cases where eviction is necessary, we follow our resettlement process.

In Mozambique, communities in Vila de Moatize seek natural resources in areas under Vale's concession, which is implementing artesian wells and increasing the community's supply network, as well as providing water points for animal feed (cattle), thus facilitating the population's access to this fundamental resource. Vale's initiative is an important alternative to the need for access control and new occupations in company areas, which avoids exposure to operational risks and guarantees the safety of the community.

In 2018 we recorded land use conflicts in the northern region of Brazil. In Pará, where there is a territorial dispute and conflict over land due to low land regularization, Vale's areas dedicated to projects, the amortization of project impacts and nature conservation are unduly occupied. If this situation is not properly treated, it can jeopardize future investments and Company commitments to regulatory agencies. In this state, eleven cases of irregular occupations were dealt with through dialogue associated with appropriate judicial measures. In cases of socioeconomic vulnerability, we have acted to resettle and relocate families to other areas, either autonomously or in partnership with institutions and governments.

In the same state, the relationship with the indigenous people Xikrin is one of the cases for which we devote special attention. The operation of the company's enterprise in a neighboring area to the indigenous land raises questions and allegations about environmental impacts. However, the enterprise is duly licensed and, recently, in a lawsuit that discusses the impacts, expert reports that were issued point out that there is no influence from our operation over the Cateté River. In this regard, it is necessary to observe that despite the allegations of impacts, the report from experts concluded that there was no causality link between the activities developed by the enterprise and the supposed contamination of the water course that separates the company and the indigenous land in question.

In the state of Maranhão, the Carajás Railroad (EFC in Portuguese) is near the southern boundary of the Awa-Guaja Indigenous Land, so we also turn our attention to this people. The railroad, implemented in 1980, made possible the demarcation of said Indigenous land. Currently, the Indigenous people allege there are impacts arising from train traffic, which are the object of mitigating and compensatory measures in the Environmental Licensing being discussed and approved by the communities and National Indian Foundation (Brazil) or FUNAI in Portuguese.

Vale has been active in immediately solving occupations of areas under the Company's domain in the Carajás and Vitória-Minas Railroads, agility that avoids the loss of possible investments that may be made by the occupants. Consolidated occupations in the two railroads are mapped and the priority is to address those that pose the greatest risk to community and operational safety. To treat irregular

occupations, Vale established internal work groups that integrate different areas and strengthen social performance in the evacuation procedures.

Communities Close to Railroads

To reduce shutdowns and incidents to our own employees, third parties and the community involving railroad events, our actions pursue four strategic pillars: safety, stakeholder engagement, local development and resettlement.

The Commission for Prevention and Investigation of Incidents (CPIA in Portuguese) has two objectives: research and mainly the prevention of incidents, particularly rail incidents. Supported by people's engagement, process knowledge, routine control checks, and effectively-structured action plans and field inspections, the CPIA establishes guidelines for managing railroad occurrences in an orderly way, providing corrective and preventive actions for weak operational safety processes.

This work results in programs and initiatives that aim to mitigate the impacts of occurrences and shut downs, besides to sensitize and raise stakeholder awareness, and to speed up response time and community service.

Vale owns the operation concessions for the Vitória-Minas Railroad (EFVM) and the Carajás Railroad (EFC) in Brazil. In 2018, these maintained the best national railroad incident rates when compared to the country's other railroads. The EFVM and EFC indices also compare well against the world's major railroads' records of people being struck and vehicle collisions at level crossings (with and without fatalities).

The EFC in northern Brazil was the target of 52 threats and eight railroad shutdowns throughout 2018,

which impacted rail transportation for 53 hours. In the Vitória-Minas Railroad (EFVM), there were 26 threats and eight railroad shutdowns, impacting a total of 12 hours of rail transport. There were no shutdowns in railroads related to conflicts with Indigenous peoples and traditional communities.

In the EFVM, there were 30 incidents during the year, which caused 81 hours of shutdowns. 22 of the incidents involved third parties (13 pedestrian collisions and nine collisions), with 16 victims, 11 of whom died, including one of our contractors.

The EFC registered 22 incidents, with 220 hours of interdiction. Nine incidents of this total (seven road incidents and two collisions) involved people external to the Company, resulting in 11 victims, nine of whom died.

Social Actions on Railroads

Vale's passenger trains are assets of relationships with communities. They transport people, contribute to regional development and integration, and represent an educational, recreational and preventive health space.

The Carajás Railroad Passenger Train (EFC) traverses 861 kilometers, crossing the states of Maranhão (23 municipalities) and Pará (four municipalities), transporting more than 300,000 passengers per year.

In 2018, more than 15,000 people participated in 19 actions that included workshops, lectures, children's recreation events, play activities and talk circles inside the Social Wagon – a car adapted in 2017 to host educational events on railroad safety among other topics, promote citizenship and generate income. The two editions of the 2018 Health Station project also took place in the Social Wagon. The action is carried

out by Vale and Vale Foundation in partnership with the Government of Maranhão, through the State Department of Health (SES), and provides passengers with information and services on preventive health. The total of 1,448 rapid tests for hepatitis, syphilis and HIV/AIDS were made through the Health Station.

The Passenger Train of the Vitória-Minas Railroad (EFVM) transported 1.1 million people in 2018, serving 42 municipalities. Throughout the year, 12 thousand passengers participated in 24 information activities carried out in the Cultural and Environmental Wagons of EFVM. In addition, approximately US\$ 2.2 million has been invested in security-focused projects near the railroad, such as level crossing automation, access to infrastructure, and education initiatives in the cities served by EFVM. A total of 11 thousand people were present in actions that addressed security in the vicinity of the railroad in a playful way.

Respect for Human Rights and Business Approach

GRI 408-1 | 409-1 | 410-1 | 412-1 | 412-2 |

Implemented in 2009 and revised in 2014, Human Rights Policy is Vale's main guideline for respecting human rights and is aligned with the UN Guiding Principles: Commitments, Integration and Monitoring of Risks and Impacts of Human Rights, Mechanisms of Listening, Demands and Complaints, and Reporting. In addition to the Policy, we published the Human Rights Guide, which helps employees and others to understand and respect human rights, and the Code of Ethical Conduct, which has a chapter dedicated to the subject. These public documents guide Vale's position on issues such as respect for diversity; awareness of moral and sexual harassment; relationships with employees, customers, partners,

suppliers, communities, government and society; as well as critical issues in the mining sector, such as forced and child labour and artisanal mining.

Among the main documents and policies that guide our work in human rights include the covenants and compacts related to this matter, including those related to the International Labour Organization (ILO), the UN Guiding Principles on Business and Human Rights, the Organization for Economic Co-operation and Development (OECD) and the International Finance Corporation (IFC).

Implementing the Human Rights Policy is responsibility of all Vale's operations, employees, subsidiaries and suppliers. The policy is reviewed whenever there are issues to be updated and disseminated in context of employee and leadership training, our approach to human rights and its importance in Company risk processes, improving monitoring mechanisms, and reporting grievances and issues involving human rights. Our employees in each area of Vale's operations are subjects and agents of human rights. They effectively make the Company respect rights and, when necessary, remedy impacted rights.

In 2018, risk assessments of human rights violations were carried out in three Brazil operations: Eliezer Batista S11D Complex, Carajás Railroad and Vitória-Minas Railroad.

During the year, two other important actions were:

- Impact studies and human rights risk assessments that began to address the issue and propose action plans when necessary, enabling critical issue management and reducing occurrences;

- Mandatory training on human rights for Vale's leaders.

Altogether, about 2,900 employees (4.1%) were trained last year in human rights policies or procedures, a continuous effort that is repeated every year. In addition, 2,971 of our own employees and those of third-party suppliers (69% of Security personnel) were trained specifically in human rights policies or procedures and their applications to Security.

Slave and Child Labour

We do not agree with and always fight against any practice that can be interpreted as degrading, or any work that is forced or analogous to slave labour. We maintain our policy of not hiring anyone under the age of 18, not even in the Young Apprentice program, which only admits youngsters 18 or older. Contracts with suppliers include clauses expressly prohibiting the use of child or forced labour or working conditions analogous to slave labour. Failure to comply with these clauses implies breach of contract.

This risk is managed at several levels, both in the due diligence processes initiated in the contractual phases, with careful analysis of the supplier's documentation, as well as during the service rendering, with periodic evaluations and even auditing in some cases. The same procedures are adopted in different countries and regions where there is higher risk of child labour.

In 2018, there were no signs of risk in the Company involving child labour, that is, young people exposed to hazardous, forced or compulsory work. In our value chain, involving operations, suppliers and customers, there was also no record of forced and child labour during the period.

To guarantee more protection against forced labour, Vale and the International Labour Organization (ILO) entered into a partnership to implement the Regional Agenda for Decent Work in the region of Carajás (ARTD), in the southwestern region of Pará, which includes 39 municipalities. The initiative, created in 2018, aims to outline a regional development strategy that will include the participation of the main social actors working on issues related to labour, the environment and human rights in the region. There is also the possibility of integration with other departments of the state and federal governments.

Diversity and Equality

Diversity is one of the main values that guide Vale's human rights protection practices. Opportunities are offered to all people within the Company, from recruitment to promotion and remuneration. Each individual is ensured that their potential will be developed regardless of cultural, ideological, gender or any other differences, an ethical commitment that has proven to be a path to innovation and competitiveness.

The topic of diversity and inclusion is closely monitored by the Human Resources Area, to ensure it traverses all our processes and promotes an inclusive workforce with equal growth opportunities within the Company.

The main resources available to teams to deal with this subject include onsite and online courses, including campaigns on the Company's social

networks and intranet, as well as lectures on specific commemorative dates (Women's Day, Father's Day, Mother's Day, etc.). The results of this effort have significantly appeared in 2018, through actions to increase women's participation in positions historically held by men.

One of the examples of such results is the Talent Has No Gender project, which increased women's participation in large equipment operation jobs in Minas Gerais and Pará operating units. In addition, 45% of the leaders of the Southeast Corridor (around 400 people) received training in the topic and took the Global Trainee Program, and subsequently hired 48% female employees, 57% of whom were allocated to operating areas.

Evaluating women's empowerment principles to monitor gender evolution, and monthly follow-up on the growing number of professionals with disabilities, are other Vale performance management mechanisms. Currently, we have 12.7% female employees in our global workforce, and in Brazil, 3.9% of our professionals have disabilities.

In line with the best market practices, our company has adhered to the Brazilian government's Citizen Company program, which extends maternity leave by 60 days (from 120 to 180 days) and paternity leave by 15 days (from 5 to 20 days).

Economic Strategy and Performance

GRI 103-1 | 103-2 | 201-1

Our strategy and future economic performance will be impacted by the failure of Dam I of the Córrego do Feijão Mine. Due to this event, iron ore production is expected to fall by about 92 million tons per year⁴, impacting the pellet feed needed to produce 11 million tons of pellets; fines will be applied and blocks will be levied against the Company's resources through court decisions. These factors will influence our 2019 business results.

These circumstances led us to develop a comprehensive indemnity program, apply compensation actions, accelerate the modification of upstream tailings dams, and suspend shareholders' income and executives' variable income programs.

We have disclosed, in our 1Q19 performance report, the provision of US\$ 4,504 million related to the Dam I rupture. The value includes US\$ 2.423 billion for compensation/remediation programs and agreements; US\$ 1.855 billion to decommission tailings dams; US\$ 104 million in incurred expenses and US\$ 122 million in other expenses. Financial impacts from the Brumadinho Dam rupture led to our first negative EBITDA in history, totaling a negative of US\$ 652 million, in 1Q19.

4. Expectations according to: 40Mtpa – Córrego do Feijão, Vargem Grande and Fábrica complexes; 30Mtpa – Brucutu; 12,8Mtpa – Timbopeba; 10Mtpa – Alegria.

In 2018, iron ore fines production reached 384.6 million tons and pellet production reached 55.3 million tons⁵. Following the Brumadinho Dam rupture, our iron ore fines production was impacted by 11.2Mt in 1Q19.

The nickel business was impacted by a process of adapting to market conditions, as well as extension and maintenance works. The production number for 2018 was 244,600 tons, 15.1% lower than in 2017. Production of finished nickel reached 54,800t in 1Q19, 14.4% lower than 4Q18 and 6.5% lower than 1Q18. With a forecast for a significant increase in demand for nickel for electric vehicle batteries for the next years, we believe there will be room for the Company's growth in this market, once that becomes a reality.

Copper production, in turn, reached 395,500 tons in 2018, 9.8% lower than in 2017, mainly due to the reduction in nickel production, of which copper is a by-product. Copper production reached 93,800t in 1Q19, 14.6% lower than 4Q18 and in line with 1Q18 of the same year.

Operational bottlenecks contributed to coal production remaining at the same levels as in 2017, at just over 11 million tons. Coal production totaled 2.2 Mt in 1Q19, 28.8% lower than in 4Q18 as a result of an extremely severe rainy season compared to previous years. To overcome this scenario, we reviewed the business plans and are implementing initiatives to consistently and sustainably increase production from 2019 by developing capacity at the mine and increased plant yield.

Transparency and Predictability

To bring more transparency and generate added value through our actions, we also readjusted our dividend policy in 2018 by developing new calculations and simulations to bring our stock holdings closer to our market strategies. Now our dividend is composed of two semi-annual installments; the first in September of the current year and the second in March of the following year. The amount to be calculated is 30% of adjusted EBITDA, less current investment. In 2018, we paid US\$ 3.3 billion in dividends and interest on shareholders' equity. The new policy has currently been suspended by resolution of the Board of Directors.

In addition, in December 2018, we completed the stock repurchase program announced in July, to a total amount of US\$ 1 billion. During 2018, the price of our shares in Brazil rose by 25%, which demonstrates the Company's strong position despite a turbulent macroeconomic scenario. Currently, we have shares in the New Market of B3 S.A, which represents compliance with the best practices in the global market. Minority shareholders now have more representation, with full voting rights and the same treatment as the controlling shareholders in Vale's major decisions.

With respect to the Ferrous segment, on December 6, 2018 we closed a contract with IEP Ferrosos Brasil LLC to purchase Ferrous Resources Limited, a company that owns and operates iron ore mines near our operations in Minas Gerais, for US\$ 550 million. The transaction is expected to be completed in 2019, subject to certain conditions precedent, including approval by antitrust authorities in Brazil.

We also concluded an agreement with Hankoe FIP to purchase New Steel Global NV (New Steel), a company that develops innovative iron ore beneficiation technologies. We closed the contract for US\$ 500 million on December 10, 2018, with all conditions fulfilled, including the approval by antitrust authorities in Brazil. The transaction was completed on January 24, 2019. New Steel currently has patents in 56 countries for Fines Dry Magnetic Separation (FDMS), a dry processing concentration technique.

The dry magnetic concentration eliminates the use of water in the process of concentrating the low-grade ore, which allows the waste generated to be disposed in waste rock piles, similar to dry stacking. This technology, however, is in the process of industrial development and is not yet ready to be applied on a large scale (*see more information on [page 24](#)*).

For more information on our economic and operating performance, see the Information to the Market section at our website at www.vale.com.

5. Including third-party purchases for iron ore and pellets.

Value generated and distributed

GRI 201-1

(US\$ million)	North America, except Canada	Canada	South America, except Brazil	Brazil	Europe	Africa	Australasia	Middle East	Total
Recipes	-	1,664.0	19.0	2,988.0	28,893.0	-	3,011.0	-	36,575.0
Direct Economic Value Generated	-	1,664.0	19.0	2,988.0	28,893.0	-	3,011.0	-	36,575.0
Operational costs	2.0	2,755.0	39.0	11,434.0	4,903.0	1,920.0	788.0	268.0	22,109.0
Wages and benefits of employees	-	684.0	9.0	1,486.0	12.0	112.0	147.0	47.0	2,497.0
Research and Development	-	61.0	17.0	238.0	-	27.0	30.0	-	373.0
Payments to capital providers	546.0	11.0	1.0	4,662.0	156.0	-	246.0	20.0	5,642.0
Government Payments	(3.2)	104.6	3.4	2,959.7	34.5	(31.3)	109.0	3.5	3,180.2
Environmental Expenditures		178.5	0.4	197.3	5.0	30.8	39.6	8.2	459.8
Social Expenditures	0.1	4.4	0.2	95.8	-	2.9	13.1	0.1	116.5
Distributed Economic Value	544.9	3,798.5	70.0	21,072.9	5,110.5	2,061.4	1,372.6	346.8	34,377.6
Accumulated Economic Value	(544.9)	(2,134.5)	(51.0)	(18,084.9)	23,782.5	(2,061.4)	1,638.4	(346.8)	2,197.3

Ethics and transparency, fighting against corruption and illegal practices

GRI 102-17 | 103-1 | 103-2 | 205-1 | 205-2 | 205-3 | 206-1 | 406-1

The principles of ethics and integrity are fundamental and must be followed by all those who act on behalf of the Company, both in handling Vale's internal matters and in dealing with government officials and commercial relations. Action must always be based on transparency, respect and accuracy of information. Our main governance instruments about these issues is the [Code of Ethical Conduct](#).

These documents set forth the rules that must be followed by all employees, as well as those of our subsidiaries and directly- and indirectly-controlled companies, relative to international anti-corruption laws and regulations (specifically related to the corruption of national or foreign public agents) applicable to the Company's business and imposed on our managers, suppliers, consultants, joint venture partners and other institutions linked to us. The principles that guide the professional conduct of all people who work in our Company and in our subsidiaries are also found in the [Code of Ethical Conduct](#).

As part of the ongoing process to update our guidelines, in 2018 we completed the revision of the code, which is now more accessible to employees

and contains greater details about the expected behaviours of all, from board of directors to trainees, contractors and partners.

Complaints of violations of the Code of Ethical Conduct are dealt with by the Ethics and Conduct Office. We do not tolerate violations of the Company's ethics and integrity policies or any law that the Company is subject to. In 2018, the channel received 2,709 complaints, of which 91% were investigated. Investigations have confirmed violations in 45% of these complaints.

All allegations are investigated by the Ethics and Conduct Office, except in the event of (i) lack of information to initiate an examination, in which case the Office will request additional information from the person raising the concern and will proceed with the investigation provided it receives additional information within 15 days, and (ii) lack of pertinence to the Ethics and Conduct Office's scope of work. The Ethics and Conduct Office's scope of work includes investigating alleged violations of Vale's Code of Ethical Conduct, such as fraud and moral harassment cases, and also resolving issues that have not been properly addressed by other areas in the Company, such as delays in payments to contractors.

All confirmed violations triggered correction plans, which are presented by the Company's managers and approved by the Ethics and Conduct Office. As a general rule, these plans contain measures to promote improvements, training initiatives and feedback to employees, depending on the seriousness of the allegations. The officials involved may be subject to administrative measures, such as warnings, suspensions or terminations. The Ombudsman's investigations in 2018 resulted in

2,007 corrective actions, including the termination of 214 employees. Among the confirmed cases, three cases of discrimination by Vale's employees were included. In these cases, the employees reported were dismissed.

The management of ethics and integrity is the joint responsibility of the Corporate Integrity, Supplies, Corporate Security, Ombudsman, Audit, Human Resources, and Internal Control areas. One of the Companies' main actions to promote this topic is the Action for Integrity, held yearly since 2015. It is aimed at all leaders, employees and third parties to encourage discussion on ethical values and the reporting of incorrect attitudes at all hierarchical levels. In 2018, the action reached 58,000 of our own employees and those of third party suppliers, in our operations around the world.

Prevention of and Fight Against Corruption

The Global Anti-Corruption Program is one of our tools to prevent and fight against corruption of public agents. It is a comprehensive set of rules that reinforce one of our values: Do What Is Right, which must be followed by the whole Company. Managing this program is the responsibility of the Corporate Integrity area, which in 2018 continued to share and reinforce an compliance and anti-corruption culture within the workforce. To achieve this, the area has conducted onsite and online training (mandatory for all employees with computer access), sent out communications, redesigned the program page on the intranet, and held periodic follow-up meetings with critical areas of the Company.

In 2018, notices were issued regarding our anticorruption policy and procedures for senior management, employees and suppliers who must adhere to the Supplier's Code of Ethical Conduct. In addition, the companies classified by the program as high-risk suppliers, which represent 7.64%, also receive the Anti-Corruption Policy and must apply its rules when rendering services to Vale. In the jurisdictions where we operate (South America, Europe, Africa, Asia Pacific, the Middle East and Canada), more than 6,000 people were trained: 626 leaders (from supervisors to top leaders) and 5,243 employees⁶. The policies and norms on this subject are available for access by all employees.

Every six-months, the Corporate Integrity area participates in meetings of the Fiscal Council regarding disseminating information about the Global Anti-Corruption Program and attends meetings of the People and Governance and Compliance and Risk Committees. Annually, on the World Day to Fight Against Corruption, a message is sent via email to all employees, in which the Chief Executive Officer and the General Counsel reinforce Vale's values and policy of zero tolerance for any form of corruption.

As part of Vale's Global Anti-Corruption Program, in 2018, 18,000 due diligence actions⁷ for business security were carried out, approximately 4,000 more

6. We do not have the number of people trained by functional category of the countries Indonesia and New Caledonia. The total number of people trained in these countries is present in the table on this page.

7. The numbers include the evaluation of third parties (suppliers, entities, institutions, among others) registered at Vale during the year.

than in 2017. As well, due diligence actions were performed on third parties who transacted with Vale before any donation or sponsorship payments

Employees trained in anti-corruption policies and procedures

GRI 205-2

Country	Number of Employees Trained
Austria	2
Brazil	4.297
Canada	239
China	32
India	4
Indonesia	187
Japan	1
Malawi	33
Malasya	176
Mozambique	511
New Caledonia	294
Oman	436
Paraguay	15
Singapore	52
Switzerland	65
United Arabe Emirates	2
United Kingdom	3
Uruguay	1
Total	6.350

were made. They included suppliers, subcontractors, landowners, institutions, among other publics.

Fighting Illegal Practices

Based on international treaties, legal frameworks in force in the countries where we operate, and internal rules and policies, we orient our commercial areas to practices and procedures that must be adopted to comply with the competition legislation. In 2018, the Company had no records of new judicial or administrative proceedings involving unfair competition practices, in Brazil or other countries where we operate.

Eight cases of private corruption were reported to the Ethics and Conduct Office in 2018 and in all of them the employees involved were punished or removed from the Company. In this period, no corruption cases were identified in relation to government officials.

Supplier Management

GRI 102-9

Our suppliers are managed according to the same compliance standards that are upheld within the Company with respect to social and environmental safety and ethics and integrity. Corporate Security verifies the history of third-party supplier companies and their partners early in the registration phase, analyzing their compliance with the requirements of the Global Anti-Corruption Program, their respect of slave labour sanctions by the brazilian Federal Government (Ceis, Cepim and CNEP), and other criteria. If any irregularity is found, the supplier is not certified and may be deemed disqualified to serve us.

Our policies and rules are aligned to the best practices of the market, to the Business Pact for Integrity and Against Corruption, to which the Company is a signatory, and to the laws applicable to Vale.

The hiring process is also based on the Health, Safety and Environment Guide, a corporate document that forms the basis of technical and commercial proposals from bidders in the competition processes, and ensures compliance with all items described during the term of the contract. Compliance with this guide is a mandatory condition for hiring. As part of the hiring process, we also engage our suppliers on the subject of climate change. For information on the Carbon Value Chain Program, visit the Other Emissions section ([page 75](#)).

Suppliers must also abide by Vale’s Code of Ethical Conduct for Suppliers, and other rules that reflect the position of the Company. The supplier’s corruption risk rating is provided in the Global Anti-Corruption Program and should be recorded in the Company’s supplier management system.

We also continuously monitor contracts to verify compliance with our requirements. Additionally, we have a list of forbidden products, or products that should be avoided in our operations (if their use is absolutely necessary, a specific risk analysis must be performed).

As part of the supplier relationship strategy and to build more transparency and quality into our supplier relationships, we created the Supplier Performance Index (IDF in Portuguese), considering five criteria: technical quality, environmental protection, health and safety, respect for employees, and continuous improvement.

Biodiversity and Ecosystem Services

GRI 103-1 | 103-2 | 304-1 | 304-2 | 304-3 | 304-4 | MM2

We understand that biodiversity and ecosystem services are essential and intrinsic to Vale’s business, and respect the richness, breadth and value of maintaining them in our management practices. We operate in several regions, including areas of high cultural value and high relevance to biodiversity, and our activities often involve suppressing or altering natural habitats. However, we seek to limit our activities to those that are strictly necessary and have the least possible intensity. We also implement prevention, mitigation, control, recovery and offset measures, going beyond our legal obligations, to protect biodiversity and ecosystem services affected by our activities. Our long-term goal is to seek No Net Loss in biodiversity, working to make a positive influence in the territories in which we operate.

Today, our operations cover 1.4 thousand km². The main risks and direct and indirect impacts are associated with our modifications to natural environments and our land use that changes components of the physical environment which in turn function as support for the elements of the biotic (flora and fauna). Of the total area affected by our operations, 56% is dedicated to ore extraction, industrial production, processing, beneficiation and product transportation, and 44% to industrial plantations. Compared to 2017, we impact 0.1 thousand km² less due to the sale of Fertilizer assets.

66.5% of our operations are in areas classified as wilderness and 25.6% are in so-called hotspots, distributed across 11 ecoregions. Considering the location in relation to protected areas or areas of high biodiversity value (wilderness areas and hotspots)⁸ located outside protected areas, our total operating areas are distributed as follows⁹ :

- 8.0% or 110.5 km² in areas of high biodiversity index outside protected areas;
- 14.2% or 194.4 km² adjacent to areas of high biodiversity index;
- 35.5% or 487.3 km² near legally protected areas; and
- 14.5% or 199.8 km² in legally protected areas (sustainable use conservation units that allow mining activity).

8. Large geographic areas considered important for conserving the world’s flora and fauna.

9. To 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.

We are associate members of the International Council on Mining and Metals, and are committed to conserving biological diversity

Integrated Territory Management

GRI 102-12

In 2018, we seek to align more closely to the Global Strategic Plan for Biodiversity 2011–2020 of the Convention on Biological Diversity by increasingly integrating the issue into our corporate and business decisions. In our risk and impact management, we developed specific studies, from planning our entry into new territories to the final completion of our projects, to evaluate sensitive habitats and species. Thus, we adopted an integrated territorial management approach in our operations, incorporating and applying concepts related to the Impact Mitigation Hierarchy (HMI in Portuguese).

We have been working in recent years on improving our Biodiversity Management Plans in the territories in which we operate and in our operations. Since 2017, we have partnered with The Biodiversity Consultancy to develop guidelines for biodiversity management. It is important to note that 46% of territories require a Biodiversity Management Plan, and in 91% of them, we already have plans in place.

We develop researches with focus on the enlargement knowledge of the territories in which we act, as well as we invest in innovation and technologies that allow the use of more and more sustainable use of natural

resources. Our research and impact management initiatives also involve recovering areas to restore native habitats that previously existed and restoring important ecosystem services. Since 2010, we have been working closely with our partners and making partnerships with research institutions and universities. In 2018, we continued the implemented projects, with an investment of over US\$ 5 million. These projects cover several themes, including environment and biodiversity.

We are associate members of the International Council on Mining and Metals (ICMM), and are committed to conserving biological diversity and using integrated approaches to land-use planning. We took part in discussions with the Brazilian Business Council for Sustainable Development (BBCSD) to facilitate the entry of the Brazil’s Natural Capital hub.

In line with Aichi Biodiversity Targets, we invest in research and conservation of endangered and restricted-distribution species through our own initiatives, partnerships and investments in institutions related to biodiversity conservation. Among these actions, the most outstanding are the Ararinha-azul na Natureza, Amigos da Jubarte, Cavalo-marinho e Onça-pintada projects.

In 2018, the sum of the species recorded in the areas directly affected nearby Vale’s operations and in protected areas was 5,021 species; 2,701 of fauna and 2,320 of flora. 100 of these are considered to be on the Ministry of the Environment 2014 (MMA in Portuguese) national list of endangered species and 67 on the international list of the International Union for Conservation of Nature (IUCN, 2018), according to the table below.

List of endangered species

GRI 304-4

Category	MMA	IUCN
Vulnerable	50	46
Endangered	37	19
Critically endangered	13	2

We protect our own areas and support third-party areas covering approximately 850,000 hectares of natural lands in biomes in Brazil and worldwide. This support affects approximately six times the total area occupied by our operating units and contributes to protecting species of native fauna and flora, including endemic and endangered species. Of the total areas that the company helps to protect, 4.5% are Vale’s own, and the remaining 95.5% are maintained in partnership with public environmental agencies, such as the Chico Mendes Institute for the Conservation of Biodiversity (ICMBio). 92.2% of these areas belong to regions classified as wilderness; and 7.8% as hotspots; 94% of these areas are located close to our operating units.

With regard to managing the impacts of our operations on biodiversity, involving communities where the Company operates, the work done in Manjung, Malaysia must be highlighted. There, we have implemented a community-based mangrove protection and rehabilitation program to improve coastal and fishery protection, as well as to develop options for sustainable alternative livelihoods for local communities, while empowering women (particularly housewives) to pursue entrepreneurship and fishermen to carry out ecotourism activities.

Recovery of Degraded Areas (RDA)

GRI 103-1 | 103-2 | MM1

The Recovery of Degraded Areas (RDA) is inherent to the mining process, due to vegetation suppression, morphological alteration of surfaces and landscapes, and other factors, so it is an extremely important issue for us. Therefore, the RAD process is developed in different phases of our projects, from the implementation, through the operation, to the closure of activities, incorporating environmental, ecological, aesthetic-landscape, socioeconomic and cultural values of the different territories where we operate.

In line with our Sustainability Policy, we have established an internal normative document called the Recovery of Degraded Areas (RDA) System Management Standard, which aims to guide the recovery process in areas impacted by our activities in Brazil.

We had a goal to plant and recover up to 1,500 hectares of areas globally by 2018 and have exceeded it. We ended the year having recovered 1,667 hectares in Brazil and regions such as Maputo (Mozambique), Ontario (Canada), and New Caledonia.

We initiated the Program for Improvement of Recovery of Degraded Areas (PRORAD in Portuguese) as a pilot project in 2016, initially dedicated to the Quadrilátero Ferrífero region operating units in Minas Gerais. We forged

partnerships with local universities to increase our knowledge about the areas and improve our actions. In 2018, we started two research projects: Monitoring in Corumbá dealt with RDA themes at the Federal University of Viçosa, and Soil Preparation Mechanization on Cutting Slopes at Senai/IST Metalmecânica de Belo Horizonte.

In the same year, we also expanded the pilot program for Carajás region (in Parauapebas, Canaã dos Carajás and Ourilândia do Norte), which enabled us to identify seven lines of potential enhancements, some of which are similar to those pointed out in 2017. A portion of these demands have been addressed by adjusting current procedures, such as improving seedling production and using chemical weeding to control invasive plants. Needs that require more detailed and multidisciplinary studies are being handled by the Vale Technological Institute for Sustainable Development in Belém (Pará), as well as by universities.

At ITV, dozens of multidisciplinary researchers conduct studies that foster sustainable development, contribute to vocational training in the region and create solutions to important mining issues, such as environmental services, water resources, genomics, climate change and soil use. The Institute works in three main axes: teaching, research and entrepreneurship, taking into account the cycle of scientific production, its practical application and the generation of concrete benefits for society. For more information about ITV, visit: www.itv.org.

The tables below set out the indices related to areas affected and recovered, in the context of all Vale activities, specifically for mining activities.

From a legal point of view, operations that exploit mineral resources are obliged to recover the degraded

environment and, therefore, must submit a Plan for Recovery of Degraded Areas (PRAD in Portuguese) for approval from the appropriate environmental agency, at the presentation of the Environmental Impact Assessment and Environmental Impact Report (EIA / RIMA, acronyms in Portuguese). As with environmental licensing, the entrepreneur is also obliged to periodically report its environmental performance and recovery activities to the appropriate agency for inspection.

Impacted Areas and Areas in Recovery (km²)
GRI 304-3

	2016	2017	2018
Impacted	17.3	13.0	9.8
Recovering (total)	19.4	13.7	12.8
Permanent	14.9	8.6	6.5
Temporary	4.5	5.1	6.3

Location of Impacted and Recovering Areas (km²)

MM1

	Impacted	Recovering (total)	Permanent	Temporary
Brazil				
Minas Gerais	2.0	6.4	0.1	6.3
Espírito Santo	0	0.3	0.3	0
Pará	2.9	3.5	3.5	0
Maranhão	0	0.4	0.4	0
Mato Grosso do Sul	0.3	0.1	0.1	0
International				
Indonesia	3.5	0.9	0.9	0
New Caledonia	0.3	0.3	0.3	0
Canada	0	1.0	1.0	0
Mozambique	0.8	0.3	0.3	0

Opening and Closing Balance (km2)

MM1

Year	Impacted Areas (opening balance)	Impacted Areas in the Reference Year	Areas in Permanent Recovery in the Reference Year	Impacted Areas (closing balance)
2016	620.8	13.9	6.7	628.0
2017	628.0	10.8	7.6	631.2
2018	631.2	9.8	6.1	625.6

We work to compensate for our impacts, investing in conservation units and planning and maintaining protected areas that are important to habitats in the biomes where we operate. Here are some of our actions in this field:

Vale Natural Reserve (RNV in Portuguese) – In Brazil, in the State of Espírito Santo within the Atlantic Forest biome, we maintain the Vale Natural Reserve (RNV). This voluntary commitment protects 23,000 hectares of Tableland Atlantic Forest in our own area (one of the last remnants of a forestry formation that is currently one of the most threatened in the Atlantic Forest biome). In addition to conserving biological diversity, the RNV develops scientific research and educational actions. In partnership with ICMBio, in an area adjacent to the RNV, we support the protection of the Sooretama Biological Reserve (Rebio), amounting to about 50,000 hectares. The RNV also maintains one of the largest nurseries of native seedlings in the Atlantic Forest, with the capacity to produce three million seedlings per year to restore forestry in the region and recover degraded areas where the Company operates. The RNV has a world-renowned Herbarium, which shares information and supports research in various locations. It also has a space for public leisure activities and environmental education. Aiming to stimulate research and conservation of the Atlantic Forest, the Reserve establishes partnerships with researchers from several academic institutions in Brazil and other countries, and hosts courses and events related to biome research.

The Quadrilátero Ferrífero region – In the Quadrilátero Ferrífero region, in Minas Gerais, Brazil, which is home to the Cerrado and Atlantic Rainforest biomes, there are around 68,000 hectares

of protected areas as a result of Vale’s environmental compensation actions and voluntary initiatives. In studies conducted so far, about 70 species of threatened animals and plants were identified in those protected areas. In 2018, the region represented 3.4 times the area of our operations in the Quadrilátero Ferrífero region. These protected spaces are defined to form a mosaic of connectivity between Legal Reserves, Conservation Units and other protected areas, resulting in significant ecological corridors that play a role in maintaining genetic diversity.

Carajás – In Carajás (in Brazil’s Pará state in the Amazon biome), Vale protects 780,000 hectares of native forests and associated natural ecosystems, affecting about 7,000 species of protected plants and animals, including 50 endangered species of animals and approximately 300 endemic animals from the Amazon, according to studies developed up to 2018. In this area, Vale created and helps to maintain, in partnership with ICMBio, the Carajás Ferruginous Fields National Park, which contains more than 79,000 hectares of protected forests and rocky fields. This park supports the preservation of remnants of ferruginous rocky fields in the north of Brazil and extends the protection of more than 22,000 hectares of continuous areas connected to the Carajás National Forest.

Units Protected by Vale or With Company Support
MM1

Protected area	Location	Biome	Property	Area (km2)
Carajás National Forest	Brazil (Pará)	Amazon Forest	ICMBio ¹	3910.0
Tapirapé-Aquiri National Forest	Brazil (Pará)	Amazon Forest	ICMBio	1142.4
Itacaiúnas National Forest	Brazil (Pará)	Amazon Forest	ICMBio	1365.9
Tapirapé Biological Reserve	Brazil (Pará)	Amazon Forest	ICMBio	992.0
Igarapé do Gelado Environmental Protection Area	Brazil (Pará)	Amazon Forest	ICMBio	232.7
Carajás 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 Forest	Vale	0.3
Vale Natural Reserve	Brazil (Espírito Santo)	Atlantic Forest	Vale	227.1
Sooretama Biological Reserve	Brazil (Espírito Santo)	Atlantic Forest	ICMBio	278.0
Natural Heritage Private Reserves (NHPR) in Minas Gerais’ Iron Quadrangle	Brazil (Minas Gerais)	Atlantic Forest	Vale	128.0
Protection area related to four small hydroelectric power stations (PCHs)	Brazil (Minas Gerais)	Atlantic Forest	Vale	3.3
North Forests Natural Reserve (Forêt Nord Nature Reserve)	New Caledonia	Forest and Maquis Shrubland	Government of New Caledonia	2.7
Pic du Grand Kaori Reseve	New Caledonia	Forest and Maquis Shrubland	Government of New Caledonia	3.1
Private Protected Area	Mozambique	-	Vale	16.7
Ecological Centre Vale Malaysia (Vale Eco Centre)	Malasya	Sundaland	Vale	2.9
Total				8,526.2

¹ The 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.

Management of Water Resources and Effluents

GRI 103-1 | 103-2 | 303-1 | 303-2 | 303-3 | 306-1 | 306-2 | 306-3 | 306-4 | 306-5

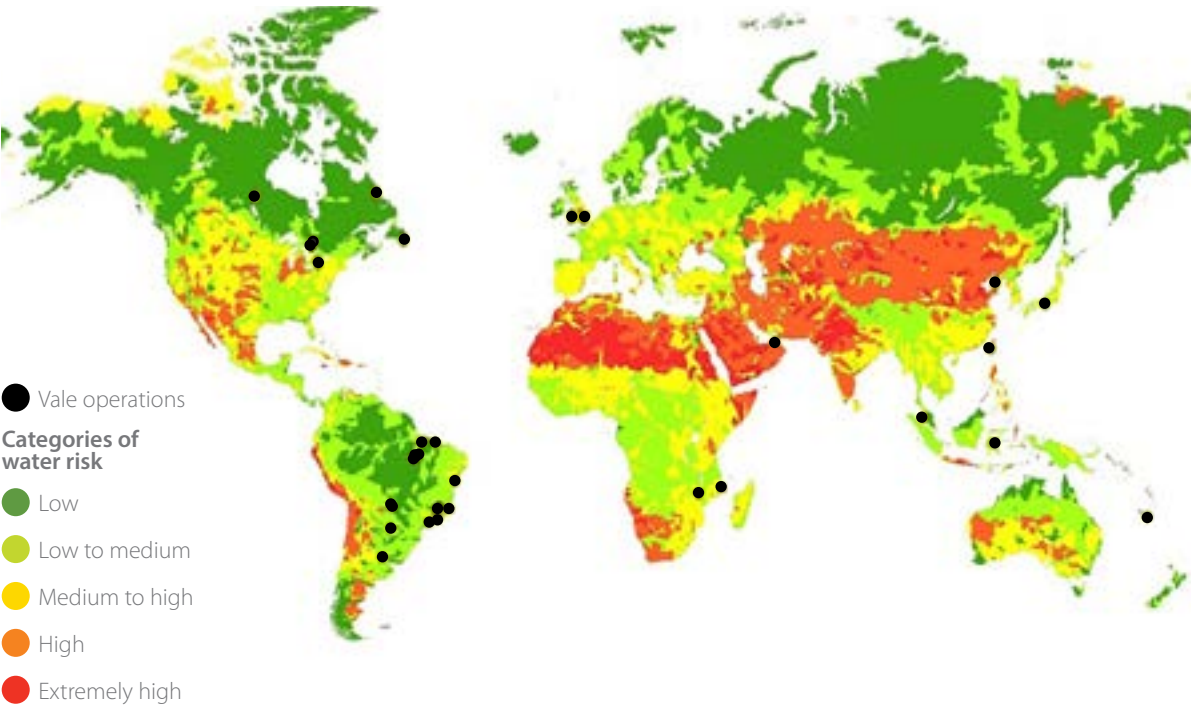
Water resources are essential to our activities and we develop programs and implement actions that go beyond compliance with legal requirements to optimize water use and consumption. One of our initiatives is participating in the CDP Water Program to manage our impacts related to water resources and disclose our performance. We also seek to reduce the water we take from the environment for our mining operations, and to promote the reuse and appropriate treatment of effluents to increase the local water supply available for biodiversity and the communities.

To guide our actions, we rely on the Target Water Program, started in 2018. Its main objective is to reduce withdraw for use in production processes. To this end, Vale invests in reuse initiatives; the search for new technologies, the development of studies, and the expansion of the monitoring network.

The goal is to achieve a 10% reduction in specific use by 2030 (new water captured and used in processes per tonne produced), which means a smaller volume of new water captured for the same volume of production. In 2018, Vale spent US\$ 80 million on water resource initiatives.

To assist the Company in analyzing risks related to water stress, we count on the Aqueduct tool. Developed by the World Resource Institute (WRI),

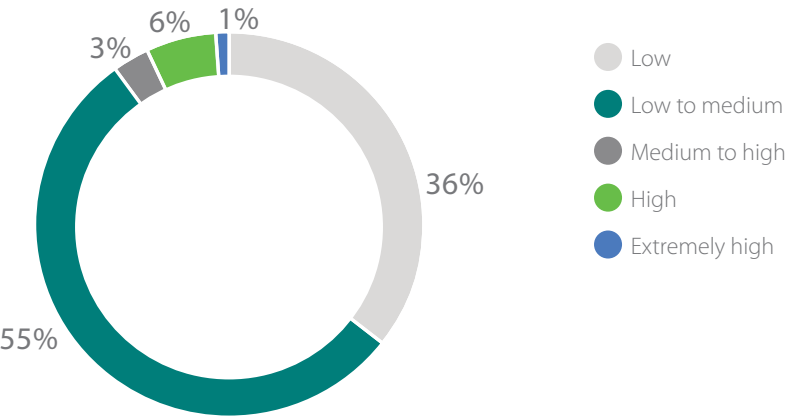
this tool provides global-scale water risk mapping to identify the impacts of river floods due to urban damage, the occurrence of floods and the severity of droughts, and the populations affected by these situations. With this tool, it is possible to correlate our operating units' water use with the degree of risk indicated by Aqueduct.



Volume and percentage of water and water stress level
(million of m³)

	North America and Europe		South America		Africa, Asia and Oceania		TOTAL	
	Volume (million of m³)	(%)	Volume (million of m³)	(%)	Volume (million of m³)	(%)	Volume (million of m³)	(%)
Total	52		112		38		202	
Low	35	67%	37	33%	0	0%	72	36%
Low to medium	17	33%	73	65%	20	53%	110	54%
Medium to high	0	0%	2	2%	3	9%	6	3%
High	0	0%	0	0%	13	33%	13	6%
Extremely high	0	0%	0	0%	2	5%	2	1%

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



The Target Water Program's main objective is to reduce water withdraw for use in production processes. The goal is to achieve a 10% reduction in specific use by 2030

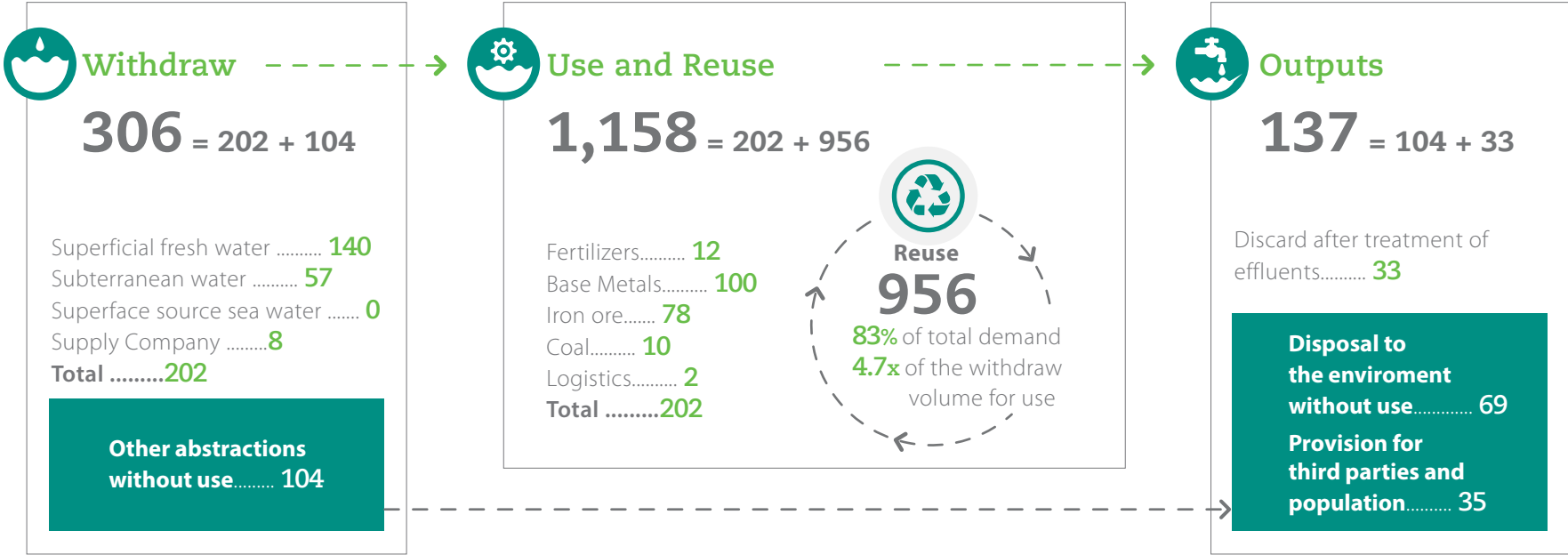
In addition to the main goals of Target Water, the program also invests in the continuous improvement of water resource management to adhere to the principles of the International Council on Mining and Metals (ICMM). All these strategies are aligned with the Structuring Plan, the basis of the Target Water program. Among our main commitments related to water resource management is:

- Manage our operating units' water resources by following the stipulated procedures, with annual frequency and by sampling;

- Acquire, install, revise, expand and maintain our water monitoring network through studies and acquisition of monitoring equipment and instruments for measurement and automation;
- Identify and make infrastructural projects and executions feasible to improve the management of water resources and effluents;
- Map water resources;
- Keep water balances up to date;
- Expand the use of the water resources and effluents data management tool;

- Establish a methodology for economic valuation of ecosystem services related to water resources;
- Map opportunities to optimize water use and reduce water collection for use in the processes through reuse;
- Develop and implement effluent treatment systems;
- Reduce and/or eliminate losses through evaporation, water retained in tailings, leaks, etc.

Hydric balance
(In million of m³)



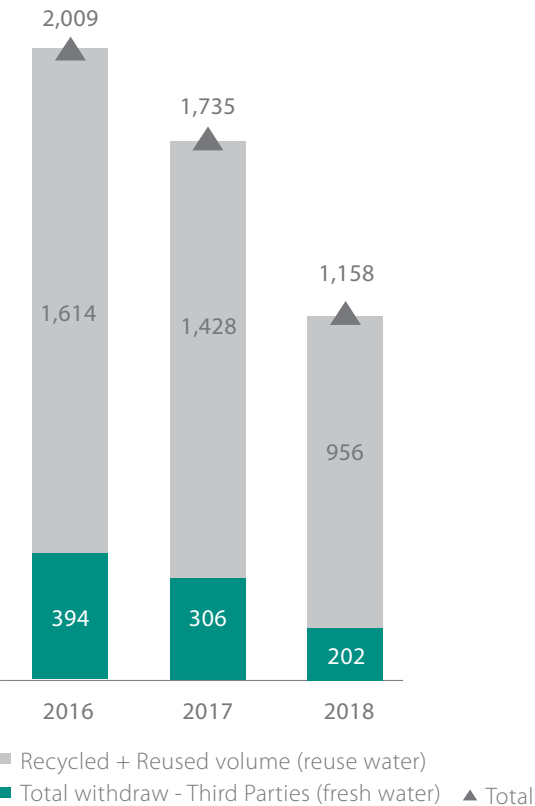
In 2018, our main initiatives in this issue included defining the Water Goal 2030; mapping of universities to develop R&D projects; analyzing 11 R&D project proposals; establishment of five contracts to improve Water Resources Management in operating units; holding water resources workshop, integrating operational units at a global level; acquiring a portable ultrasonic flow meter and conducting verification campaigns in operating units; training water resources coordinators in operating units; purchasing 413 instruments and items of equipment for water monitoring; revising the water balance in operating

units; developing a systematic analysis and gathering water resources quantitative data; identifying a tool for water resources management and implementing the quality module in five operating units; and consolidating and centralizing grants information in the corporate area.

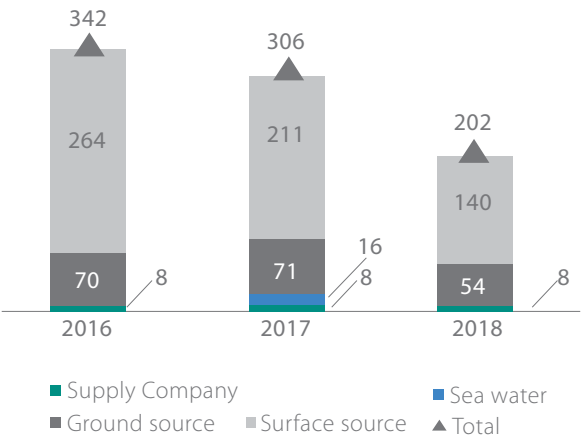
In 2018, the total volume of withdrawal water for use in our production processes was 202 million m³, 34% less than 2017, mainly due to the sale of Fertilizer assets and stoppage of some nickel operations. A further 104 million m³ were withdraw, but not used

in the productive process. Of these, 35 million were channeled to neighbouring communities and 69 million were returned to the environment. The volume of water reused was 956 millions of m³, 83% of total production demand. After use in industrial operations, the effluents totaling 33 million m³ are directed to control, treatment and disposal systems.

Total demand
(In million m³)



Water withdraw for use in Vale's production processes
(In million m³)



Non-mineral Wastes

GRI 103-1 | 103-2 | 306-2

The efficient management of non-mineral waste is of great importance to Vale, since it enables us to minimize the environmental impact of our activities. Thus, our Waste Management Program focuses on the performance of three main fronts: lower generation of waste from awareness in the operational areas, reuse of waste with actions and projects for insertion in new production chains and new disposal technologies and, finally, control and development of new suppliers receiving waste from rigid processes of environmental assessment, reducing the risks related to improper disposal.

To control the destination of waste in Brazil, we emphasize our actions related to the Waste Recipient Audits Program, in which all companies that receive waste from Vale Brazil undergo an environmental assessment and auditing process in a maximum period of three years. During 2018, 87 audits were carried out, for a total of 203 companies actively registered.

We generated 661,000 tons of waste in 2018; which 96% was non-hazardous and 4% was hazardous. There was a significant reduction compared to 2017 (976,000 tons) due to the sale of the fertilizer business.

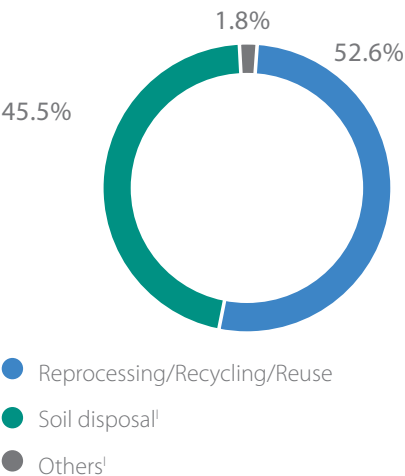
In 2018, 53% of the total waste generated by Vale was destined for recycling, and included off-road tires, conveyor belts, wood and composting organic waste, among other materials. 221 tons of waste were sent to the recycling cooperatives in Minas Gerais, boosting job generation and income in the recycling chain in Vale's region of activity. The Carajás Mine, through a project in partnership with a local company, sought to use wood waste energy to reduce landfill disposal and support a local furniture cooperative. The result was the reuse of 220 tons of wood waste during 2018, with potential for expansion in the coming years.

Vale has also developed actions to streamline waste disposal with polychlorinated biphenyls, known as PCBs, in all its operational units, and to anticipate the goals of the Stockholm Convention for disposing of such materials by 2025 and ensuring their adequate final disposal by 2028.

PCBs are considered environmental contaminants that impact health and ecosystems. In 2018, 150 tons of PCB waste were disposed of in Brazil, including transformer equipment and used oils.

Disposition and Destination

(Total of 669 thousand tons)
GRI 306-2

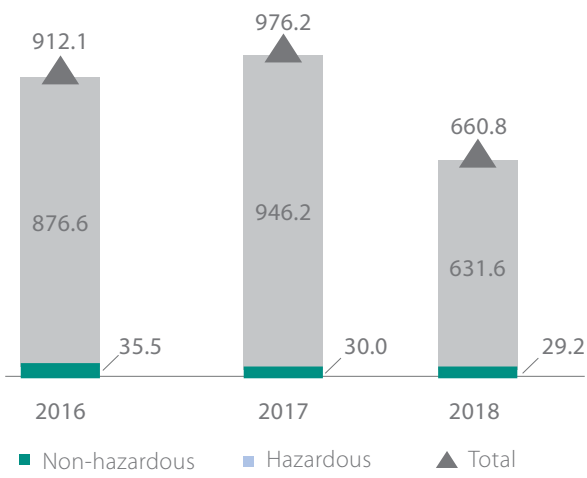


I. External sanitary landfill, internal landfill, disposition in overburden pile and subsoil.
II. Co-processing, incineration and biological treatment.

In 2018, 53% of the total waste generated by Vale was destined for recycling, and included off-road tires, conveyor belts, wood and composting organic waste, among other materials

Global - Waste Generation

(in thousand tons)
GRI 306-2



International Transport of Hazardous Waste

GRI 306-4

The transboundary transport of hazardous waste originating from Vale units meets the requirements of the Basel Convention. The document establishes international mechanisms to control movements based on the principle of prior and explicit consent for the import, export and transit of such waste.

In 2018, there was transboundary transport only in the New Caledonia operating unit. Of the total 1,299.92 tons transported, 979.02 tons were hazardous wastes exported to New Zealand, according to agreements reached between the parties.

Significant Spills

GRI 306-3

In 2018, within the scope of significant spills, we reinforced the process of internal sharing of information related to environmental incidents, seeking to increase the learning and transparency between the areas and to improve the risk analysis. Nevertheless, we recorded three occurrences considered significant, one referring to oil leakage and two other effluents. Spills were duly reported to the relevant environmental agencies in accordance with defined emergency response plans. The units involved took measures to minimize impacts, analyze incidents and adopt actions to avoid recurrence.

Mitigation, adaptation and resilience to climate change

GRI 103-1 | 103-2 | 201-2 | 305-5

Climate change represents a scientifically proven reality and a challenge that affects not only our production activities, but the entire planet. As a result, we have acted continuously and are guided by scientific references and practices, always adhering to our internal policies and rules, to deal with the issue.

Vale's Global Climate Change Mitigation and Adaptation Policy is a document that outlines the guidelines on the issue for us and for our supply chain, encompassing commitments to manage and reduce Company-specific emissions and establish a global goal for reducing Greenhouse Gases (GHGs). The document also directs the removal of CO₂, risk management and adaptation to climate change, and discusses our work with our supply chain and engagement with governments and scientific and research institutions, among other commitments. See more details of the policy on Vale's website.

We follow trends and studies on climate change in global forums, which aim to determine regulatory and economic strategies to mitigate and adapt worldwide. In Brazil, we participate in discussions, collaborating to prepare policies and strategies aimed at transitioning to a resilient and low-carbon economy. One such example is our participation in developing Adaptaclima – a government platform to spread knowledge about adaptation to improve information access and connect interested parties in Brazil. We

also participate in international discussion meetings, including technical discussions on economic instruments, to encourage the global reduction of GHG emissions.

From our voluntary adherence to recommendations of the Task Force on Climate-related Financial Disclosures (TCFD) led by the Financial Stability Board, in 2018 we launched studies on the impacts, risks and opportunities for Vale considering climate change scenarios proposed by the International Energy Agency (IEA).

It was also possible to anticipate achieving the Carbon Goal¹⁰ for 2017, an original proposal of reducing direct GHG emissions by 5% by 2020. Vale's projects and initiatives have prevented or reduced direct emissions by around 1 million tons of CO₂e¹¹, which means that emissions would be around 7.8% higher without these projects, justifying our anticipation of achieving the goal by 2020.

Once the current Carbon Goal was achieved, in 2018 the Company set a new goal for the period from 2017 to 2030, aiming to reduce by 16% the intensity of direct and indirect¹² GHG emissions, considering the emissions of 2017 as the base year.

10. The Carbon Goal considers reducing emissions in relation to a business-as-usual scenario; that is, the difference between the actual emissions inventoried and the emissions that would occur if the Company did not take any initiative to avoid or reduce its emissions.

11. Deducting reductions related to fertilizer assets sold.

12. For the purpose of calculating the emission intensity, the target considers the iron ore production, our main product, as a parameter to compare the production of the Company's other products, such as coal, nickel and copper. Therefore, all our production is converted to a tonne of iron ore equivalent.

To reach the goal, we seek to implement new initiatives to replace fossil fuels with renewable sources in the energy supply chain, as well as reforestation projects in degraded areas and energy efficiency projects, through annual targets in the Sustainability KPI program. In addition, the Company is studying operation electrification projects, associated with a more renewable electricity matrix, and encouraging a cleaner, lower-carbon energy matrix. One of the assumptions of the KPI is to establish annual goals to reduce emission intensity indicators of our operations, encompassing both direct emissions (Scope 1¹³) of production activities and indirect emissions (Scope 2¹⁴) related to electricity consumption.

Among our Carbon Goal initiatives, we highlight our operation of the truckless system (using no trucks) in the S11D Eliezer Batista Complex (Canaã dos Carajás, PA), preferred use of natural gas instead of fuel oil in our pellet plants, energy efficiency measures at our railroads and pelletizing plants, and better mine planning in Itabira (MG). In 2018, released approximately 1.2 million fewer tons of CO₂e into the atmosphere due to these and other reduction projects.

13. It covers emissions from Vale's own or controlled sources, such as the use of fuels, production processes, fugitive emissions, agricultural emissions and changes in soil use. Non-significant direct emissions, such as waste and liquid effluent treatment and disposal, are not included.

14. It covers emissions related to Vale's purchase and use of electricity from systems connected to the network and from isolated systems.

GHG Emissions and Energy

GRI 305-1 | 305-2 | 305-4

The Company's total GHG emissions¹⁵, the sum of scopes 1 and 2, totaled 14.3 million tons of equivalent CO₂, an increase of 2.7% in relation to 2017.

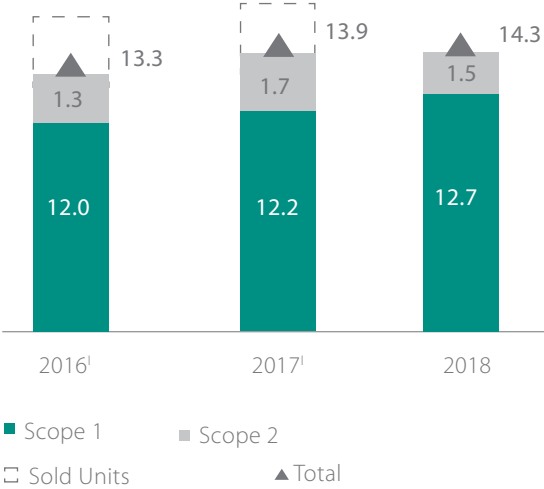
Increased production in 2018 is a consequence of successful ramp-ups of Pelletizing Plants 1 and 2 in Tubarão (Vitória, ES) and the São Luís plant (MA), as well as continued ramp-ups in the coal operations of Moatize in Mozambique and iron ore at the S11D Eliezer Batista Complex (Carajás, PA), which impact product flow via the Carajás Railroad. As a consequence, energy consumption increased, mainly due to the conclusion of Fertilizer unit sales, our strategy to continue sailing our own ships, and our optimization of production flow in our Nickel and Copper business, especially in the North Atlantic operations.

Vale's direct GHG emissions (Scope 1) were about 4% higher in 2018 compared to 2017, after deducting emissions of assets sold, totaling 12.7 million tCO₂e. Indirect emissions from electricity purchases (Scope 2) were reduced by 7% in 2018, totaling 1.5 million tCO₂e on the same basis of comparison, mainly due to

15. Vale's inventory is developed with an operational control approach, has a mobile base year and includes the gases carbon dioxide (CO₂), methane (CH₄) and 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 CDP Climate Change questionnaire.

Total GHG Emissions of Vale

(millions of tCO₂e)



I. The results of 2016 and 2017 were adjusted due to the revision of data and emission factors, according to GHG Protocol recalculation methodology.

the reduced Grid emission factor of some countries, including Brazil, Canada and the United Kingdom, since purchased electricity consumption was not reduced in 2018.

Regarding biogenic (renewable) emissions, which totalled 466.8 thousand tCO₂ in 2018, there was an increase of 24% in relation to 2017, of which 82% are from burning renewable fuels. This result is mainly due to the increase of the proportion of biodiesel in commercial diesel in Brazil and Indonesia, in mobile and stationary sources, and deforestation in anthropogenic areas.

We removed 30.4 thousand tons of CO₂ from the atmosphere through the revegetation of impacted areas and/or compensation, an increase of 34% over the previous year.

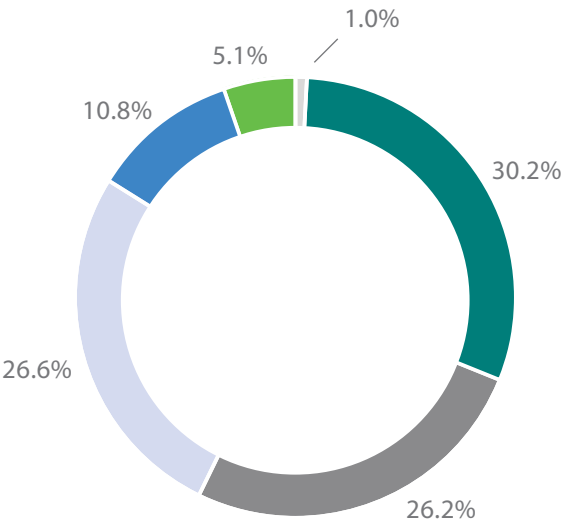
As can be seen in the Total Emissions by Source chart, in 2018 there was a strong correlation between our energy consumption matrix and GHG emissions, since about 64% of the Company's emissions are related to energy use as a source of combustion or electricity use.

In 2018, the energy matrix continued with a similar profile to 2017, with a slight increase in the use of renewable sources, which currently represents 28% of the Company's consumption energy matrix. The specific emission arising from energy use in 2017 was slightly reduced when compared to the previous year, totaling 47.6 tCO₂e/TJ.

In terms of energy supply, we continue striving to achieve self-sufficiency in electric power in Brazil. We have sought to invest continuously in self-production from renewable sources, such as hydroelectric, wind and solar power plants, guided by the quality and security of supply, cost competitiveness and sustainability.

We signed another renewable energy supply contract from the Folha Larga Sul wind project, which is expected to start operating in the first half of 2020. This contract also contains Vale's option to acquire the park, which would add up to 151.2 MW to our generation capacity.

Total Emissions (Scopes 1 and 2) by source



- Industrial Process (I)
- Mobile Combustion
- Stationary Combustion (II)
- Purchase of electricity and steam
- Fugitive (III)
- Agriculture and land use (IV)

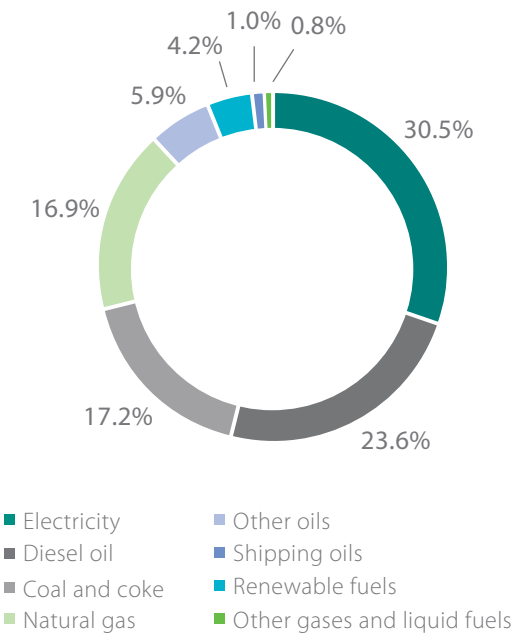
I. Industrial Process: burnt iron ore pellets, Nickel and co-products, Ferroalloys, Nitric Acid, Ammonia and Phosphate Rock.

II. Stationary Combustion: fuel consumptions and use of explosives.

III. Fugitive: coal mining and HFCs losses.

IV. Agricultural and soil use: fertilizer application and changes in soil use.

Energy consumption matrix by source



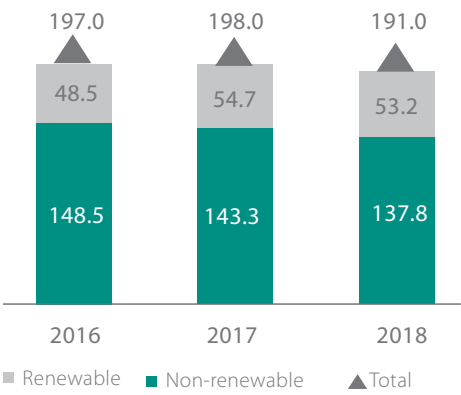
Other Emissions

GRI 305-3 | 305-6

Scope 3 emissions, indirect GHG emissions calculated throughout the value chain, cover upstream emissions (related to goods and services purchased or acquired) and downstream emissions (related to goods and services sold). In 2018, these emissions totaled approximately 586 million tCO₂e in the year, a result very similar to that of 2017. About 97% of these downstream emissions are due to the processing and use of products sold by Vale.

In adherence to the Global Climate Change Policy, in 2011 we created the Carbon Program in the Value Chain. Initially, the program involved training suppliers to prepare an inventory of GHG emissions. Now it commits to the annual reporting of GHG emissions from critical suppliers to Vale, as well as other information on emission management. This commitment is formalized by inserting a voluntary clause in contracts executed in Brazil.

Participation of renewable sources
(thousand TJ)



Distribution of energy consumption by source

	(%)	(Thousand TJ)
Non-renewable fuels	65%	125
Coal and coke	17%	33
Diesel oil	24%	45
Shipping oils (I)	1%	2
Other oils (II)	6%	11
Natural gas	17%	32
Other gases (III)	1%	1
Other liquid fuels (IV)	0%	0
Renewable fuels (V)	4%	8
Electricity consumed - Own Generation (Indonesia and Canada)	5%	10
Purchased electricity consumed (GRID)	23%	45
Electricity NR GRID	6%	12
Electricity RE GRID	17%	33
Purchased electricity consumed (OFF GRID)	2%	3
Electricity NR OFF GRID	1%	1
Electricity RE OFF GRID	1%	2
Energy Recovery	0%	0
Electrical energy consumed NR	0%	0
Electrical energy consumed RE	0%	0
Renewable Steam Energy consumed	0%	0
Non-renewable Steam Energy consumed	0%	0
Purchased Refrigeration Consumed	0%	0
Purchased Heat Consumed	0%	0
Total	100%	191

(I) Maritime Diesel Oil, IFO, MGO, MDO; (II) Fuel oil, BPF oil, HFO, light distillate oil, residual oil; (III) GLP, HLR, propane, fuel gas; (IV) Gasoline, methanol, kerosene and jet fuel; (V) Biodiesel, Biomass, chip, charcoal, ethanol.

The program is meant for companies from any region, as long as they have active agreements with Vale. The campaign had the greatest result since its inception and inventories of 193 suppliers were received, as a consequence of engaging category managers and building awareness among suppliers of the importance of the theme and its impacts on companies.

Emissions of ozone-depleting substances (ODSs) totaled about 0.42 tons in 2018, a reduction of around 73% compared to 2017. These emissions relate to the use of refrigerant gases and other fluids controlled by the Montreal Protocol.

Atmospheric Emissions

GRI 103-1 | 103-2 | 305-7

For Vale, the main air pollutants emitted are particulate matter (PM), sulfur oxides (SOx) and nitrogen oxides (NOx). Our air pollutant management starts with an inventory of sources, which may be fixed or mobile, specific or diffuse, followed by the implementation of control systems and emission monitoring plans. We also maintain air quality monitoring stations in the vicinity of operating units. We seek continuous improvement of operational processes and adoption of new technologies, focusing on reducing emissions from stationary sources and improving air quality indicators. In 2018, US\$ 127.5 million was spent on the issue of atmospheric emissions.

We work to reduce diffuse emissions (particulate material) in our operating units by adopting measures such as improving sprinkler systems and using dust suppressor products. Due to each unit's operational particularity, the actions and goals of emission reduction are established in a specific way and in harmony with the local scenario.

In 2018, in partnership with the Espírito Santo Federal University (UFES in Portuguese), Vale developed and patented a biodegradable dust suppressor product. This resin is produced by chemically recycling PET-based waste and has a characteristic sealant that maintains moisture in stockpiled material, railroad wagons and unpaved roads. The product has already been laboratory-tested under adverse conditions and is currently being field-tested to validate its efficiency and quality assurance. This initiative and technology will help Vale to reduce its particulate matter emissions, improving air quality in surrounding communities. In addition to the environmental benefits, there is the social gain of involving associations of local collectors to foment plastic waste recycling, making businesses more sustainable.

Another achievement of 2018 was signing a new Environmental Commitment Term (TCA in Portuguese) to reduce particulate matter emissions at the Tubarão operational unit in Vitória, Espírito Santo. The Term signature involved the Federal Public Ministry, State Public Ministry, State Secretariat for the Environment and State Environmental Institute and aims to ensure transparency in implementing all initiatives presented by the Environmental Master Plan.

The Environmental Master Plan consists of implementing actions and projects to reduce particulate matter emissions and improve the unit's water management. Highlights of the controls include applying cellulose-based products in ore piles; implementing new wind fences; adjusting approximately 40 km of conveyor belts and installing fog cannons in pellet yards. The expectation is that, by the year 2023 when we complete the implementation of all these measures, diffuse emissions will be reduced by up to 93%. Our investments total US\$ 348 million, currently the largest contribution our Company has made toward environmental stewardship.

This Environmental Commitment Term and Environmental Master Plan signify our commitment not to measure efforts and resources to make all these actions happen, representing Vale's attitude towards the municipality of Vitória, Espírito Santo.

At our Sudbury unit in Canada, Vale completed the Clean AER Project, in which a total of US\$ 1 billion has been invested since 2012. The project reduced 85% of SOx emissions from the foundry at Copper Cliff. In addition, the project will also reduce our smelter's greenhouse gas emissions by 40%. These emission reductions reflect the Company's position to provide resources to improve controls and environmental management to help recover the local landscape. The Clean AER Project has reduced emissions so significantly that there is no need to continue using the existing large iconic chimney known as the Superstack, which has been replaced by two smaller, more efficient chimneys. This replacement

will be finalized by 2019, allowing the Superstack to be decommissioned by 2020. With this adjustment, natural gas consumption is expected to decrease by approximately 50%.

The Clean AER Project also involves installing new converters at the smelter, a new wet gas treatment plant and a new ventilation and bag filter system, which will cut particulate emissions from metals by approximately 40%.

We maintain a policy of improving our operational processes and control systems and increasing productivity, aiming to adopt fuels with lower sulfur contents, reducing SOx emissions by 60% compared to 2016.

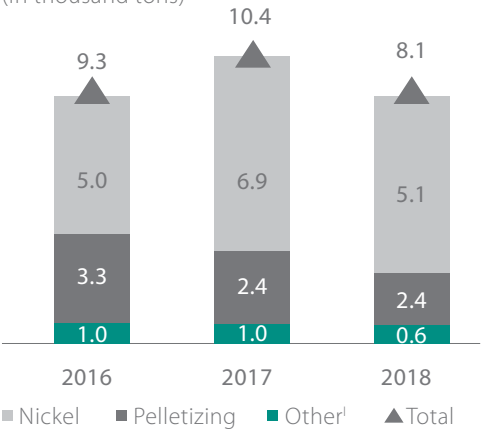
In calculating atmospheric emissions, we apply two methodologies: consolidating direct monitoring results and calculating emission factors multiplied by fuel consumption. The results of these methodologies are presented below.

Emissions of Particulate Matters

Our reduction of particulate matter emissions by approximately 23% compared to 2017 mainly reflects investments in operational improvements and the Thompson unit's furnace shutdown.

Emissions of Particulate Matters

(In thousand tons)



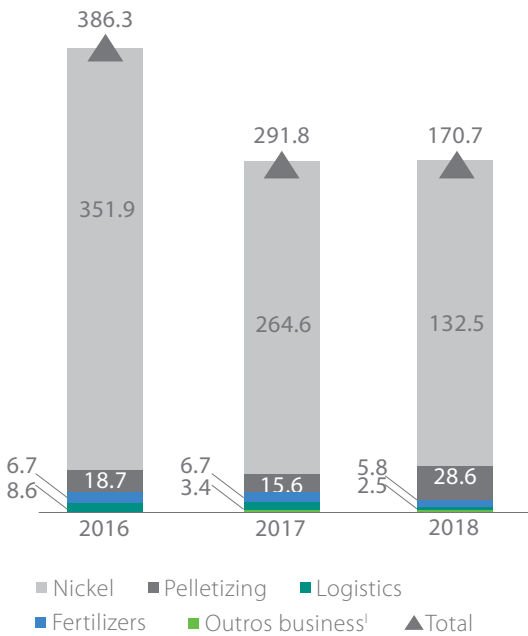
I. Manganese and Fertilizers

Sulfur Oxides (SOx)

Our significant reduction SOx pollutant emissions in the Nickel business is mainly due to the Thompson unit furnace shutdown and investments made through the Clean AER Project in Sudbury completed in 2018. Increased emissions from the Pelletizing business occurred due to increased production and resumption of Plants I and II in Tubarão.

SOx Emissions

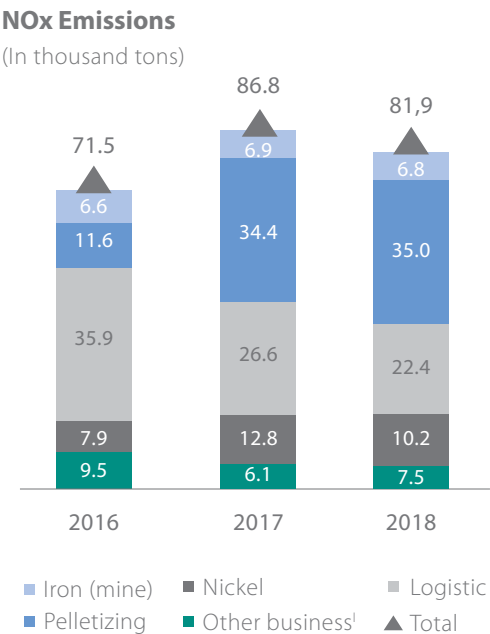
(In thousand tons)



I. Coal, Iron (Mine), Manganese and Cooper

Nitrogen Oxides (NOx)

The reduction of NOx emissions by approximately 6% compared to 2017 is mainly due to the Logistics business, which has adopted a higher percentage of biofuel in its fleet.



I. Coal, Cooper, Manganese, Energy and Fertilizers

Scope

GRI 102-45 | 102-46 | 102-49

In order to define the content and scope of this Sustainability Report, aligned with the Material Aspects and Limits methodology, Vale relied on the materiality matrix resulting from the mapping of indicators. The work took into account stakeholder expectations and interests regarding the Company's significant economic-financial and socio-environmental impacts. The ability of these themes to influence investment assessments and decisions was also considered.

Regarding the scope, the report includes information on the performance of companies over which Vale has operational control and holds a participation of over 50%. References to "Vale" or "the Company" in this report are generally limited to Vale S.A. and its subsidiaries. Whenever a controlled subsidiary is specifically mentioned in this report, the information provided in respect of that entity will be limited to it only.

In January 2018, a substantial portion of our Fertilizer business was sold to The Mosaic Company ("Mosaic"), which includes (i) our phosphate assets in Brazil; (ii) our participation in the joint venture that operates the phosphate rock mine in Bayóvar, Peru; (iii) our potash production assets in Brazil; and (iv) our Canada-based potash production project (Kronau). In May, we completed the sale to Yara International ASA of our wholly-owned subsidiary, Vale Cubatão Fertilizantes Ltda., which owned and operated nitrogen and phosphate assets in Cubatão, Brazil. Therefore, the

performance of this division is not contemplated in this Report. (Learn more about this in the 20-F Report and the Investors section of www.vale.com).

Within its subsidiaries, Vale seeks to ensure that policies and standards are implemented, according to applicable legislation, in line with its internal policies and standards. In the direct or indirect affiliated companies in which Vale (i) owns between 20% and 50% of the voting capital, or (ii) holds more than 50%, but without control, including cases of shared control, Vale expects these companies to implement and follow policies and standards aligned with the Company's. However, due to the lack of control, Vale cannot guarantee that these companies fully comply with all their policies, procedures and controls.

External verification

GRI 102-56

Statement by SGS ICS Certificadora Ltda. (SGS) regarding the sustainability information provided in this report, given to Vale S.A.

Assurance nature and scope

SGS was hired by Vale S.A. to render independent and limited assurance of its 2018 Sustainability Report. Based on assurance methodology of SGS Sustainability report, the certification scope includes the text and data related to GRI standard indicators for 2018 provided here, based on methodology to assure SGS Sustainability reports.

The responsibility for information of 2018 Sustainability Report and its presentation lies on management members 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. Our assurance work is focused on data of report 2018, and it does not cover the Brumadinho tragedy in 2019.

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 2018 Sustainability Report" is deemed as Comprehensive Option.

The assurance process suggested by Vale S.A. 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 "The 2018 Sustainability Report" of Vale S.A was not assessed as part of this assurance process. So, both pieces of information were assessed in different audit process.

Once it is performed at a plenty of Vale S.A., units the audit process enabled a more accurate assurance direct in the information source, in addition to provide inputs for the Company's Sustainability Management System enhancement, generating value

to the assurance process traditionally performed by companies, where the audit teams are restricted to data and information check at their head offices. The SGs team had the opportunity to complete the assurance stages at the following plants: mine of nickel PTVI Sorowako (Indonesia), mine of cooper Sossego and Salobo and mine of iron Complex S11D Eliezer Batista in the state of Pará (Brazil), operations of maritime and port terminals Itaguaí maritime terminal and Guaíba Island Maritime Terminal in the state of Rio de Janeiro (Brazil), Corporate in the state of Minas Gerais and in the state of Rio de Janeiro (Brazil).

Independence and Competence Statement

The SGS group is a worldwide leader in inspections, analysis and verifications which operates in 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 (GHG). SGS reinforce its Independence from Vale becoming cleared from any interest conflict against the organization, its subsidiaries and stakeholders.

Assurance Statement

The assurance team was nominated based on knowledge, expertise and skills for this service and was composed of:

- An Audit Lead on Assurance of Sustainability Report, a Lead auditor on Socioenvironmental programs a Lead Assessor of Greenhouse Gases (GHG), 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 Gas Effect (GHG) and Climate Change Program, Lead Auditor on Socioenvironmental programs.
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gas Effect (GHG) and Climate Change Program.
- An Auditor on Sustainability Report Assurance, Lead Assessor on Greenhouse Gas Effect (GHG) and Lead Auditor on Environmental, Quality and Health and Safety Management Systems.

Assurance Opinion

Regarding the verification performed against the methodology, process and data provided by Vale S.A., we attest the information and data provided in "2018 Sustainability Report" is reliable and a true and balanced representation of the sustainability activities performed by Vale in 2018. The assurance team has the opinion the report can be used by stakeholders of company as part of their assessment processes. The organization has elected the comprehensive option, which meets its needs.

In our opinion, based on what was found in company office in Campinas and on documents provided by Vale, the report content meets fully the GRI standard requirements, including those in Sectorial Appendix for Mining and Metals and Sustainable Development Framework: Assurance Procedure of ICMM – International Council on Mining and Metals

Recommendations, findings and conclusions of Assurance

The Vale "2018 Sustainability Report" comprises information of all matters considered as material for the segment and stakeholders. The Vale S.A. reported properly the disclosures 103-1 – Subject matter and its limit, 103-2 – Management methods and their components and 103-3 – Management method assessment for each subject matter.

- The report 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. Except the disclosure 403-2 that was reported partially.
- The disclosure 306-5 was partially reported through the action plan to be implemented.

Regarding the contribution to improvement in the development of future sustainability report and a higher efficiency in assurance process, we recommend to Vale S.A. that:

1. Develops a continuous process to map the stakeholders and materiality, avoiding, thus, specific moments to perform this activity in the year. The best practices suggest the subject matters should be taken from the organization interface processes with their stakeholders that are already in progress and occurring throughout the year.
2. Promotes a better understanding of their activities and the importance of GRI indicators management in their plants. We understand that, despite of training that have already been held in company, such awareness should be reinforced. An effective

manner to promote this awareness is to encourage the data input on indicator collecting system be performed by higher number of employees, spreading the information input that is extremely concentrated in few people.


Finally, SGS encourages the transparency importance and congratulates VALE for innovative way the company has disclosed the information of the dam breach at Brumadinho (MG) in Sustainability Report 2018. We also express our condolences for everyone who was involved and impacted by such tragedy.

Executed by and on behalf of SGS



Fabian Peres Gonçalves
Business Manager - Sustainability

SGS ICS Certificadora Ltda.



Mariana de Oliveira Klein
Lead Auditor for Sustainability Report

SGS ICS Certificadora Ltda.

June 3rd, 2019

www.sgs.com

GRI Content Index

GRI 102-55



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102-32 Highest governance body's role in sustainability reporting	36 and for more information, go to the topic "12.1 - Description administrative structure "in the Reference Form.			1, 2
102-33 Communicating critical concerns	36			1, 2, 10
102-34 Nature and total number of critical concerns	45			1, 2, 10
102-35 Remuneration policies	36 and for more information, go to the topic "13 - Remuneration of administrators" in the Reference Form.			1, 2
102-36 Process for determining remuneration	36 and for more information, go to the topic "13 - Remuneration of administrators" in the Reference Form.			1, 2

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
102-37 Stakeholders' involvement in remuneration	36 and for more information, go to the topic "13 - Remuneration of administrators" in the Reference Form.			10
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	46			10
102-41 Collective bargaining agreements	We celebrate collective bargaining agreements with all labor unions, representing 100% of the employees in Brazil. We have collective agreements with unionized employees in our operations in Brazil, Canada, Indonesia, Malawi, Mozambique, New Caledonia, and the United Kingdom - representing 95%. For more information, see item 14.4 of our Reference Form, committed to respecting, not obstructing or retaliating against collective bargaining and free association.	8		3

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102-52 Reporting cycle	4			10
102-53 Contact point for questions regarding the report	4			10

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
102-54 Claims of reporting in accordance with the GRI Standards	4			
102-55 GRI content index	84			
102-56 External assurance	82			
GRI 201: Economic Performance 2016				
103-1 Explanation of the material topic and its Boundary	46, 60			
103-2 The management approach and its components	37-44, 60			
103-3 Evaluation of the management approach	38, 42			
201-1 Direct economic value generated and distributed	60	2, 5, 7, 8, 9		9
201-2 Financial implications and other risks and opportunities due to climate change	75	13		6
201-3 Defined benefit plan obligations and other retirement plans	More information in Form 20-F: Note 29 Employee benefits.			
201-4 Financial assistance received from government	No significant financial assistance was received from governments.			

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
GRI 202: Market Presence 2016 - Non-material				
GRI 203: Indirect Economic Impacts				
103-1 Explanation of the material topic and its Boundary	46, 50			
103-2 The management approach and its components	37-44, 50			
103-3 Evaluation of the management approach	38, 42			
203-1 Infrastructure investments and services supported	53	2,5, 7, 9, 11		9
203-2 Significant indirect economic impacts	56	1, 2, 3, 8, 10, 17		9
GRI 204: Procurement practices 2016 - Non-material				
GRI 205: Anticorruption 2016				
103-1 Explanation of the material topic and its Boundary	46, 63			
103-2 The management approach and its components	37-44, 63			

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
103-3 Evaluation of the management approach	38, 42			
205-1 Operations assessed for risks related to corruption	63	16		1
205-2 Communication and training about anti-corruption policies and procedures	63, 64	16		1, 2
205-3 Confirmed incidents of corruption	63			1
GRI 206: Anti-competitive Behavior 2016				
103-1 Explanation of the material topic and its Boundary	46, 63, 64			
103-2 The management approach and its components	37-44, 63, 64			
103-3 Evaluation of the management approach	38, 42			
206-1 Legal actions for anti-competitive behavior, anti-trust, and monopoly practices	64	16		1
GRI 301: Materials 2016 - Non-material				
GRI 302: Energy 2016 - Non-material				
GRI 303: Water 2016				

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
103-1 Explanation of the material topic and its Boundary	46, 70			
103-2 The management approach and its components	37-44, 70			
103-3 Evaluation of the management approach	38, 39, 42			
303-1 Water withdrawal by source	70	6		6
303-2 Water sources significantly affected by withdrawal of water	70	6		6
303-3 Water recycled and reused	70	6, 8, 12		
GRI 304: Biodiversity 2016				
103-1 Explanation of the material topic and its Boundary	46, 65			
103-2 The management approach and its components	37-44, 65			
103-3 Evaluation of the management approach	38, 39, 42			
304-1 Operational sites owned, leased, managed in, or adjacent to, protected areas and areas of high biodiversity value outside protected areas	65	6, 14, 15		2, 7
304-2 Significant impacts of activities, products, and services on biodiversity	65	6, 14, 15		7

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
304-3 Habitats protected or restored	65, 67	6, 14, 15		6, 7
304-4 IUCN Red List species and national conservation list species with habitats in areas affected by operations	65, 66			
GRI 305: Emissions 2016				
103-1 Explanation of the material topic and its Boundary	46, 75, 79			
103-2 The management approach and its components	37-44			
103-3 Evaluation of the management approach	38, 39, 42			
305-1 Direct (Scope 1) GHG emissions	76	3, 12, 13, 14, 15		6
305-2 Energy indirect (Scope 2) GHG	76	3, 12, 13, 14, 15		
305-3 Other indirect (Scope 3) GHG emissions	78	3, 12, 13, 14, 15		6
305-4 GHG emissions intensity	76	13, 14, 15		
305-5 Reduction of GHG emissions	75	13, 14, 15		6
305-6 Emissions of ozone-depleting substances (ODS)	78	3, 12, 13		

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
305-7 Nitrogen oxides (NOx), sulfur oxides (SOx), and other significant air emissions	79	3, 12, 13, 14, 15		6
GRI 306: Effluents and waste 2016				
103-1 Explanation of the material topic and its Boundary	46, 70, 73			
103-2 The management approach and its components	37-44, 70, 73			
103-3 Evaluation of the management approach	38, 39, 42			
306-1 Water discharge by quality and destination	70	3, 6, 12, 14		6
306-2 Waste by type and disposal method	73, 74	3, 6, 12		6
306-3 Significant spills	75	3, 6, 12, 14, 15		6
306-4 Transport of hazardous waste	75	3, 12		
306-5 Water bodies affected by water discharges and/or runoff	70	6, 15	Details of the water bodies are unavailable. There is a workplan for collecting information for the SR 2020.	
GRI 307: Environmental compliance 2016 - Non-material				

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
GRI 308: Supplier Environmental Assessment 2016 - Non-material				
GRI 401: Employment 2016 - Non-material				
GRI 402: Labor/Management Relations 2016 - Non-material				
GRI 403: Occupational Health and Safety 2016				
103-1 Explanation of the material topic and its Boundary	26, 46, 47			
103-2 The management approach and its components	26, 37-44, 47			
103-3 Evaluation of the management approach	38, 42			
403-1 Workers representation in formal joint management-worker health and safety committees	50	8		5
403-2 Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	47, 48, 49	3, 8	Gender information are unavailable. There is a workplan for collecting information for the SR 2019.	5
403-3 Workers with high incidence or high risk of diseases related to their occupation	47	3, 8		5

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
403-4 Health and safety topics covered in formal agreements with trade unions	47	8		5
GRI 404: Training and Education 2016 - Non-material				
GRI 405: Diversity and Equal Opportunity 2016 - Non-material				
GRI 406: Non-discrimination 2016				
103-1 Explanation of the material topic and its Boundary	46, 50, 59, 60			
103-2 The management approach and its components	37-44, 50, 59, 60			
103-3 Evaluation of the management approach	38, 42			
406-1 Incidents of discrimination and corrective actions taken	63	5, 8, 16		3
GRI 407: Freedom of Association and Collective Bargaining 2016 - Non-material				
GRI 408: Child Labor 2016				
103-1 Explanation of the material topic and its Boundary	46, 50, 59			
103-2 The management approach and its components	37-44, 50, 59			

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
103-3 Evaluation of the management approach	38, 42			
408-1 Operations and suppliers at significant risk for incidents of child labor	59	8, 16		3
GRI 409: Forced or Compulsory Labor 2016				
103-1 Explanation of the material topic and its Boundary	46, 50, 59			
103-2 The management approach and its components	37-44, 50, 59			
103-3 Evaluation of the management approach	38, 42			
409-1 Operations and suppliers at significant risk for incidents of forced or compulsory labor	59	8		3
GRI 410: Security Practices 2016				
103-1 Explanation of the material topic and its Boundary	46, 50, 59			
103-2 The management approach and its components	37-44, 50, 59			
103-3 Evaluation of the management approach	38, 42			
410-1 Security personnel trained in human rights policies or procedures	59	16		3

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
GRI 411: Rights of Indigenous Peoples 2016				
103-1 Explanation of the material topic and its Boundary	46, 50, 57			
103-2 The management approach and its components	37-44, 50, 57			
103-3 Evaluation of the management approach	38, 42			
411-1 Incidents of violations involving rights of indigenous peoples	57	2		3
GRI 412: Human Rights Assessment 2016				
103-1 Explanation of the material topic and its Boundary	46, 50, 59			
103-2 The management approach and its components	37-44, 50, 59			
103-3 Evaluation of the management approach	38, 42			
412-1 Operations that have been subject to human rights reviews or impact assessments	59			3
412-2 Employee training on human rights policies or procedures	59			3

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
412-3 Significant investment agreements and contracts that include human rights clauses or that underwent human rights screening	There were no significant investment contracts or agreements, that is, investments related to transactions involving acquisitions, mergers or incorporation of companies, in 2018. All Company contracts include human rights clauses.			3
GRI 413: Local Communities 2016				
103-1 Explanation of the material topic and its Boundary	46, 50			
103-2 The management approach and its components	37-44, 50			
103-3 Evaluation of the management approach	38, 39, 42			
413-1 Operations with local community engagement, impact assessments, and development programs	51			9
413-2 Operations with significant actual and potential negative impacts on local communities	51, 55	1, 2		9
GRI 414: Supplier Social Assessment 2016 - Non-material				
GRI 415: Public Policy 2016				
103-1 Explanation of the material topic and its Boundary	46			

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
103-2 The management approach and its components	37-44, 46			
103-3 Evaluation of the management approach	38, 39, 42			
415-1 Political contributions	In accordance with Brazilian law, we do not perform any contribution of any kind to political parties and/or politicians.	16		1
GRI 416: Customer Health and Safety 2016 - Non-material				
GRI 417: Marketing and Labeling 2016 - Non- material				
GRI 418: Customer Privacy 2016 - Non-material				
GRI 419: Socioeconomic Compliance 2016 - Non-material				
Mining and metals sector guidance:				
Biodiversity				
MM1- Amount of land (owned or leased, and managed for productions activities or extractive use) disturbed or rehabilitated	67, 68, 69	3, 6, 12, 14, 15		2, 6, 7

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
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	63	6, 14, 15		2, 6, 7
Effluents and Waste				
MM3 - Total amounts of overburden, rock, tailings, and sludges and their associated risks	26	3, 6, 12		7
Labor/Management Relations				
MM4 - Number of strikes and lock-outs exceeding one week's duration, by country	Non- material			
Rights of Indigenous Peoples				
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		3, 10
Local communities				
MM6 - Number and description of significant disputes relating to land use, customary rights of local communities and indigenous peoples	57	1, 2		10

GRI Standard / Disclosure	Page/Answer	SDGs	Omission	ICMM Principles
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	57	2		9, 10
Artisanal and Small-scale				
MM8 - Number (and percentage) of company operating sites where artisanal and small-scale mining (asm) takes place on, or adjacent to, the site; the associated risks and the actions taken to manage and mitigate these risks	In 2018, there were 29 occurrences within the limits of our operations and 31 adjacent ones.	1, 2, 3, 6, 8, 12		
Resettlement				
MM9 - Sites where resettlements took place, the number of households resettled in each, and how their livelihoods were affected in the process	56	1, 2		3, 10
Closure Planning				
MM10 - Number and percentage of operations with closure plans	Non-material			

Appendix I: Entities and associations

GRI 102-13	Conselho Empresarial do BRICS	Iniciativa de Transparência da Indústria Extrativa (EITI) – fazemos parte via ICMM
Academia Brasileira de Ciências (ABC)	Conselho Empresarial Mundial para o Desenvolvimento Sustentável(WBCSD)	Instituto Brasileiro de Mineração (Ibram)
Associação de Comércio Exterior do Brasil (AEB)	European Association of Metals (Eurometaux)	Instituto Latino-americano de Ferro e Aço (Ilafa)
Associação dos Terminais Portuários Privados (ATP)	European Steel Association (Eurofer)	International Chamber of Commerce (ICC)
Associação Nacional dos Transportes Ferroviários (ANTF)	Fórum de CEOs Brasil-Canadá	International Council on Mining & Metals - (ICMM)
Brazil Industries Coalition (BIC)	Fórum de CEOs Brasil-EUA	ONU Mulheres
Centre National de Recherche Technologique Nickel et Son Environnement (CNRT Nickel)	Fórum Intergovernamental sobre Mineração, Minerais Metais e Desenvolvimento Sustentável (IGF)	Rede de Soluções de Desenvolvimento Sustentável (SDSN)
Centro Brasileiro de Relações Internacionais (Cebri)	Fundação Centro de Estudos do Comércio Exterior (Funcex)	Reputation Institute Sustainability 50
Cobalt Development Institute	Fundo Global para o Combate a Aids, Tuberculose e Malária (Global Fund) – checar com área de Saude se ainda fazemos parte	Sindicato da Indústria Mineral do Estado de Minas Gerais (Sindiextra)
Columbia Center on Sustainable Investment (CCSI)	Global Business Coalition on HIV/Aids, Tuberculosis and Malaria (GBC)	The Cobalt Development Institute
Comitê Consultivo de Empresas e Indústria da OCDE (Biac)	Global Business Initiative on Human Rights	The Indonesian Mining Association (IMA)
Comitê de Cooperação Econômica Brasil-Japão (CCE)	Grupo de Institutos e Fundações de Empresas (Gife), via Fundação Vale	The Mining Association of Canada (MAC)
Confederação Nacional da Indústria (CNI)		The Nickel Institute
Conselho Empresarial Brasil-China (CEBC)		Voluntary Principles on Security and Human Rights
Conselho Empresarial Brasileiro para o Desenvolvimento Sustentável(Cebds)		

