Meet Vale
Disclaimer

This presentation may include declarations stating Vale’s expectations concerning future events or results. All declarations, when based on future expectations rather than historical facts, involve various risks and uncertainties. Vale cannot guarantee that such declarations will prove to be accurate. Such risks and uncertainties include factors related to the following: (a) countries where we have operations, especially Brazil and Canada; (b) the global economy; (c) the capital markets; (d) mining and metals businesses and their dependence on global industrial production, which is cyclical by nature; and (e) the high degree of global competition in the markets in which Vale operates. To obtain additional information about factors that could give rise to results different from those estimated by Vale, please consult the reports filed with the Brazilian Securities Commission (CVM), the Autorité des Marchés Financiers (AMF), the US Securities and Exchange Commission (SEC), The Stock Exchange of Hong Kong Limited, and, in particular, the factors discussed in the “Estimates and projections” and “Risk factors” sections of Vale’s Annual Report – Form 20F.

Cover photo: Gabriel Lordêllo
About us

Photo: Ricardo Téles
We are Vale

- A mining company that works as the basis of a chain that contributes to the development of society.
- Company with world-class assets
- Global leader in the production of iron ore, nickel and pellets.
• We also produce copper, coal, fertilizers, manganese, ferroalloys and by-products of gold, silver, cobalt and platinum group metals.

• We invest in logistics, steel making and energy.

• We innovate every day to make mining more modern, safe and sustainable.
Why do we exist?

Mining is **essential** for the **development** of society and modern life. It is essential for our lives.
The ore is in everything

They allow us to:

- Contribute to development of medicine
- Relieve the longing
- Have energy at home to use the appliances
- Take your kids to school or you to work
- Escape from heat
- Exercise body and mind
For Vale, **innovation** is far beyond technology. It is in each one of us, in the different thinking, in the restlessness that leads us to do better what we already do.

We continue to reinvent mining by looking for more sustainable ways of working, always evolving. We are building today the future we want.
# Intellectual Property at Vale

<table>
<thead>
<tr>
<th>Protection of Vale's knowledge</th>
<th>Technological strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evaluate the technology state of the art, and identify the best ways and territories in which Vale's technical creations should be protected.</td>
<td>Provide both technical and legal support to Vale technology strategy.</td>
</tr>
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<table>
<thead>
<tr>
<th>Evaluation and monitoring</th>
<th>Negotiation of Technologies</th>
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<tbody>
<tr>
<td>Value and monitor both technical and legal intangible assets with intellectual property authorities.</td>
<td>Provide support to Business Units in trading know-how (purchase and sale), patents exploitation, cooperation, partnerships and agreements (technology transfer).</td>
</tr>
</tbody>
</table>
2017 R&D Investments
for VALE and ITV (Vale Institute of Technology)

In 2017, Vale invested 98 million (USD) in R&D projects.

- Budget classification*: “Technological Innovation and New Process”
- Our goal is to do more with less – build synergies across the company and leverage what we have

(*) Vale’s Research Centers expenditures in R&D human resources and lab equipment have been excluded from R&D budget of their projects. These expenditures are not paid as investment in R&D.
Project S11D

- Replacing fixed crushers and off highway trucks (OHT), the system uses **movable crushers and conveyor belts**. Instead of the 100 off-highway trucks, a structure comprised of shovels and movable crushers will extract the iron ore and feed about 30 kilometers of conveyor belts.

- The processing uses the humidity in the ore itself to remove impurities.

- **93%** reduction in water consumption
- **50%** reduction in greenhouse gas emissions
- **About 70%** reduction in diesel consumption
- **18,000 Mwh/year** economy in electricity
- **86% reuse** of collected water
- **97% of activities** outside the area of the Carajas National Forest in Para, in the North of Brazil
Main innovation in the Project S11D

TRUCKLESS SYSTEM

It is different from the traditional mining methods because it employs conveyor belts, instead of trucks, to transport the iron ore from the mining fronts.
Main innovation in the Project S11D
TRUCKLESS SYSTEM

Brazilian Patent Application
Nº BR102015010652-1 filed on May 11, 2015
Vale’s Patent Numbers

Last 10 years

Total: 1501

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<tr>
<th>Year</th>
<th>Brazil:</th>
<th>Abroad:</th>
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<td>2017</td>
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</tr>
</tbody>
</table>

Source: Internal database
Vale’s Patent Numbers in China

- In 2018 Vale celebrates 45 years of partnership with China
- During these years Vale sent more than 2 billion tons of iron ore to China

Source: ORBIT and internal database
Brazilian Green Patents Priority Examination Program

- Process for obtaining ore dust suppressant resin, ores dust suppressant resin, process for inhibition of ore particulate emission and resin use

Owner: Vale S.A. and Federal University of Espirito Santo (UFES)

- Iron ore concentration process with grinding circuit, dry desliming and dry or mixed (dry and wet) concentration

Owner: Vale S.A.

Accepted on the Green Patents Program on March, 13, 2018
Vale Institute of Technology (ITV)
Mining and Sustainable Development Research Lines

ITV MINING
- Automation, Robotics, and Integration
- Mineral Processing and Transport Phenomena
- Tribology
- Dam Technologies and disposal

ITV SUSTAINABLE DEVELOPMENT
- Biodiversity and Ecosystem Services
- Environmental Genomics
- Environmental Geology & Water Resources
- Environmental Technology
- Socioeconomics and Sustainability
- Advanced Computation

It aims to create options for the future through scientific research and development of technologies to expand Vale’s knowledge and business frontiers in a sustainable manner.

Nature Magazine

* Part of applied physics that studies the phenomenon of friction in different forms.
For strategic decision, the technologies developed by ITV are filed in the name of Vale S.A.

Source: Vale’s internal database
Obrigada! Thank you!

谢谢。

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claudia.silva.oliveira@vale.com
Vale S.A.