Vale Day
New York
2016

The comeback of a leader
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Murilo Ferreira
Chief Executive Officer
Vale’s competitive position stems from four core accomplishments:

- **Environmental licenses**
  - Over 300 licenses granted since 2011 allowing timely project implementation

- **Project implementation**
  - 18 main projects concluded in the last 5 years
  - Main projects concluded on budget and on time

- **Cost and expenses reduction**
  - Over 30% cost reduction since 2012, despite volume increases
  - Over 80% expenses reduction since 2012

- **Portfolio management**
  - Focus on core world-class assets
  - Divestments of almost US$ 13 billion of non-core assets in the last 6 years
Strategic approach to environmental licensing allowed timely project implementation

Northern System
- N5S
- N5S Expansion
- N4WS
- Serra Leste
- S11D Mine
- S11D Railway
- S11D Railway Spur

Southern System
- Abóbora Expansion
- Capão Xavier Expansion
- Vargem Grande
- Vargem Grande Itabiritos
- Fábrica Dam
- Capitão do Mato Expansion
- Maravilhas III Dam

Southeastern System
- Itabira
- Fábrica nova
- Brucutu Mine
- Brucutu South Dam
- Brucutu North Dam
Successful project implementation with disciplined capital allocation allowed reduction in sustaining and growth investments.

Projects delivered in the last 5 years:

- Salobo
- Carajás Additional 40
- Conceição Itabiritos
- Pier IV S11D South Berth
- Long Harbour
- Totten
- Serra Leste
- Vargem Grande Itabiritos
- Tubarão VIII
- Teluk Rubiah
- Salobo II
- Conceição Itabiritos II
- Cauê Itabiritos
- Nacala Logistics Corridor
- Moatize II
- Carajás Serra Sul S11D
- Railway Spur S11D
- Pier IV S11D North Berth

Capex (US$ billion):

- **Sustaining**
- **Growth**

- **2012**: 16.2
- **2013**: 14.2
- **2014**: 12.0
- **2015**: 8.4
- **2016E**: 5.6

- **-65%**
New mines and infrastructure allowed the achievement of higher ore quality and increased price realization

Iron ore sales by type of product

- Carajás IOCJ 65%
- Other products (average Fe 62%)

Carajás IOCJ 65% will represent over 50% of our production by 2020

Price index

US$/dmt$¹

<table>
<thead>
<tr>
<th>Date</th>
<th>IODEX 62% (A)</th>
<th>IOCJ 65% (B)</th>
<th>(B-A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>09/15/2016</td>
<td>56.3</td>
<td>64.9</td>
<td>8.6</td>
</tr>
<tr>
<td>09/30/2016</td>
<td>55.9</td>
<td>63.6</td>
<td>7.7</td>
</tr>
<tr>
<td>10/15/2016</td>
<td>57.5</td>
<td>67.0</td>
<td>9.5</td>
</tr>
<tr>
<td>10/30/2016</td>
<td>65.4</td>
<td>75.9</td>
<td>10.5</td>
</tr>
<tr>
<td>11/15/2016</td>
<td>73.0</td>
<td>84.5</td>
<td>11.5</td>
</tr>
<tr>
<td>11/28/2016</td>
<td>81.6</td>
<td>94.5</td>
<td>12.9</td>
</tr>
</tbody>
</table>

¹ Dmt = dry metric ton
Cost discipline led to a material reduction in costs and expenses

**Costs**

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>22.7</td>
</tr>
<tr>
<td>2013</td>
<td>20.5</td>
</tr>
<tr>
<td>2014</td>
<td>21.2</td>
</tr>
<tr>
<td>2015</td>
<td>17.0</td>
</tr>
<tr>
<td>2016E</td>
<td>15.7 - 15.8</td>
</tr>
</tbody>
</table>

**Expenses**

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>6.9</td>
</tr>
<tr>
<td>2013</td>
<td>4.5</td>
</tr>
<tr>
<td>2014</td>
<td>3.5</td>
</tr>
<tr>
<td>2015</td>
<td>1.9</td>
</tr>
<tr>
<td>2016E</td>
<td>1.2 - 1.3</td>
</tr>
</tbody>
</table>

1. Net of depreciation and amortization
2. Includes SG&A, R&D, Pre-operating and stoppage and other expenses; does not include gain/loss on sale of assets
3. Positive impact of US$ 244 million from the goldstream transaction in 1Q13
4. Positive impacts of US$ 230 million from the goldstream transaction in 1Q15 and US$ 331 million of Asset Retirement Obligations (ARO)
5. FX Rate of BRL/USD 3.30 for 2H16 on average; includes the positive impact of US$ 150 million from the goldstream transaction in 3Q16 on expenses
Vale optimized its asset base by divesting non-core assets and unlocking value

US$ billion

Reference US$ 1 billion

Aluminum assets

- 2011: US$ 1.1 billion
- 10 VLOCs¹

Very Large Ore Carriers

- 2012: US$ 1.5 billion
- CADAM
- Ferroalloys in Europe
- El Hatillo
- Araucária
- 10 VLOCs¹

- 2013: US$ 6.0 billion
- Norsk Hydro
- Log-In
- VLI

Oil and gas concessions

- 2015: US$ 3.0 billion
- Goldstream I
- Goldstream II
- MBR preferred shares
- 8 VLOCs¹

Goldstream

- 2016: US$ 1.1 billion
- Belo Monte stake
- 4 VLOCs¹
- Goldstream III

1 Very Large Ore Carriers
Net debt will decline in the near term while still considering dividend payments

Reaching a sound financial position

• Cash generation plus divestments to reduce debt
• Net debt target of US$ 15-17 billion
• New dividend policy in line with cash flow generation
• Focus on shareholder return
Clovis Torres
Executive Officer – Human Resources, Sustainability, Compliance and General Counsel
Sustainability is one of Vale’s strategic pillars

**Governance**
- All employees trained on anticorruption in 2016
- Sustainability KPIs considered in all Vale’s employees remuneration

**Environment**
- Energy matrix composed of 25% of renewable energy
- Almost 280,000 km² of natural areas preserved

**Community**
- Over 70% of work force locally hired
- Local suppliers prioritized, acting as a driver for local development

**Safety**
- Annual Safety Reflection Day promoted for all employees and contractors
- Zero harm targeted throughout all operations
Significant progress achieved

Health and Safety¹

- **Safety management:** 18% reduction in total injury rate
- **Risk management:** 17% reduction in the number of incidents with high potential impact

Environment¹

- **Water resources:** 85% of recycling and reuse in the process
- **Atmospheric emissions:** 19% reduction in particulate emissions in pelletizing plants

Local development²

- **Social and environmental investment:** US$ 800 million invested
- **Favoring local regions:** 8% increase in local purchases, totaling 72%

¹ Values for Ferrous Minerals business segment, 2015 vs. 2014
² Values for Vale
Zero harm in our operations is our utmost goal

**Accomplishments**

- Promotion of “Safe Choices” through “Stop, Think, Care” campaign
- Reduction of risks through increased control mechanisms, technical improvements and implementation of the Integrated HSE Management System
- Recognition for Voisey’s Bay being the mine with the lowest injury frequency rate in Canada (John T. Ryan Award)

**Total recordable injuries frequency rate**

Per million hours worked

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>3.3</td>
</tr>
<tr>
<td>2012</td>
<td>2.8</td>
</tr>
<tr>
<td>2013</td>
<td>2.6</td>
</tr>
<tr>
<td>2014</td>
<td>2.1</td>
</tr>
<tr>
<td>2015</td>
<td>2.2</td>
</tr>
<tr>
<td>2016</td>
<td>1.8</td>
</tr>
</tbody>
</table>

-45% decrease from 2011 to 2016

1 Year to date
Success in environmental licensing with more than 300 licenses granted was crucial to timely project implementation

Number of licenses granted per year

1 Licenses granted up to October 2016
S11D sets a benchmark on sustainability applied to large scale projects

- S11D long distance conveyor belt
- 93% less water consumption
- 86% of reuse of water
- The world’s leading iron ore project
  - Low impact
  - Truckless operation
  - Dry processing
  - Low CO₂ emissions
- 70% less fuel by using 37 km of conveyor belts
- 18,000 MW of electricity savings per year
Vale currently generates 51% of its worldwide electricity needs from its own hydro plants which guarantees stable prices through PPAs\(^1\)

- 7 hydro power plants in full operation
- 1,158 MW of installed capacity
- 100% of energy output sold in long-term through PPAs\(^1\)
- Guaranteed energy average of 652 MW

\(^1\) Power purchase agreement
Renova Foundation has been diligently working to remediate and compensate for the damages of the Samarco’s dam failure

- The Foundation was created on August 2\textsuperscript{nd}, 2016 with the support of Samarco and its shareholders
- The Foundation main purpose is to implement and manage the repair, restauration and reconstruction programs of the regions affected by the collapse of the Fundão Dam
- The scope of actions is focused on environmental and socio-economic recovery programs
The scope of actions spans from reconstruction of infrastructure to monitoring of water quality.
Several reconstruction initiatives have taken place in the affected communities

<table>
<thead>
<tr>
<th>November 2015</th>
<th>September 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Main road in Barra Longa soon after the dam failure" /></td>
<td><img src="image2" alt="Main road in Barra Longa after clean-up" /></td>
</tr>
</tbody>
</table>
| Examples of initiatives

Main road in Barra Longa after clean-up
Revegetation has taken place in several river springs

November 2015

Carmo river soon after the dam failure

March 2016

Carmo river after revegetation works

Examples of initiatives
Peter Poppinga
Executive Officer, Ferrous Minerals
Main accomplishments

Productivity gains

- Steady development of the S11D project
  - Delivery of the north berth at Pier IV
- Consistent progress on the ramp-up of key projects
  - N4WS and N5S mine extensions (Northern System)
  - Itabiritos projects (Conceição, Cauê Itabiritos and Vargem Grande)
- Substantial gains in productivity throughout the supply chain
  - Global recovery rate improved from 45% in 9M15 to 48% in 9M16
  - Blended volumes\(^1\) increased from 18 Mt in 2015 to 40 Mt in 2016

Margin improvement

- Significant margin improvements
  - C1\(^2\) cash costs in BRL reduced by 23% in 3Q16 vs. 4Q14
  - Iron ore and pellets cash breakeven\(^3\) reduced by 53% in 3Q16 vs. 4Q14
  - Price realization improved to 110% of the average Platts IODEX 62% in 1H16 from 103% in 1H15

1 Include Malaysia, Oman and China
2 C1 cash cost at the port (mine, plant, railroad and port)
3 Including sustaining investment
The hot commission of S11D mine and plant is progressing well with start-up expected in 2016

- Physical progress of 96%
- Ore stocking in the stockyards initiated with over 300,000 tons of ROM
The railway spur started up in early October with the circulation of the first train with 330 wagons.

- Start-up of the railway spur in October
- Physical progress of railway duplication at 59% with 289 km of 570 km duplicated
The new berth at Pier IV loaded 2 vessels in October and first commercial shipment with S11D ore is expected in January 2017

Port onshore and offshore

- 5 vessels loaded up to Nov-16 with a total of 1.3 Mt of ore
- Physical progress of 93%
The successful ramp-up of projects helped to boost Vale’s results

Production volumes – N4WS and N5S mine extension

<table>
<thead>
<tr>
<th></th>
<th>Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Northern System mines</td>
<td>46.7</td>
</tr>
<tr>
<td>N4WS and N5S</td>
<td>32.4</td>
</tr>
</tbody>
</table>

C1 cash cost\(^1\) in the Northern System

<table>
<thead>
<tr>
<th></th>
<th>R$/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>9M15</td>
<td>43.2</td>
</tr>
<tr>
<td>9M16</td>
<td>37.7</td>
</tr>
</tbody>
</table>

\(^1\) C1 cash cost at the port (mine, plant, railroad and port, excluding royalties)
The ramp-ups together with operational efficiency resulted in the increase of the global recovery\(^1\) and other productivity gains.

Global recovery\(^1\), %

\(^1\) Global recovery = total production / (waste + ROM)
Productivity gains and production increase more than offset the recent appreciation of the Brazilian currency

US$/t, 3Q16 vs. 2Q16

Increase of 3 p.p. in global recovery from 2Q16 to 3Q16
Increase in production of 5 Mt in 3Q16 vs. 2Q16

<table>
<thead>
<tr>
<th>2Q16 C1 cash cost</th>
<th>Exchange rate variation</th>
<th>Global recovery</th>
<th>Fixed cost dilution</th>
<th>Productivity gains and other savings</th>
<th>3Q16 C1 cash cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.2</td>
<td>1.0</td>
<td>0.3</td>
<td>0.6</td>
<td>0.3</td>
<td>13.0</td>
</tr>
</tbody>
</table>
Price realization improved relative to peers in 2016

Ratio of price realization to the Platts 62% Fe content¹, %

Vale’s higher price realization compared to the Platts 62% Fe content will be enhanced as premiums on high grade increase and, consequently, peers with lower grade ore will be more penalized

1 On a CFR and dry metric ton basis
2 Includes adjustment for the pellets margin gains
Source: Financial reports of Vale and Peers
## Closing the previous iron ore competitiveness gap

### Cash generation\(^1\), US$/t

<table>
<thead>
<tr>
<th></th>
<th>1H15</th>
<th>1H16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vale(^2)</td>
<td>27.5</td>
<td>22.0</td>
</tr>
<tr>
<td>Peer 1</td>
<td>26.5</td>
<td>20.4</td>
</tr>
<tr>
<td>Peer 2</td>
<td>26.5</td>
<td>20.5</td>
</tr>
<tr>
<td>Peer 3</td>
<td>13.3</td>
<td>20.5</td>
</tr>
</tbody>
</table>

### Notes:

1. Measured by EBITDA per ton less sustaining investments per ton
2. Adjusted EBITDA of iron ore, pellets, ROM and other ferrous for Vale’s figures

Source: Financial reports of Vale and peers
Vale will deliver on 3 key initiatives to further increase its competitiveness

1. Ramp-up of S11D
2. Optimization of global supply chain
3. Improvement of global recovery
S11D will further decrease Vale’s costs and sustaining capex

**C1 cash cost**

<table>
<thead>
<tr>
<th></th>
<th>US$/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Vale²</td>
<td>13.0</td>
</tr>
<tr>
<td>Current Carajás²</td>
<td>10.8</td>
</tr>
<tr>
<td>Expected S11D³</td>
<td>7.7</td>
</tr>
</tbody>
</table>

Reduction through truckless operation and dry processing

**Sustaining capex**

<table>
<thead>
<tr>
<th></th>
<th>US$/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Vale²</td>
<td>2.5</td>
</tr>
<tr>
<td>Current Carajás²</td>
<td>2.4</td>
</tr>
<tr>
<td>Expected S11D³</td>
<td>1.8</td>
</tr>
</tbody>
</table>

S11D will consolidate Vale’s position as the lowest C1 cash cost producer of the industry

---

1. C1 cash cost at the port (mine, plant, railroad and port, excluding royalties)
2. Vale’s Current and Carajás based on 3Q16
3. S11D fully ramped up, normalized to the exchange rate of BRL/USD 3.37
Optimization of Vale’s integrated global supply chain – increasing its efficiency through productivity and cost reduction

- Replacement of trucks for belt conveyors in Brucutu, Itabira and Água Limpa (Southeastern System), as well as in N4WS (Northern System)
- Increase in productivity of port operations in Brazil due to reduction in number of final products and progressive increase of Valemax’s fleet
- Increase of Valemax full discharge in China and increase of vessels discharging at a single port leading to freight reductions
- 2nd generation of Valemaxes
- Integrated management of the freight portfolio\(^1\), resulting in further freight reductions
- Elimination of the floating transfer stations

\(^1\) Adjusting the volumes of spot chartering and short term Contracts of Affreightement (COAs) according to market conditions
Optimization of Vale’s integrated global supply chain – improving price realization

Examples

1. Increase market capillarity and customer base
2. Increase offshore blending capacity
3. Develop the option to sell in RMB
4. Develop partnerships with local traders and ports

Development of new distribution channels

Realization of full value in use of high grade ore

- Vale’s supply growth is mainly concentrated in the Northern System, with Carajás product characteristics that will enable:
  - Higher productivity for steel mills
  - Less usage of coking coal
  - Less emission during steel making process
- Strengthen our ability to capture value gaps in the market through improved management of blending optionalities
- Develop the market opportunities for low alumina ore
Vale has the flexibility to shape its supply for any market scenario

<table>
<thead>
<tr>
<th>Premiums and discounts over the 62% Fe index¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>US$/t</td>
</tr>
<tr>
<td>65% Fe</td>
</tr>
<tr>
<td>BRBF premium</td>
</tr>
<tr>
<td>58% Fe LAPS²</td>
</tr>
<tr>
<td>58% Fe</td>
</tr>
</tbody>
</table>

- Steel mills are progressively seeking for more productivity, thus supporting a structural trend for higher premiums for high grade fines
- The optionality of offshore blending enables Vale to explore margin optimization, positively impacting price realization

¹ Absolute price spread between each index and the 62% Fe MB, average up to November 25th, 2016
² LAPS = low alumina, phosphorus and sulphur

Source: Metal Bulletin
Vale is progressively reducing its time to market by moving inventory throughout the supply chain

Offshore blending capacity
Mtpy

Share of offshore over total inventories
%

Offshore blending capacity will increase by more than 5x in 2017 vs. 2015

The reduction of logistics bottlenecks in Brazil enables the inventory movement downstream
Goal of achieving highest global recovery among peers as a result of higher share of dry processing and optimization of strip ratio

Global recovery rate
\[ \text{Global recovery} = \frac{\text{total production}}{(\text{waste} + \text{ROM})} \]

<table>
<thead>
<tr>
<th></th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vale</td>
<td>54%</td>
</tr>
<tr>
<td>Peer 1</td>
<td>38%</td>
</tr>
<tr>
<td>Peer 2</td>
<td>38%</td>
</tr>
<tr>
<td>Peer 3</td>
<td>36%</td>
</tr>
</tbody>
</table>

Source: Vale, Woodmac and peers reports

Levers

- Strip ratio improvement by grinding and concentrating compact itabirites and by allowing for some flexibility in the alumina and phosphorous contents of intermediate products

- Increase of dry processing from 40% in 2016 to 60% in 2020 and 70% in 2022 in conjunction with a revision of mine plans, increasing the life of mines, postponing replacement investments, whilst lowering production costs
The review of mine plans will reduce future expenditures while maintaining the highest average product quality in the industry.
The new mine plan is based on the simplification of the portfolio with final products being formed closer to customers.

Before

Mine → Crushing → Screening → Milling → Concentration → Tailing dam → Saleable product

Ports

Customers

Final products formed in Brazilian ports

After

Mine (natural moisture route) → Crushing → Screening → Intermediate products

Ports

Customers

Final products formed closer to customers in DC’s, Chinese ports, or virtual blend

The offshore blending allows Vale to ship intermediate products from Brazil, thus eliminating the need for each system to produce a final saleable product.

1 Distribution center
Global recovery increase will substantially reduce our replacement capex expenditure needs until 2030

Number of projects\(^1\) to maintain 450 Mtpy from 2017 to 2030

<table>
<thead>
<tr>
<th>Year</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>22</td>
</tr>
<tr>
<td>2015</td>
<td>9</td>
</tr>
<tr>
<td>2016</td>
<td>6</td>
</tr>
</tbody>
</table>

Long term capex\(^1\) to maintain 450 Mtpy from 2017 to 2030 (US$ billion)

<table>
<thead>
<tr>
<th>Year</th>
<th>Capex ($ billion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>26</td>
</tr>
<tr>
<td>2015</td>
<td>11</td>
</tr>
<tr>
<td>2016</td>
<td>5</td>
</tr>
</tbody>
</table>

1 Does not include the S11D project, 65% of capex disbursements will happen after 2025.
Compared to its peers, Vale has a lower depletion rate, thus having the lowest future capital intensity of the industry

Depletion of Vale vs. its main peers

<table>
<thead>
<tr>
<th>5-7 years view</th>
<th>Vale</th>
<th>Peer 1</th>
<th>Peer 2</th>
<th>Peer 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depletion Mt</td>
<td>14</td>
<td>50</td>
<td>80</td>
<td>25</td>
</tr>
<tr>
<td>Proportion of production¹</td>
<td>4%</td>
<td>15%</td>
<td>31%</td>
<td>15%</td>
</tr>
<tr>
<td>Capex² (US$ billion)</td>
<td>0.3 – 0.4</td>
<td>2.0 – 3.5</td>
<td>1.6 – 3.2</td>
<td>1.0 – 1.5</td>
</tr>
<tr>
<td>Type of project</td>
<td>Brownfield</td>
<td>Greenfield</td>
<td>Brownfield</td>
<td>Greenfield</td>
</tr>
</tbody>
</table>

Chinese domestic production vs. investments

- Vale will not have to invest over the next 7 years to maintain its capacity and has enough brownfield options to replace its production
- The average incentive price of these replacement projects is around US$ 50/t

¹ Considering production volumes of 2016
² Absolute estimated capital disbursement to implement the projects

Source: Vale internal data and JP Morgan report on August, 2016
Vale will maintain production discipline to maximize margins

### Production volumes¹ range

**Mtpy**

<table>
<thead>
<tr>
<th>Year</th>
<th>Production range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016E</td>
<td>340-350</td>
</tr>
<tr>
<td>2017E</td>
<td>360-380</td>
</tr>
<tr>
<td>2018E</td>
<td>400-420</td>
</tr>
<tr>
<td>2019E</td>
<td>400-430</td>
</tr>
<tr>
<td>2020E</td>
<td>400-450</td>
</tr>
<tr>
<td>2021E</td>
<td>400-450</td>
</tr>
</tbody>
</table>

¹ Including third party purchases

### Northern System capacity range

**Mtpy**

<table>
<thead>
<tr>
<th>Year</th>
<th>Capacity range</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016E</td>
<td>153</td>
</tr>
<tr>
<td>2017E</td>
<td>175</td>
</tr>
<tr>
<td>2018E</td>
<td>206</td>
</tr>
<tr>
<td>2019E</td>
<td>230</td>
</tr>
<tr>
<td>2020E</td>
<td>230</td>
</tr>
</tbody>
</table>

Previous ramp-up

Current ramp-up
EBITDA per ton of Ferrous Minerals\(^1\) is expected to increase between US$ 3/t to US$ 5/t by 2020

US$/t, 9M16 vs. 2020

1.0 - 1.5
1.0 - 2.0
0.5 - 1.0
0.5
3.0 - 5.0

\(^1\) Assuming no change in Platts IODEX 62% reference price, bunker oil prices, and exchange rate of BRL 3.37 / USD
Iron ore will be a strong cash generator irrespective of market prices, with its EBITDA potentially reaching US$ 18 billion in 2020

2020 EBITDA\(^1\), US$ billion

<table>
<thead>
<tr>
<th>Exchange rate BRL/USD</th>
<th>Platt's IODEX (US$/t)</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>50</td>
<td>60</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>3.2</td>
<td>10.0</td>
<td>13.9</td>
<td>17.8</td>
<td></td>
</tr>
<tr>
<td>3.4</td>
<td>10.3</td>
<td>14.2</td>
<td>18.1</td>
<td></td>
</tr>
<tr>
<td>3.6</td>
<td>10.5</td>
<td>14.4</td>
<td>18.3</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) Assuming bunker oil prices of US$ 260/t, for every US$ 100/t in bunker oil variation the EBITDA will vary approximately US$ 1 billion
Jennifer Maki
Executive Officer, Base Metals
Main accomplishments

• Production of nickel and copper increased by 21% and 24% since 2013\(^1\)
  – Production from VNC increased by 140%
  – Production from Salobo increased by 173%

• Productivity gains throughout the supply chain
  – VNC reduced costs by US$ 110 million compared to 2015
  – Salobo reduced costs by US$ 17 million compared to 2015, while increasing production by 14%

• Significant cost and expenses decrease since 2013
  – Unit costs\(^2\) decreased 31% in nickel and 58% in copper
  – Expenses decreased by 75%

\(^1\) Increase from 2013 to 2016E
\(^2\) After by-products
Ramp-ups have been progressing well

### Nickel

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016E</th>
</tr>
</thead>
<tbody>
<tr>
<td>kt</td>
<td>260</td>
<td>275</td>
<td>291</td>
<td>315</td>
</tr>
</tbody>
</table>

### Copper

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016E</th>
</tr>
</thead>
<tbody>
<tr>
<td>kt</td>
<td>361</td>
<td>369</td>
<td>414</td>
<td>448</td>
</tr>
</tbody>
</table>

Several operations achieving record production months in the 2H16: (i) VNC at 4,034t, (ii) Long Harbour at 2,054t and (iii) Onça Puma at 2,524t

Salobo reaching nominal capacity on a monthly basis in October at 17,156t

1 Excluding Lubambe’s attributable production
Nickel and copper costs have declined consistently

Nickel operations\(^1\) after by-products

<table>
<thead>
<tr>
<th>Year</th>
<th>US$/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>8,634</td>
</tr>
<tr>
<td>2014</td>
<td>8,312</td>
</tr>
<tr>
<td>2015</td>
<td>8,268</td>
</tr>
<tr>
<td>2016E</td>
<td>6,000</td>
</tr>
</tbody>
</table>

-31% decrease

South Atlantic Copper after by-products

<table>
<thead>
<tr>
<th>Year</th>
<th>US$/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4,084</td>
</tr>
<tr>
<td>2014</td>
<td>2,826</td>
</tr>
<tr>
<td>2015</td>
<td>2,022</td>
</tr>
<tr>
<td>2016E</td>
<td>1,900</td>
</tr>
</tbody>
</table>

-54% decrease

\(^1\) Includes VNC and Long Harbour
Expenses\(^1,2\) decreased 75% since 2013

US$ million

<table>
<thead>
<tr>
<th>Year</th>
<th>Expenses</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>1,414(^3)</td>
</tr>
<tr>
<td>2014</td>
<td>861</td>
</tr>
<tr>
<td>2015</td>
<td>773(^4)</td>
</tr>
<tr>
<td>2016E</td>
<td>347(^5)</td>
</tr>
</tbody>
</table>

\(^1\) Net of insurance effects, depreciation and amortization

\(^2\) Includes SG&A, R&D, Pre-operating and stoppage and other expenses

\(^3\) Excludes the positive one-off impact of US$ 244 million of the goldstream transaction in 1Q13

\(^4\) Excludes the positive one-off impact of US$ 230 million of the goldstream transaction in 1Q15

\(^5\) Excludes the positive one-off impact of US$ 150 million of the goldstream transaction in 3Q16

Source: Company annual and quarterly reports, 2016 estimated
We achieved many improvements in 2016, with initiatives to be undertaken in 2017 that will strengthen our competitive position.

1. Optimize North Atlantic operations
2. Continue with VNC de-risking plan
3. Develop PTVI’s potential for expansions
4. Consolidate Salobo’s cash generation position
Sudbury is transitioning to single furnace operation

- Shift to single furnace and significant flowsheet change in 2017 while operating
  - Increase in production of copper concentrate to maximize room in the furnace for nickel
  - Rebuild of furnace #2 with expanded capacity
  - Maintenance shutdown in June 2017 (4 weeks)
  - Cease copper anode production and sell copper matte to market
- Permanent direct cost reduction of US$ 42 million in 2018
Thompson will shift from an integrated to a mine-mill operation

- The transition will start in 1Q17 with the decommission of one of the two furnaces in Thompson
- 2017 will be the last year for processing Voisey's Bay feed in Thompson
- The remaining smelting and refining assets will be closed in 2018 and the operation will focus on nickel concentrate production
  - Sudbury and Long Harbour refineries will process Thompson concentrate
- A simpler and leaner structure will be in place in 2018
Long Harbour will finalize the commissioning of all its circuits in 2017, encompassing:
- Start-up of copper and cobalt electrowinning circuits
- Processing of midgrade concentrate from Voisey’s Bay
- Improvement of nickel purity in our products
Vale will continue with VNC de-risking plan

- Cost reductions of over US$ 100 million in 2016
  - US$ 70 million on better management of suppliers contract
  - US$ 15 million on materials and spare parts control
  - US$ 15 million on labor and administration
- EUR 200 million loan from the French government
- 2017 focus on operational improvements to increase production and further reduce costs
VNC will increase production and decrease unit unit costs

### Nickel production

<table>
<thead>
<tr>
<th>Year</th>
<th>Production (t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016E</td>
<td>36,000</td>
</tr>
<tr>
<td>2017E</td>
<td>43,500</td>
</tr>
<tr>
<td>2018E</td>
<td>44,000</td>
</tr>
<tr>
<td>2019E</td>
<td>50,000</td>
</tr>
<tr>
<td>2020E</td>
<td>56,000</td>
</tr>
</tbody>
</table>

### Unit cash cost of sales after by-product credits

<table>
<thead>
<tr>
<th>Year</th>
<th>Cost (US$/t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>21,559</td>
</tr>
<tr>
<td>2016E</td>
<td>12,200</td>
</tr>
<tr>
<td>2017E</td>
<td>11,000</td>
</tr>
<tr>
<td>2018E</td>
<td>11,000</td>
</tr>
<tr>
<td>2019E</td>
<td>10,300</td>
</tr>
<tr>
<td>2020E</td>
<td>Less than 10,000</td>
</tr>
</tbody>
</table>

Note: VNC site cost to nickel oxide sinter
Develop PTVI’s potential for expansions

• Expansion of our mining and processing facilities at Sorowako through:
  – Continuous improvement to support growth with focus on capital discipline
  – Modernization of the furnaces to optimize production and increase cost efficiency
  – Processing capacity by 2019 will increase 8 kt¹ as a result of optimization initiatives

• Further expansions include:
  – Optionality of inviting strategic partners in Pomalaa and Bahodopi to exploit the saprolite ore layer
  – Increase of production via 5th line expansion according to market conditions

¹ Compared to 2015 production
Salobo is a world-class copper operation and has potential for further expansion

- Salobo III represents a low-cost brownfield expansion opportunity
  - Expansion through the addition of a concentration plant for extra 12 Mtpy processing capacity
  - Leverage on current experience with Salobo’s ore body to increase gold and copper production
  - Project still subject to approval of Board of Directors
- Synergies with Silver Wheaton to be further explored to reduce the capital expenditures required
- First deep exploration drilling at Salobo in 2017 to assess potential for an underground mine
Steady nickel and copper production

<table>
<thead>
<tr>
<th>Nickel</th>
<th>kt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudbury</td>
<td>Thompson</td>
</tr>
<tr>
<td>315</td>
<td>317</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Copper¹</th>
<th>kt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sudbury</td>
<td>Thompson</td>
</tr>
<tr>
<td>448</td>
<td>470</td>
</tr>
</tbody>
</table>

¹ Not including Lubambe
Base Metals has growth potential due to strong resources and expansion opportunities if the market conditions are there

• Strong reserve position with industry leading resources across our operations

• Able to maintain nickel production for next 25 years - well beyond in New Caledonia, Brazil, and Indonesia

• World-class copper reserves at Salobo

• Further upside potential:
  – Increase in Salobo mineral resources
  – Continued extension and discovery in Sudbury
  – Larger underground resource at Voisey’s Bay
Sound EBITDA generation going forward even with moderate increases in nickel and copper prices

EBITDA 2018 US$ billion

<table>
<thead>
<tr>
<th>Copper Price (US$/t)</th>
<th>4,500</th>
<th>5,000</th>
<th>5,500</th>
<th>6,000</th>
<th>6,500</th>
<th>7,000</th>
<th>7,500</th>
</tr>
</thead>
<tbody>
<tr>
<td>8,000</td>
<td>0.8</td>
<td>1.0</td>
<td>1.2</td>
<td>1.4</td>
<td>1.6</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>10,000</td>
<td>1.4</td>
<td>1.6</td>
<td>1.8</td>
<td>2.0</td>
<td>2.2</td>
<td>2.4</td>
<td>2.6</td>
</tr>
<tr>
<td>12,000</td>
<td>2.0</td>
<td>2.2</td>
<td>2.4</td>
<td>2.6</td>
<td>2.8</td>
<td>3.0</td>
<td>3.2</td>
</tr>
<tr>
<td>14,000</td>
<td>2.6</td>
<td>2.8</td>
<td>3.0</td>
<td>3.2</td>
<td>3.4</td>
<td>3.6</td>
<td>3.8</td>
</tr>
<tr>
<td>16,000</td>
<td>3.2</td>
<td>3.4</td>
<td>3.6</td>
<td>3.8</td>
<td>4.0</td>
<td>4.2</td>
<td>4.4</td>
</tr>
<tr>
<td>18,000</td>
<td>3.8</td>
<td>4.0</td>
<td>4.2</td>
<td>4.4</td>
<td>4.6</td>
<td>4.8</td>
<td>5.0</td>
</tr>
<tr>
<td>20,000</td>
<td>4.4</td>
<td>4.6</td>
<td>4.8</td>
<td>5.0</td>
<td>5.2</td>
<td>5.4</td>
<td>5.6</td>
</tr>
</tbody>
</table>

- Modest increases in commodity prices produce an amplified impact on our EBITDA generation
- EBITDA more sensitive to changes in copper prices after Salobo’s ramp-up
Roger Downey
Executive Officer, Coal
Main accomplishments

- Nacala Logistics Corridor ramping up as planned, reaching 4.6 Mt ytd\(^1\)
- Moatize CHPP II started up in August 2016 and produced 0.7 Mt ytd, being 0.4 Mt during hot commissioning and 0.3 Mt after its start-up

- Improvements in equipment availability, utilization and throughput resulted in a record production in September 2016 (756 kt)
- Moatize production increased 4% yoy\(^1\) and 40% qoq\(^1\)

- Costs and expenses\(^2\) declined 14% yoy, despite the increase in coal sales volumes
- Adjusted EBITDA from Mozambique operations improved more than 30% yoy, from -US$ 366 million in 9M15 to -US$ 247 million in 9M16

\(^1\) ytd = 9M16; yoy = 9M16 vs. 9M15; qoq = 3Q16 vs. 2Q16
\(^2\) Net of depreciation
The Nacala Logistics Corridor is already a reality, with growing volumes allowing an expressive cost reduction

- Start-up in 4Q15
- 4.6 Mt of coal railed since start up
- 54 ships loaded in 9M16
The Moatize CHPP\(^1\) II plant was successfully delivered and reached 2 Mtpy run-rate in Sep-16

- Start-up in Aug-16
- Production in Aug-16 of 129,000 t
- Production in Sep-16 of 169,000 t
- Expected to reach 18 Mtpy run-rate by 2018

\(^1\) Coal Handling and Processing Plant
The Nacala and Moatize II ramp-up resulted in significantly lower costs and in EBITDA improvements

Cash Costs and Expenses\(^1\) – Mozambique operations

<table>
<thead>
<tr>
<th></th>
<th>1Q16</th>
<th>2Q16</th>
<th>3Q16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs</td>
<td>110</td>
<td>91</td>
<td>80</td>
</tr>
</tbody>
</table>

\(-27\%\)

Adjusted EBITDA – Mozambique operations

<table>
<thead>
<tr>
<th></th>
<th>1Q16</th>
<th>2Q16</th>
<th>3Q16</th>
</tr>
</thead>
<tbody>
<tr>
<td>EBITDA</td>
<td>-112</td>
<td>-100</td>
<td>-35</td>
</tr>
</tbody>
</table>

\(^1\) Cost of Goods Sold, SG&A, R&D, pre-operating and stoppage and other expenses, excluding depreciation; costs are FOB port Mozambique

Adjusted EBITDA of positive US$ 31 million in Oct-16
The ramp-up of Moatize production will contribute to further cost reductions and cash generation increases

Moatize production volume, Mt

Source: Vale’s budget
Costs in Mozambique will reduce dramatically

Production cash cost at the port\(^1\), US$/t

\(^1\) Production cost includes mine, plant, railway, port and royalties and excludes inventory movement and accounting adjustments.

\(^2\) Nacala tariff is composed by debt service and other costs, such as taxes.
Coal business has well diversified sales portfolio and pricing system mix

Sales distribution – metallurgical coal
% of sales, 2017

- Japan, Korea, Taiwan: 34%
- Atlantic: 32%
- India, Middle East, Africa & South America: 34%

Pricing System – metallurgical coal
% of sales

- Index: 70% (9M16), 34% (2017E)
- Benchmark: 30% (9M16), 66% (2017E)

Geographically well distributed portfolio of metallurgical coal sales

Index based sales to increase to manage pricing volatility
Vale’s Coal EBITDA is expected to turn positive in 2017

### Coal adjusted EBITDA

<table>
<thead>
<tr>
<th>Year</th>
<th>US$ million</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>(508)</td>
</tr>
<tr>
<td>2016E</td>
<td>(175) - (200)</td>
</tr>
<tr>
<td>2017E</td>
<td>250 - 600</td>
</tr>
</tbody>
</table>

### Assumptions for 2017

- Sales volume of 13 Mt
  - 11 Mt transported through the Nacala Logistics Corridor (NLC)
  - 2 Mt transported through the Sena-Beira Logistics Corridor
- Production split
  - 65% metallurgical coal
  - 35% thermal coal
- EBITDA excluding effects from Nacala tariff, i.e., before deconsolidation of the NLC
Roger Downey
Executive Officer, Fertilizers
Highlights

Price

- Average prices decreased sharply in 9M16 vs 9M15
  - MAP: -28% and TSP: -25%
  - Potash: -16% and urea: -29%

Sales volume

- Sales increased slightly for potash, nitrogen and DCP, while decreasing for phosphate rock, MAP and SSP in 9M16 vs 9M15
  - Potash: 7%, ammonium nitrate: +3%, DCP (animal feed): +10%
  - Phosphate rock: -5%, MAP: -1%, SSP: -11%

Replacement project

- Phosphate ROM replacement project is progressing well
  - Capex on budget
  - Start-up in 1H17
Fertilizers market prices decreased, impacting business results

MAP\(^1\)

<table>
<thead>
<tr>
<th></th>
<th>US$/t</th>
<th>9M15</th>
<th>9M16</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>475</td>
<td>343</td>
<td>-28%</td>
</tr>
</tbody>
</table>

Ammonium nitrate\(^1\)

<table>
<thead>
<tr>
<th></th>
<th>US$/t</th>
<th>9M15</th>
<th>9M16</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>226</td>
<td>159</td>
<td>-30%</td>
</tr>
</tbody>
</table>

TSP\(^2\)

<table>
<thead>
<tr>
<th></th>
<th>US$/t</th>
<th>9M15</th>
<th>9M16</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>393</td>
<td>296</td>
<td>-25%</td>
</tr>
</tbody>
</table>

Potash\(^3\)

<table>
<thead>
<tr>
<th></th>
<th>US$/t</th>
<th>9M15</th>
<th>9M16</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>305</td>
<td>255</td>
<td>-16%</td>
</tr>
</tbody>
</table>

\(^1\) FOB Black sea
\(^2\) FOB Morroco
\(^3\) FOB Vancouver

Source: CRU Fertilizer week
9M16 EBITDA was strongly hit by international prices, followed by the impacts of lower production on costs

EBITDA, US$ million
Implement Phosphate ROM Project

1. Achieved 90% physical progress
2. Start-up: 1H17
3. Capex: on budget
4. Phosphate rock volume: ~1.3Mtpa

Cost cutting

- Procurement initiatives
  - Contract renegotiation
  - Scope of services revision
  - Variable and fixed cost reduction
- Organizational restructuring
  - Fixed cost and SG&A reduction

SSP strategy

3. Technical sales campaign for SSP focused on soybean
4. Market share increase / maintenance in key markets

Advance in value chain

4. Direct delivery to farmers through blenders
5. Ongoing development of new sales channel

1 From 2018 onwards
Luciano Siani Pires
Chief Financial Officer
Re-rating of Vale’s shares is on the back of de-risking equity story in three dimensions

- Closed the competitiveness gap in iron ore and base metals
- Turned around loss making operations
- Concluded the investment cycle bringing Vale’s CAPEX on par with peers
- Reduced capital and sustaining investments with continued discipline in capital allocation
- Relentless focus on reducing leverage through cash generation and divestments
- Target of US$ 15 - 17 billion of net debt in 2017
Continuous efforts to reduce costs and expenses helped Vale to close the competitiveness gap in 2016

1 Copper price: US$ 7,322/t in 2013 and US$ 4,722/t in 2016E
Investments in the coming years will be mostly in sustaining and replacement.

US$ billion

<table>
<thead>
<tr>
<th>Year</th>
<th>Growth approved</th>
<th>Sustaining</th>
<th>Replacement</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016E</td>
<td>3.2</td>
<td>2.4</td>
<td>0.2</td>
</tr>
<tr>
<td>2017E</td>
<td>1.8</td>
<td>2.5</td>
<td>0.2</td>
</tr>
<tr>
<td>2018E</td>
<td>1.1</td>
<td>2.5</td>
<td>0.9</td>
</tr>
<tr>
<td>2019E</td>
<td>0.3</td>
<td>2.5</td>
<td>1.2</td>
</tr>
<tr>
<td>2020E</td>
<td>0.7</td>
<td>2.5</td>
<td>3.2</td>
</tr>
<tr>
<td>2021E</td>
<td>0.6</td>
<td>2.3</td>
<td>2.9</td>
</tr>
</tbody>
</table>

Note: BRL/USD exchange rate of BRL/USD 3.37 from 2017 onwards.
Vale’s CAPEX to remain low in the future when compared to main peers

US$ billion

Vale

-49%

-22%

Peer 1

-58%

+57%

Peer 2

-51%

-3%

Peer 3

-63%

0%
The market expects Vale to be free cash flow positive in 2017

<table>
<thead>
<tr>
<th>Component</th>
<th>US$ Billion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analysts’ average EBITDA 2017</td>
<td>10.3</td>
</tr>
<tr>
<td>CAPEX</td>
<td>4.5</td>
</tr>
<tr>
<td>Financial expenses, net</td>
<td>1.5</td>
</tr>
<tr>
<td>REFIS</td>
<td>0.5</td>
</tr>
<tr>
<td>Income tax</td>
<td>0.3</td>
</tr>
<tr>
<td>Debt hedge settlement</td>
<td>0.3</td>
</tr>
<tr>
<td>Payments related to Sumic²</td>
<td>0.4</td>
</tr>
<tr>
<td>Others³</td>
<td>0.6</td>
</tr>
<tr>
<td>Free cash flow</td>
<td>2.2</td>
</tr>
</tbody>
</table>

1 Average of 15 banks, as of 11/24/16
2 Compromising of US$ 135 million related to their equity stake in VNC and US$ 218 million related to debt funding Sumic provided to VNC
3 Dividends paid to noncontrolling interest and others
Cumulative free cash flow\(^1\) can reach over US$ 19 billion by 2021

US$ billion, cumulative FCF 2017-2021E

Iron prices @ US$50/t

Iron prices @ US$60/t

Distribution of dividends may reach higher levels and debt will decline quickly

Large distribution of dividends and quick debt reduction

---

Vale is constantly optimizing its debt amortization schedule

Debt amortization schedule in Jan-16

<table>
<thead>
<tr>
<th>Year</th>
<th>Revolving credit lines</th>
<th>Debt amortization</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2.0</td>
<td>31.2</td>
</tr>
<tr>
<td>2017</td>
<td>3.1</td>
<td>3.0</td>
</tr>
<tr>
<td>2018</td>
<td>4.8</td>
<td>18.5</td>
</tr>
<tr>
<td>2019</td>
<td>3.6</td>
<td>1.8</td>
</tr>
<tr>
<td>2020 onwards</td>
<td>2.8</td>
<td>16.7</td>
</tr>
<tr>
<td>Total debt</td>
<td>12.7 bi</td>
<td>31.2</td>
</tr>
</tbody>
</table>

Current\(^2\) debt amortization schedule

<table>
<thead>
<tr>
<th>Year</th>
<th>Revolving credit lines</th>
<th>Debt amortization</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>1.3</td>
<td>16.0</td>
</tr>
<tr>
<td>2018</td>
<td>3.8</td>
<td>3.4</td>
</tr>
<tr>
<td>2019</td>
<td>3.4</td>
<td>3.9</td>
</tr>
<tr>
<td>2020 onwards</td>
<td>2.8</td>
<td>12.4 bi</td>
</tr>
<tr>
<td>Total debt</td>
<td>28.4</td>
<td>28.4</td>
</tr>
</tbody>
</table>

1 US$ 3 billion of revolving credit was withdrawn in January 2016
2 As of October 31, 2016. Including the payment of the revolving facilities in 4Q16
Net debt of US$ 15-17 billion can be achieved by free cash flow generation¹ with divestments being a strategic optionality

Net debt, US$ billion

<table>
<thead>
<tr>
<th>Iron ore Platts (US$/t)</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>16.6</td>
<td>9.6</td>
<td>2.5</td>
</tr>
<tr>
<td>55</td>
<td>17.9</td>
<td>12.6</td>
<td>7.1</td>
</tr>
<tr>
<td>50</td>
<td>19.5</td>
<td>15.6</td>
<td>11.6</td>
</tr>
<tr>
<td>45</td>
<td>21.2</td>
<td>19.3</td>
<td>16.7</td>
</tr>
</tbody>
</table>

¹Figures do not include dividend payments nor future asset sales apart from the coal transaction (US$ 3 billion) in 2017
Thank you