Zero Ground Project for environmental recovery in Brumadinho (MG) – section of the Ferro-Carvão stream

VALE'S PERFORMANCE IN 2019

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Vale's year in review

Rio de Janeiro, February 20th, 2020 – *"One year has passed since the Dam I rupture, and I would like to restate our respect for the families of the victims. Vale remains firm in its purposes: to integrally repair Brumadinho and to ensure the safety of our people and our assets. We have made significant progress, with an effective reparation program, relevant governance and operational improvements, and a decharacterization plan for our upstream tailings dams under accelerated implementation. We are de-risking Vale. We are paving the way to make our business better, safer and more stable",* commented Eduardo Bartolomeo, Chief Executive Officer.

Reparation progress

Since the first hours of the dam rupture, Vale has taken care of victims and families impacted, providing assistance to restore their dignity and livelihoods. Vale has also provided support to local governments and public entities, given the extent of the impacts and of the halting of Vale's operations in the region. To support the rescue of fauna and mitigate environmental impacts, over 700 professionals, a hospital and an animal shelter were mobilized.

Repairing the damage caused in a fair and agile way is fundamental to the families, and Vale has prioritized initiatives and resources for that end. Based on open dialogue with authorities and people affected, Vale has drawn up the Integral Reparation Program, structured in social, environmental and infrastructure pillars, to ensure that actions and resources will effectively compensate individuals and communities, recover the environment and enable sustainable development of Brumadinho and surroundings.

Economic compensation has evolved with agility, as per three relevant framework agreements entered into with authorities[1]:

- *Labour indemnification* to 244 of the 250 employees that lost their lives in the disaster, comprehending 611 agreements, 1,570 beneficiaries and R$1.4 billion paid out[2];
- *Individual or collective* indemnification reaching 4,451 beneficiaries and more than R$ 679 million paid;
- *Emergency aid payment* to approximately 106,000 people residing in Brumadinho and along the Paraopeba river has been extended until October 2020. Over R$ 1.2 billion has already been paid;
- *Other 27 agreements* signed to cover specific fronts, such as: (i) support for municipalities in providing public services and infrastructure; (ii) environmental recovery; (iii) water supply, including new water withdrawal and treatment systems with COPASA; (iv) emergency payments to families relocated in Barão de Cocais and for the Pataxós indigenous community; and (v) external audits and asset integrity studies, providing technical support for the authorities, with measures to review and reinforce structures and halting of operations.

[1] Figures as of February 20th, 2020.
[2] Including R$ 400 million paid in collective indemnification.

On the environmental front, a plan has been developed to remove and treat tailings, recover fauna and flora and ensure the water catchment and supply to the Belo Horizonte metropolitan region. Two Water Treatment Stations (ETAF) are already operating to clean and return treated water to the Ferro-Carvão stream and the Paraopeba river. The Zero Ground project will fully recover the original conditions of the Ferro-Carvão stream by 2023.

On the socio-economic front, non-economic compensation measures aim to ensure respect for human rights and are negotiated and defined following the perspectives and demands of the people affected and authorities. Vale's initiatives are being designed to provide structured assistance for long-term results in education, healthcare and well-being, employment and income generation, ultimately enabling sustainable development in the region.

Vale knows there is still a lot to be done to fully repair Brumadinho and reinforces its commitment to doing it. For further information on the updated balance of actions Vale has taken so far, refer to the following website: www.vale.com/repairoverview.

Safety

Vale has implemented significant improvements in governance, processes and people towards achieving its goal to become one of the safest mining companies in the world:

- The Board of Directors has approved a new Risk Management Policy, establishing, among other measures, four Business Risk Executive Committees to deal with Operational Risks, Strategic, Financial and Cyber Risks, Compliance Risks and Geotechnical Risks, allowing for the information to flow freely and openly at all organizational levels.

- The new Safety and Operational Excellence Office, which reports directly to the CEO and has the authority to halt operations on safety grounds, has outlined its work plan for the next two years, with actions covering the four areas around which it is organized: (i) Tailings Management, to ensure Vale's dams are safe and comply with international standards, (ii) Asset Integrity, to assure that assets are well maintained and safe to operate, (iii) Operational Excellence, to implement the Vale Production System (VPS) across the company, guaranteeing the continuity of the improvements that are being implemented, and (iv) Health & Safety and Operational Risk, to enhance the safety culture and also map all risks throughout the company.

One of the key milestones on the road to reducing the risk level of the company is the decharacterization of the upstream structures, a process that will continue over the next years.

- The first decharacterized dam, 8B, was completed in December 2019; the second one, Fernandinho dam, will be concluded in 2020.

- Vale has also completed the construction of the containment structure for Sul Superior Dam in the city of Barão de Cocais, while the containment structures for B3/B4 and Forquilhas dams will be concluded in 1H20, increasing the safety conditions in the areas downstream from the dams and allowing the decharacterization works at these sites to start thereafter.

- As of September 2019, due to the technical revaluation of the construction methods of the Doutor and Campo Grande dam by the Brazilian National Mining Agency (ANM), Vale included them in the decharacterization plan. Additionally, smaller dikes that were raised through the upstream method and drained stack structures will also be decharacterized.

- In December 2019, the independent Expert Panel retained to provide an assessment of the technical causes of the Dam I rupture reported on its conclusions, which were promptly taken to the authorities and made public knowledge. Results of this sort are also an important input to improve the tailings management practices at Vale.

For the future, Vale plans to reduce significantly its use of dams and will invest in alternatives that will enable the transitioning from wet processing operations to safer and more sustainable processes.

- Dry processing will reach 70% of iron ore production volume in the next three years.

- Vale will invest US$ 1.8 billion in the next years to increase the use of filtering and dry stacking in more than 50% of the remaining wet processing volume.

- Vale will invest in the development of new technologies, such as New Steel's dry concentration that is being currently tested.

Reducing uncertainties

Following the Brumadinho dam rupture, Vale's iron ore production capacity was significantly impacted by the stoppage of operations with interdictions on Brucutu, Vargem Grande, Alegria, Timbopeba and Fábrica operations. Over the year, Vale has made progress as regards the resumption of the stopped production capacity:

- Brucutu mine: In June 2019, following the decision of the legal authorities, Brucutu mine restarted adding back 30 Mtpy of production capacity. However, in December 2019, Vale took the decision to suspend temporarily the disposal of tailings at the Laranjeiras dam. Until at least the end of March 2020, the Brucutu plant will operate at around 40% of its capacity, with an estimated impact due of approximately 1.5Mt per month.

- Vargem Grande Complex: In July 2019, the ANM authorized the partial resumption of the dry processing operations at the site, enabling 5 Mt of production in 2019, which represents 12 Mtpy of production capacity.

- Alegria mine: In November 2019, Vale received the necessary authorization from the ANM to resume the operations of the Alegria Mine, enabling 3 Mt of production in 2019, which represents 8 Mtpy of production capacity.

As for the plan to resume approximately 40 Mtpy of halted capacity, enabling additional 15 Mt and 25 Mt production in 2020 and 2021, respectively, Vale is making progress in the discussions with the ANM, the Minas Gerais State Public Prosecutor's Office (MPMG) and the external audit firms to start site tests and gradually resume production. Further details on the plan to resume the halted production can be found in the Ferrous Minerals section of this report.

Vale's performance in 2019 and 4Q19

- In 2019, proforma EBITDA, excluding the provisions and incurred expenses related to Brumadinho, totaled US$ 17.987 billion, US$ 1.394 billion higher than in 2018, mainly due to higher prices (US$ 5.991 billion) and favorable foreign exchange variations (US$ 571 million), which were partially offset by lower volumes (US$ 2.796 billion), higher costs, expenses and others[3] (US$ 1.404 billion) and the stoppage expenses and others due to Brumadinho (US$ 968 million).

- Vale generated US$ 8.105 billion in Free Cash Flow from Operations in 2019, enabling:

  - the repurchase of US$ 2.270 billion of bonds, with gross debt totaling US$ 13.056 billion in 4Q19, a decrease of US$ 2.410 billion in relation to 4Q18;

  - the increase in cash and cash equivalents to US$ 8.176 billion, US$ 2.452 billion higher than 4Q18, and the decrease in net debt to US$ 4.880 billion, US$ 4.770 billion lower than 4Q18 and the lowest level since 2008;

  - the redemption and cancelation of MBR preferred shares, which paid dividends to non-controlling interest of US$ 162 million and US$ 168 million in 2019 and 2018, reducing future cash-flow commitments.

- Interest paid on loans totalled US$ 921 million in 2019, the lowest level since 2010 and 45% lower than the peak level of US$ 1.663 billion in 2016, reflecting the deleveraging and strengthening process of Vale's balance sheet in the last three years.

- In December 2019, Vale completed the sindication of a US$ 3.0 billion revolving credit facility, which will be available for five years. The new line, together with the existing US$ 2.0 billion facility that expires in 2022, preserves the total available amount in revolving credit facilities at US$ 5.0 billion, providing a liquidity buffer for Vale and allowing for an efficient cash management.

- Vale posted a loss of US$ 1.683 billion in 2019, compared to a net income of US$ 6.860 billion in 2018. The US$ 8.543 billion decrease was mostly driven by: (i) provisions and expenses related to the Brumadinho dam rupture, including the decharacterization of dams and reparation agreements (US$ 7.402 billion), (ii) recognition of non-cash impairment charges and onerous contracts, mainly in the Base Metals and Coal businesses (US$ 4.202 billion), (iii) provisions related to the Renova Foundation and to the decommissioning of Germano dam (US$ 758 million), which were partially offset by lower foreign exchange losses (US$ 2.555 billion) in the year.

- Impairment charges were mainly due to revisions on the Base Metals and Coal business plans. In the Base Metals business, the New Caledonian operation has experienced challenging issues throughout 2019, mainly in relation to production and processing. Thus, Vale reduced the expected production levels for the remaining life of the operation and recognized an impairment charge of US$ 2.511 billion. In the Coal business, the revaluation of the expectations related to the yield of metallurgical and thermal coal, the review of the

[3] Excluding Brumadinho stoppage expenses of US$ 759 million and extraordinary logistic expenses of US$ 209 million.

mining plan, which led to a reduction in the proven and probable reserves, and the lowering of the long-term price assumptions led to an impairment charge of US$ 1.691 billion.

- In December 2019, the Board of Directors approved the interest on capital (JCP[4]) of R$ 7.253 billion, equivalent to R$ 1.414364369 per share. The decision did not modify the Board of Directors' previous decision of suspending the Shareholder Remuneration Policy, with the allocation of the JCP to be decided only after the Policy suspension is withdraw.

- In 4Q19, Vale's proforma EBITDA totaled US$ 4.677 billion in 4Q19, US$ 151 million lower than 3Q19. The impact of lower iron ore reference prices was largely offset by: (i) higher iron ore fines sales volumes, (ii) lower unit cost of the iron ore delivered at Chinese ports that reached a break-even EBITDA of US$ 37.6/t in 4Q19, US$ 2.5/t lower than 3Q19, mainly due to the decrease in C1 and freight costs and the higher pellets contribution, and (iii) higher base metals realized prices.

Ferrous Minerals

- In 2019, adjusted EBITDA of the Ferrous Minerals business segment was US$ 16.997 billion, 16% higher than in 2018, mainly due to higher prices (US$ 6.099 billion), which were offset by lower volumes (US$ 2.463 billion) and higher costs (US$ 885 million), following Dam I rupture impacts.

- On a quarterly basis, adjusted EBITDA of the Ferrous Minerals business segment was US$ 4.538 billion in 4Q19, in line with 3Q19 despite decrease in prices (US$ 663 million), which was offset by higher sales volumes (US$ 196 million), lower costs (US$ 168 million) and higher received dividends (US$ 152 million).

- Despite the lower 62% Fe reference price, 13% lower than in 3Q19, Vale's realized price CFR/FOB decreased only 6% vs. 3Q19, due to the positive effect of the pricing system mechanisms impacted by the strong price volatility in the quarter together with a higher forward price curve.

- C1 cash cost for iron ore fines decreased to US$ 14.5/t in 4Q19 from US$ 15.3/t in 3Q19, mainly due to lower volumes and prices of third-party purchases and BRL depreciation.

- Freight costs decreased US$ 0.9/t, totaling US$ 18.2/t in 4Q19, mainly due to lower exposure to spot market and mix of routes/fleet. Vale expects freight costs in 1Q20 to reduce in relation to 4Q19, mainly as a result of spot market volatility caused, among other factors, by uncertainties related to coronavirus.

Base Metals

- Base Metals adjusted EBITDA totaled US$ 2.174 billion in 2019, vs. US$ 2.542 billion in 2018. The decrease was mainly due to higher costs (US$ 387 million), mostly related to VNC, Onça Puma and Sossego operations, lower cobalt realized prices (US$ 157 million), lower copper realized prices (U$ 45 million) and higher expenses (US$ 73 million), mostly for research expenses related to Hu'u project, which were partially offset by favourable exchange

[4] In Portuguese, Juros sobre Capital Próprio

rate variations (US$ 132 million), higher nickel realized prices (US$ 81 million) and higher gold realized prices (US$ 76 million).

- Nickel operations are progressing towards higher reliability with production at the refineries going back to regular operating rates after the scheduled and unscheduled maintenance activities at the Copper Cliff Nickel Refinery, in Sudbury, and at the Clydach, Matsusaka and Long Harbour refineries. Likewise, production at Onça Puma mine and plant was resumed after a judicial authorization granted in September.

- The performance of copper operations was supported by Salobo's solid performance during the year, reaching close to zero unit cash costs after by-products in 2H19, notwithstanding the impact of unscheduled maintenance in Sossego.

- On a quarterly basis, Base Metals adjusted EBITDA was US$ 649 million in 4Q19 vs. US$ 555 million in 3Q19, mainly due to higher nickel and copper realized prices (US$ 139 million), higher by-products volumes (US$ 100 million) and favourable exchange rate variations (US$ 8 million), partially offset by higher costs (US$ 78 million), lower nickel and copper volumes (US$ 42 million) and higher expenses (US$ 33 million), mainly as a result of stoppage expenses related to unscheduled maintenance at Sossego.

- The average nickel realized price was US$ 16,251/t, US$ 801/t higher than the average LME nickel price of US$ 15,450/t in 4Q19, mainly due to the effect of sales with lagged prices (US$ 439/t), as the nickel average price fell throughout the fourth quarter, and the positive hedge program settlements (US$ 279/t), reflecting the lower LME prices vis a vis the floor price of the collar hedge structure (US$ 15,714/t).

Selected financial indicators

US$ million	4Q19	3Q19	4Q18
Net operating revenues	9,964	10,217	9,813
Total costs and other expenses	6,507	6,345	6,234
Expenses related to Brumadinho	1,141	225	-
Adjusted EBIT	2,504	3,676	3,699
Adjusted EBIT margin (%)	25%	36%	38%
Adjusted EBITDA	3,536	4,603	4,467
Adjusted EBITDA margin (%)	35%	45%	46%
Iron ore - 62% Fe reference price	88.6	102.0	71.6
Net income (loss)	(1,562)	1,654	3,786
Net debt [1]	4,880	5,321	9,650
Capital expenditures	1,472	891	1,497

[1] Does not include leases (IFRS 16).

US$ million	2019	2018	%
Net operating revenues	37,570	36,575	2.7
Total costs and other expenses	23,775	23,721	0.2
Expenses related to Brumadinho	7,402	-	-
Adjusted EBIT	6,859	13,242	(48.2)
Adjusted EBIT margin (%)	18%	36%	(18%)
Adjusted EBITDA	10,585	16,593	(36.2)
Adjusted EBITDA margin (%)	28%	45%	(17%)
Net income (loss)	(1,683)	6,860	(124.5)
Capital expenditures	3,704	3,784	(2.1)

Market overview

IRON ORE

Iron ore 62% Fe reference price averaged US$ 93.4/dmt in 2019, 34% higher than in 2018 driven by disruptions on supply side, attributable mainly to the Brumadinho tragedy in Brazil and the impact of cyclone Veronica in Australia and a record steel production in China. In 4Q19, 62% Fe price averaged US$ 88.6/dmt, 13% lower than 3Q19.

MB65% index averaged US$ 104.5/dmt in 2019, 15% higher than in 2018, following the overall iron ore price trend. In 4Q19, the index fell 10% compared to 3Q19, a lower decrease than the 62% Fe index. Going forward, Vale is positive about high Fe grade ores use and premiums, in response to China's reforms and Ministry of Industry and Technology Information recent policy of not approving more steel capacity swaps and ordering local governments to inspect steel projects meant to swap older capacity in compliance with environmental, energy consumption and other policies.

In China, crude steel production was record, achieving 996.3 Mt in 2019, with a strong performance in the 4Q19, driven by continued momentum in the real estate sector, a recovery in manufacturing and softer winter restrictions.

Ex-China, according to the World Steel Association (WSA), crude steel production decreased to 873.6 Mt in 2019, 1.6% lower than in 2018, as the steel-using sectors suffered the side-effects of trade tensions between the US and China.

Europe has been hit the hardest, as the export-oriented sectors such as automotive and machinery were impacted by lack of investments and lower trade flows. Steel production in the region totaled 159.4 Mt in 2019, 5% lower than 2018.

In North America, the US was the only country to increase steel production, achieving 87.9 Mt in 2019, 1.5% higher than 2018, due particularly to higher steel production from electric arc furnaces.

In developing countries, India's steel production increased below expectations to 111.2 Mt, 1.8% higher than in 2018. The modest growth was attributed to slow manufacturing and domestic consumption. On the other hand, Southeast Asia has kept the steel production momentum observed in the past years and steel production was 11% higher than in 2018, based on preliminary figures from WSA.

Vale remains positive on steel demand in China, this time driven by a rebound in infrastructure investments. Nevertheless, we see growing risks emerging from the coronavirus uncertainties, which have led to travel restrictions and a longer Chinese New Year holiday, impacting first mainly services, consumer goods manufacturing and overall sentiment. Iron ore price may be impacted in the short-term by the uncertainties, but it should recover, reacting to restocking activity and stimulus policies. Ex-China, iron ore seaborne demand will be driven by growth of steel production in emerging economies, such as Southeast Asia, and a slow recovery in developed markets such as Europe, Japan and Korea.

COAL

Seaborne coking coal prices averaged US$177.0/t in 2019, 15% lower than in 2018, and averaged US$140.0/t in 4Q19, 13% lower than in 3Q19. Poor performance of seaborne coking coal during the year was mainly driven by factors in 2H19 such as (i) weak macro data in India, due to lower housing and infrastructure spending over an extended monsoon period and weak auto sales and consumer spending; (ii) shutdown of several blast furnaces in Europe due to weak steel margins due to high carbon prices, steel raw material prices and weak auto sales because of trade concerns; (iii) decrease in coke prices and domestic coking coal prices in China; (iv) lower crude steel production in Japan with completion of Olympic Games demand and weak auto sales; (v) steady supply from Australia with no disruptions, as those observed in 2018.

Seaborne coking coal market should remain bearish on prices, mainly due to lower than expected growth in Indian steel demand and emerging uncertainties due to coronavirus in China. Support can be seen from growing demand for coking coal with commissioning of new blast furnaces in Southeast Asia.

In the thermal coal market, Richards Bay FOB price averaged US$71.5/t in 2019, 27% lower than in 2018, and averaged US$75.8/t in 4Q19, 40% higher than in 3Q19. Weaker prices in the year were mainly driven by (i) lower LNG prices due to rise in gas supply by 12% amid warm winters; (ii) higher carbon prices in Europe squeezing the margins for coal fired power generation; (iii) rising alternate power generation sources such as renewables in Europe, hydro in China, nuclear in Japan and Korea; (iv) weaker seasonal demand in India due to monsoon period; (v) higher stock levels in China amid warm winters and steady domestic coal supply; (vi) rise in Indonesian thermal coal production by 10%.

Thermal coal market sentiment remains negative due to the same drivers observed in 2019 and added uncertainties around the coronavirus, impacting industrial demand and power generation in China. However, prices should be supported by steady demand from the Indian DRI (Direct Reduction Iron) sector due to their technical dependence on this type of coal.

NICKEL

LME nickel prices averaged 2019 at US$ 13,936/t, 6% stronger compared to US$ 13,122/t in 2018.

Total exchange inventories (LME and SHFE) had a net decline, closing at 190.5 kt by the end of 2019, down 28.4 kt since 2018. LME inventories at the end of 2019 stood at 153.3 kt, a decline of 53.1 kt since the end of 2018. SHFE inventories increased 24.7 kt to 37.1 kt by the end of 2019.

Global stainless-steel production increased 3.3% in 2019 relative to 2018 with strong growth led by Indonesia, India and China. This mismatch of stainless production and stainless consumption is resulting in surplus and is evidenced by the record high reported stainless inventories, particularly in China. Sales of electric vehicles worldwide grew 12% in 11M19 relative to 11M18 amid a continued decline in overall automotive sales. Demand for nickel in other applications is mixed, with aerospace supporting increased growth in super alloy applications and the poor results for the automotive market negatively impacting plating applications. Nickel supply increased approximately 8% in 2019 relative to 2018, with Class II production growing 15% whereas Class I production increased 1% during this period.

The Indonesian export ore ban, which was fast tracked and has taken effect in the beginning of 2020, two years earlier than previously indicated, contributed significantly to recent price gains. Chinese NPI (nickel pig iron) production, which relies heavily on Indonesian ore imports, will be negatively impacted in the long-term. However, in the near-term, alternative sources of ore could soften the impact, such as, current Chinese ore stockpiles (visible and invisible), the additional Indonesian quotas for the current year (which are permitted for export) and the potential export increases from the Philippines, New Caledonia and Guatemala. Further to the supply developments, an important consideration for all commodities is the impact of the overarching macroeconomic factors such as the coronavirus outbreak, the ongoing trade dispute between China and the US and a slowing global economy, which influences sentiment, demand and, therefore, prices. The physical market reflects a slowing growth environment. Due to these factors, our near-term view on nickel is subdued.

Our long-term outlook for nickel is positive. Nickel in electric vehicle batteries will become an increasingly important source of demand growth particularly as battery chemistry favors higher nickel content due to lower cost and higher energy density against the backdrop of robust demand growth in other nickel applications. Additionally, we see price support from recent announcements of increasing HPAL costs in Indonesia. HPAL projects are more complex than originally envisioned and this has the potential to increase the financial burden on nickel producers to meet the growing battery demand. While the Indonesian export ore ban will limit Chinese NPI in the longer term, the ban has incentivized domestic nickel RKEF and HPAL developments within the country. As a result, several projects and expansions have been announced, and in some cases, construction at current developments is ahead of schedule.

COPPER

LME copper price averaged US$ 6,000/t in 2019, a decrease of 8% from 2018 (US$ 6,523/t).

Copper inventories on the LME increased by 13 kt in 2019 vs. 2018. In 2019, COMEX decreased by 73 kt, while SHFE increased by 5 kt in comparison with 2018. Overall, copper exchange inventory reduced by 55 kt, which makes up ~0.2% of total refined supply for 2019.

Global demand remained relatively flat in 2019 compared to 2018. Global refined copper production increased slightly by 0.3% in 2019 vs. 2018 while the recent China scrap ban supported primary use.

Our near-term outlook for copper is relatively positive. We expect the market to remain essentially balanced with some upside risk for deficits in 2020, with macroeconomic factors, such as the ongoing trade dispute between China and the US, though negotiations are currently making progress amidst a US election year, continuing to influence price and subdue refined copper demand as it has over this past year. Also, due to potential impacts of the coronavirus, we expect additional Chinese stimulus to support short-term growth.

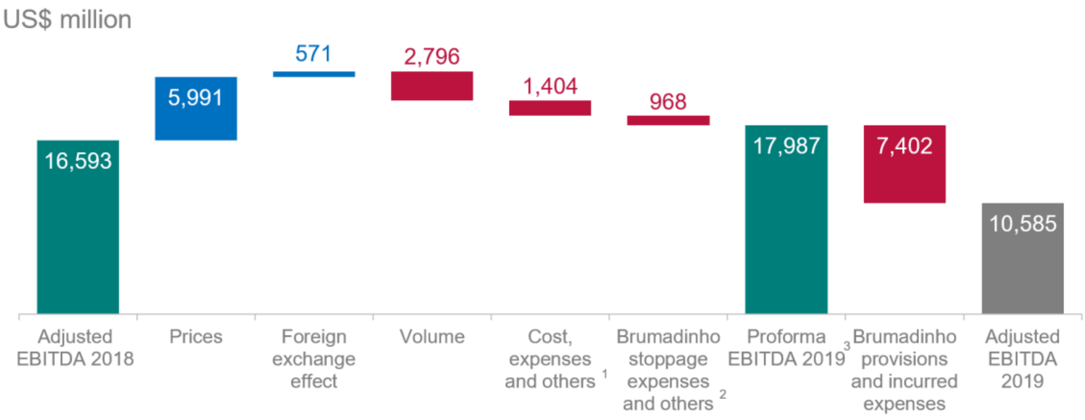
Our long-term outlook for copper is positive. Copper demand is expected to grow, partially driven by electric vehicles and renewable energy as well as infrastructure investments, while future supply growth is challenged given declining ore grades and the need for greenfield investment, creating a positive market outlook.

Adjusted EBITDA

In 2019, proforma EBITDA, excluding the provisions and incurred expenses related to Brumadinho, totaled US$ 17.987 billion, US$ 1.394 billion higher than in 2018, mainly due to higher prices (US$ 5.991 billion) and favorable foreign exchange variations (US$ 571 million), which were partially offset by lower volumes (US$ 2.796 billion), higher costs, expenses and others[5] (US$ 1.404 billion) and the stoppage expenses and others due to Brumadinho (US$ 968 million).

Adjusted EBITDA in 2019 was US$ 10.585 billion, US$ 6.008 billion lower than 2018, mainly due to provisions and incurred expenses related to Brumadinho (US$ 7.402 billion) and the above-mentioned impacts on the proforma EBITDA.

Adjusted EBITDA 2019



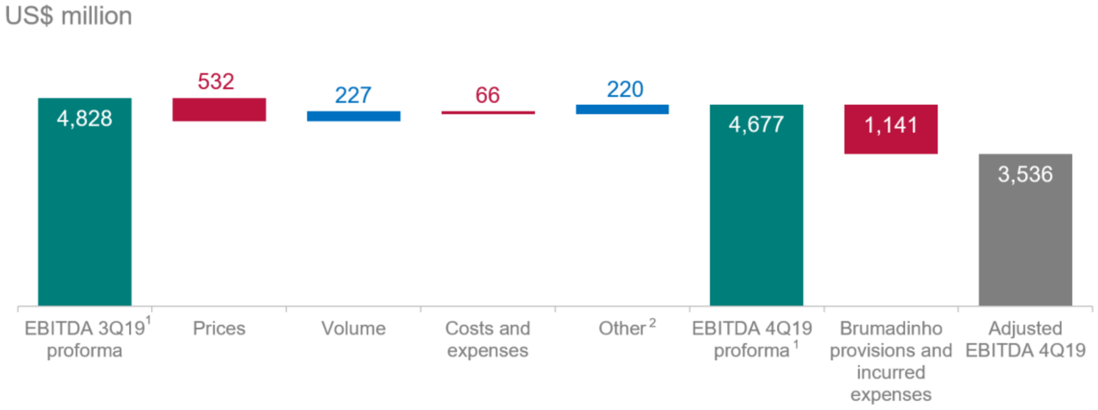
[1] Excluding stoppage and extraordinary logistics expenses due to Brumadinho and including dividends received
[2] Stoppage expenses (US$ 749 million) and extraordinary logistics expenses (US$ 209 million) due to Brumadinho
[3] Net of Brumadinho provisions and incurred expenses

On a quarterly basis, proforma EBITDA totaled US$ 4.677 billion in 4Q19, US$ 151 million lower than in 3Q19. The decrease was mainly a result of lower prices (US$ 532 million) and higher costs and expenses (US$ 66 million), which were partially offset by higher sales volumes (US$ 227 million) and higher dividends received (US$ 159 million).

In 4Q19, adjusted EBITDA was US$ 3.536 billion, US$ 1.067 billion lower than in 3Q19 mainly due to Brumadinho event provisions (US$ 898 million) and incurred expenses (US$ 243 million) in 4Q19 vs. 3Q19, which only recorded incurred expenses of US$ 225 million.

[5] Excluding Brumadinho stoppage expenses of US$ 759 million and extraordinary logistic expenses of US$ 209 million and including US$ 78 million dividends received.

Adjusted EBITDA 4Q19



[1] Net of Brumadinho provisions and incurred expenses
[2] Including US$ 159 million of dividends received and US$ 61 million of foreign exchange effect

Impact of provisions and reparation expenses related to the Brumadinho dam rupture

In 2019, Vale provisioned US$ 6.550 billion to meet its assumed and expected commitments in relation to the Dam I rupture, including framework agreements and donations as well as environmental initiatives and the decharacterization of its dams and other geotechnical structures.

As of December 31st, 2019, Vale paid US$ 989 million in relation to the provisioned amount and US$ 730 million in incurred expenses, giving a total of US$ 1.719 billion. The balance of the provisioned commitments as of December 31st, 2019 is US$ 5.472 billion[6].

US$ million	1Q19	2Q19	3Q19	4Q19	2019	Payments	PV & FX adjust[1]	Balance in 31dec19
Decharacterization	1,855	98	-	671	2,624	(158)	23	2,489
Agreements & donations	2,423	1,276	-	227	3,926	(831)	(112)	2,983
Total Provisions	**4,278**	**1,374**	**-**	**898**	**6,550**	**(989)**	**(89)**	**5,472**
Incurred expenses	226	158	225	243	852	(730)	(122)	-
Total impact in EBITDA	**4,504**	**1,532**	**225**	**1,141**	**7,402**	**(1,719)**	**(211)**	**-**

[1] Present value and currency translation adjustments.

In 4Q19, the total impact of Brumadinho provisions and incurred expenses in Vale's EBITDA was US$ 1.141 billion, as it recognized additional provisions of US$ 898 million related to the decharacterization plan, framework agreements and donations and US$ 243 million in incurred expenses.

[6] After present value and currency translation adjustments.

Decharacterization plan

As disclosed in the press release of February 11th, 2020, Vale updated its dam decharacterization plan and provisioned US$ 671 million as a net-effect of: (i) review of the engineering plan for the decharacterization of the nine upstream dams whose construction method is similar to the Dam I construction method and internal dikes built using the upstream methods, (ii) inclusion of Doutor and Campo Grande dams in the decharacterization plan, (iii) decharacterization of three drained stack structures in compliance with requirements of Resolution ANM 13/19 and (iv) adjustments to the provision related to structures located nearby Córrego do Feijão.

Framework agreements and donations

In November 2019, Vale agreed with the extension for an additional 10 months period of payments of emergency aid to those affected by the Dam I rupture. Accordingly, Vale provisioned US$ 227 million mainly to cope with the extended commitment.

In addition, Vale is under negotiations with the Government of the State of Minas Gerais and other relevant authorities for an additional agreement for collective damages indemnification and further compensation for the society and environment. The goal of Vale with a potential agreement would be to provide a stable legal framework for the execution of reparation and compensation, with the suspension of the existing civil lawsuits.

The potential agreement is still very uncertain as it is subject to conclusion of the ongoing negotiations and approval by Vale, the Government of the State of Minas Gerais, Public Prosecutors and other authorities and Intervenient parties.

Therefore, the provisions recorded in the financial statements do not include the potential outcome of the current negotiation as it is not yet possible to reliably estimate an amount or whether the current negotiations will be successful.

The estimate of the economic impact of a potential agreement will depend on (i) final agreement on the list of reparation and compensation projects, (ii) a detailed assessment of the estimates of the amounts to be spent on the reparation and compensation projects being discussed, (iii) an analysis of the detailed scope of such projects to determine their overlap with the initiatives and amounts already provisioned; and (iv) the timing of the execution of projects and disbursements, which will impact the present value of the obligations.

Based on the current terms under discussion, and preliminary estimates subject to the uncertainties listed above, such possible agreement might result in an additional provision ranging from US$ 1.0 billion to US$ 2.0 billion. All accounting impacts, if any, will be recorded in the period an agreement is reached.

Adjusted EBITDA

US$ million	4Q19	3Q19	4Q18	2019	2018
Net operating revenues	9,964	10,217	9,813	37,570	36,575
COGS	(5,632)	(5,681)	(5,752)	(21,187)	(22,109)
SG&A	(139)	(128)	(141)	(487)	(523)
Research and development	(158)	(124)	(125)	(443)	(373)
Pre-operating and stoppage expenses	(314)	(290)	(66)	(1,153)	(271)
Expenses related to Brumadinho	(1,141)	(225)	-	(7,402)	-
Other operational expenses	(264)	(122)	(150)	(505)	(445)
Dividends and interests on associates and JVs	188	29	120	466	388
Adjusted EBIT	**2,504**	**3,676**	**3,699**	**6,859**	**13,242**
Depreciation, amortization & depletion	1,032	927	768	3,726	3,351
Adjusted EBITDA	**3,536**	**4,603**	**4,467**	**10,585**	**16,593**

Adjusted EBITDA by business area

US$ million	4Q19	3Q19	4Q18	2019	2018
Ferrous Minerals	4,538	4,634	4,115	16,997	14,711
Base Metals	649	555	592	2,174	2,542
Coal	(186)	(172)	16	(533)	181
Others	(324)	(189)	(256)	(651)	(841)
Brumadinho impact	(1,141)	(225)	-	(7,402)	-
Total	**3,536**	**4,603**	**4,467**	**10,585**	**16,593**

Net operating revenue by business area

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
Ferrous Minerals	**8,020**	**80.5**	**8,327**	**81.5**	**7,646**	**77.9**	**30,005**	**79.9**	**27,933**	**76.4**
Iron ore fines	6,451	64.7	6,566	64.3	5,487	55.9	23,343	62.1	20,354	55.7
ROM	5	0.1	14	0.1	9	0.1	35	0.1	35	0.1
Pellets	1,378	13.8	1,596	15.6	1,921	19.6	5,948	15.8	6,651	18.2
Manganese ore	46	0.5	18	0.2	70	0.7	148	0.4	288	0.8
Ferroalloys	34	0.3	30	0.3	41	0.4	134	0.4	166	0.5
Others	106	1.1	103	1.0	118	1.2	397	1.1	439	1.2
Base Metals	**1,643**	**16.5**	**1,529**	**15.0**	**1,613**	**16.4**	**6,161**	**16.4**	**6,703**	**18.3**
Nickel	764	7.7	757	7.4	723	7.4	2,892	7.7	3,231	8.8
Copper	500	5.0	447	4.4	582	5.9	1,986	5.3	2,115	5.8
PGMs	148	1.5	105	1.0	78	0.8	469	1.2	381	1.0
Gold as by-product	188	1.9	179	1.8	152	1.5	651	1.7	606	1.7
Silver as by-product	9	0.1	7	0.1	9	0.1	28	0.1	31	0.1
Cobalt	28	0.3	27	0.3	64	0.7	112	0.3	313	0.9
Others	6	0.1	7	0.1	5	0.1	23	**0.1**	26	**0.1**
Coal	**191**	**1.9**	**241**	**2.4**	**482**	**4.9**	**1,021**	**2.7**	**1,643**	**4.5**
Metallurgical coal	134	1.3	178	1.7	351	3.6	764	2.0	1,189	3.3
Thermal coal	57	0.6	63	0.6	131	1.3	257	0.7	454	1.2
Others	**110**	**1.1**	**120**	**1.2**	**72**	**0.7**	**383**	**1.0**	**296**	**0.8**
Total	**9,964**	**100.0**	**10,217**	**100.0**	**9,813**	**100.0**	**37,570**	**100.0**	**36,575**	**100.0**

COGS by business segment

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
Ferrous Minerals	3,763	66.8	3,855	67.9	3,881	67.5	13,802	65.1	14,641	66.2
Base Metals	1,238	22.0	1,204	21.2	1,260	21.9	5,038	23.8	5,363	24.3
Coal	453	8.0	504	8.9	543	9.4	1,875	8.8	1,820	8.2
Other products	178	3.2	118	2.1	68	1.2	472	2.2	285	1.3
Total COGS	**5,632**	**100.0**	**5,681**	**100.0**	**5,752**	**100.0**	**21,187**	**100.0**	**22,109**	**100.0**
Depreciation	943		837		738		3,399		3,207	
COGS [1], ex-depreciation	**4,689**		**4,844**		**5,014**		**17,788**		**18,902**	

[1] COGS currency exposure in 4Q19 was as follows: 53% USD, 41% BRL, 5% CAD and 1% EUR; and in 2019 was as follows: 49% USD, 44% BRL, 6% CAD and 1% EUR

Expenses

US$ million	4Q19	3Q19	4Q18	2019	2018
SG&A ex-depreciation	**125**	**116**	**129**	**431**	**461**
SG&A	**139**	**128**	**141**	**487**	**523**
Administrative	**116**	**105**	**110**	**395**	**428**
Personnel	49	45	48	181	212
Services	33	25	34	85	92
Depreciation	14	12	12	56	62
Others	20	23	16	73	62
Selling	**23**	**23**	**31**	**92**	**95**
R&D	**158**	**124**	**125**	**443**	**373**
Brumadinho - extraordinary logistics expenses	**28**	**55**	**-**	**209**	**-**
Pre-operating and stoppage expenses	**314**	**290**	**66**	**1,153**	**271**
Brumadinho - stoppage expenses	182	179	-	759	-
Stobie & Birchtree	-	-	-	4	-
Onça Puma	-	16	4	20	16
Sossego	20	-	-	20	-
S11D	-	-	22	-	82
Others	37	17	22	79	91
Depreciation	75	78	18	271	82
Expenses related to Brumadinho	**1,141**	**225**	**-**	**7,402**	**-**
Provisions	898	-	-	6,550	-
Incurred expenses	243	225	-	852	-
Other operating expenses	**236**	**67**	**150**	**296**	**445**
Total expenses	**2,016**	**889**	**482**	**9,990**	**1,612**
Depreciation	89	90	30	327	144
Expenses ex-depreciation	**1,927**	**799**	**452**	**9,663**	**1,468**

Net income (loss)

Vale posted a loss of US$ 1.683 billion in 2019, compared to a net income of US$ 6.860 billion in 2018. The US$ 8.543 billion decrease was mostly driven by: (i) provisions and expenses related to the Brumadinho dam rupture, including the decharacterization of dams and reparation agreements (US$ 7.402 billion), (ii) recognition of non-cash impairment charges and onerous contracts, mainly in the Base Metals and Coal businesses (US$ 4.202 billion), (iii) provisions related to the Renova Foundation and to the decommissioning of Germano dam (US$ 758 million), which were partially offset by lower foreign exchange losses (US$ 2.555 billion) in the year.

Net income was negative US$ 1.562 billion in 4Q19, US$ 3.216 billion lower than 3Q19. The decrease was mainly due to: (i) US$ 4.202 billion non-cash impairment charges recognized in 4Q19 in relation to Vale New Caledonia and Mozambique coal mine assets, (ii) US$ 671 million provision related to the dam decharacterization plan and (iii) US$ 227 million provision related to the framework agreements.

In December 2019, the Board of Directors approved the interest on capital (JCP[7]) of R$ 7.253 billion, equivalent to R$ 1.414364369 per share. The decision did not modify the Board of Directors' previous decision of suspending the Shareholder Remuneration Policy, with the allocation of the JCP to be decided only after the Policy suspension is withdrawn.

Impairments and onerous contracts

Asset impairments and onerous contracts (excluding impairment on investments[8]) from continuing operations, both with no cash effect, totaled US$ 5.074 billion in 2019, mainly due to charges in the Nickel and Coal businesses.

In the Base Metals nickel business, the New Caledonian operation has experienced challenging issues throughout 2019, mainly in relation to production and processing. Thus, Vale has revised its business plan, reducing the expected production levels for the remaining life of the operation. The new business strategy led to an impairment charge of US$ 2.511 billion in 2019.

In the Coal business, the revaluation of the expectations related to the yield of metallurgical and thermal coal in the operations in Mozambique, the review of the mining plan, which led to a reduction on the proven and probable reserves, and the lowering of the long-term price assumption led to an impairment charge of US$ 1.691 billion in 2019.

Vale also recognized US$ 513 million of assets write-off, mainly related to the Córrego do Feijão mine and other upstream dams in Brazil.

[7] In Portuguese, Juros sobre Capital Próprio
[8] From associates and joint ventures.

Impairment of assets US$ million	**Total in 2019**
Base Metals – Nickel – VNC	2,511
Coal – Moatize mine	1,691
Other assets impairments and write-off	632
Onerous contracts	240
Total	**5,074**

Financial results

Net financial results accounted for a loss of US$ 3.413 billion, US$ 1.544 billion lower than in 2018. The decrease was mainly due to lower foreign exchange losses (US$ 2.555 billion) in the year, due to the adoption of net investment hedge, therefore reducing the exposure to foreign exchange volatility, which were partially offset by higher mark-to-market expenses in the shareholder debentures (US$ 925 million).

Financial results

US$ million	4Q19	3Q19	4Q18	2019	2018
Financial expenses	**(1,163)**	**(1,084)**	**(550)**	**(3,806)**	**(2,345)**
Gross interest	(205)	(258)	(283)	(989)	(1,185)
Capitalization of interest	29	34	40	140	194
Shareholder debentures[1]	(361)	(486)	(60)	(1,475)	(550)
Others	(598)	(333)	(202)	(1,328)	(607)
Financial expenses (REFIS)	(28)	(41)	(45)	(154)	(197)
Financial income	**176**	**132**	**113**	**527**	**423**
Derivatives[2]	**159**	**(74)**	**55**	**244**	**(266)**
Currency and interest rate swaps	141	(115)	83	42	(279)
Others (bunker oil, commodities, etc)	18	41	(28)	202	13
Foreign Exchange	**-**	**25**	**448**	**39**	**(2,247)**
Monetary variation	**(12)**	**(138)**	**(81)**	**(417)**	**(522)**
Financial result, net	**(840)**	**(1,139)**	**(15)**	**(3,413)**	**(4,957)**

[1] In 4Q19, US$ 89 million were paid as remuneration on shareholder debentures.

[2] The cash effect of the derivatives was a loss of US$ 115 million in 4Q19.

CAPEX

Investments in 2019 remained in line with 2018, totaling US$ 3.704 billion, consisting of US$ 544 million in project execution and US$ 3.160 billion in maintenance of operations. In 2020, Vale expects to invest US$ 5.0 billion, an increase of 35% compared to 2019, mainly to boost the use of the filtration and dry stacking system.

Project Execution and Sustaining by business area

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
Ferrous Minerals	815	55.4	491	55.1	838	56.0	2,070	55.9	2,392	63.2
Coal	84	5.7	79	8.9	59	3.9	240	6.5	156	4.1
Base Metals	569	38.7	314	35.2	595	39.7	1,376	37.1	1,223	32.3
Energy and others	4	0.3	7	0.8	5	0.3	18	0.5	13	0.3
Total	**1,472**	**100.0**	**891**	**100.0**	**1,497**	**100.0**	**3,704**	**100.0**	**3,784**	**100.0**

Project execution

Investments in project execution totaled US$ 544 million in 2019, 38.7% lower than in 2018. Two main multi-year projects are under development: the Northern System Logistics 240 Mtpy project and the Salobo III project.

The first project aims to expand the Northern System's mine and logistics capacity and had a first installation license granted in December 2019. The second project is a brownfield expansion of the copper throughput capacity at the Salobo site, which had installation license granted in November 2018.

Capital projects progress indicator[9]

Projects	**Capacity** (tons per year)	**Estimated start-up**	**Executed capex** (US$ million)		**Estimated capex** (US$ million)		**Physical progress (%)**
			2019	**Total**	**2020**	**Total**	
Ferrous Minerals Project							
Northern System Logistics 240 Mtpy	240 (10) [1] Mt	2H22	69	69	224	770	14%
Base Metals Project							
Salobo III	(30-40) kt	1H22	133	136	323	1,128	40%

[1] Net additional capacity.

Project execution by business area

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
Ferrous Minerals	122	67.8	90	66.7	197	99.5	385	70.8	823	92.7
Coal	-	-	-	-	-	-	-	-	24	2.7
Base Metals	56	31.1	43	31.9	-	-	151	27.8	34	3.8
Energy and others	2	1.1	2	1.5	1	0.5	8	1.5	7	0.8
Total	**180**	**100.0**	**135**	**100.0**	**198**	**100.0**	**544**	**100.0**	**888**	**100.0**

[9] Pre-operating expenses were not included in the estimated capex for the year, although included in the total estimated capex column, in line with Vale's Board of Directors approvals. Estimated capex for the year is only reviewed once a year.

Sustaining CAPEX

In 2019, investments in the maintenance of operations increased 9.1% compared to 2018, with the continuity of the projects Gelado, in Brazil, and Voisey's Bay underground mine extension (“VBME”), in Canada.

The Gelado project aims to recover approximately 10 Mtpy of pellet feed with 64.3% Fe content, 2.0% silica and 1.65% alumina in the Carajás Complex, to feed the São Luís pellet plant. The VBME project is expected to extend the mine life of Voisey’s Bay, with annual underground mine production of around 45 kt of nickel in concentrate, on average, about 20 kt of copper and about 2.6 kt of cobalt. VBME will replace existing Voisey’s Bay mine production.

Replacement projects progress indicator[10]

Projects	Capacity (ktpy)	Estimated start-up	Executed capex (US$ million)		Estimated capex (US$ million)		Physical progress (%)
			2019	Total	2020	Total	
Voisey’s Bay Mine Extension	45	1H21	249	471	499	1,694	41
Gelado	9,6	2H21	70	75	121	428	48

Investments in dam management

Vale has been continuously investing in the maintenance and safety of its dams, with standards being updated and in continuous alignment with the most rigorous international practices.

In 2019, investments in dam management reached US$ 102 million, an increase of 67% compared to 2018. Investments in dam management encompass: dam maintenance, monitoring, safety and operational improvements, audits and risk analysis, revisions of the Emergency Action Plan for Mining Dams (PAEBM) and warning systems, video monitoring and instrumentation.

Investments in US$ million	2016	2017	2018	2019
Dam management	31	56	61	102

Investments in new dams totaled US$ 53 million in 2019 and reflect ongoing construction projects and Vale's operational requirements. It is important to emphasize that all of Vale's new dam constructions follow the conventional construction method, in line with the decision made in 2016, to render inactive and decharacterize all upstream dams, following the rupture of Samarco's Fundão dam, in Mariana (MG).

Vale aims to develop safe and sustainable alternatives to tailings dams. The company will increase dry processing up to 70% of its iron ore production volume by 2023, while investing approximately US$ 1.8 billion between 2020-2024 to increase wet processing with the filtration

[10] Pre-operating expenses were not included in the estimated capex for the year, although included in the total estimated capex column, in line with Vale’s Board of Directors approvals. Estimated capex for the year is only reviewed once a year.

and dry stacking system to up to 16% of its iron ore production volume. Additionally, Vale will invest in innovative technologies for dry magnetic concentration of iron ore fines. In such context, investments in new dams and dam raising will be gradually decreased.

Sustaining capex by type - 4Q19

US$ million	Ferrous Minerals	Coal	Base Metals	Energy and others	Total
Enhancement of operations	397	67	247	1	712
Replacement projects	51	-	132	-	183
Dam management	10	-	8	-	18
Other investments in dams and waste dumps	42	1	45	-	88
Health and Safety	80	4	27	-	111
Social investments and environmental protection	35	8	14	-	57
Administrative & Others	81	4	37	1	123
Total	**696**	**84**	**510**	**2**	**1,292**

Sustaining capex by business area

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
Ferrous Minerals	693	53.6	401	53.0	641	55.3	1,685	53.3	1,569	54.2
Coal	84	6.5	79	10.5	59	4.5	240	7.6	132	4.6
Base Metals	513	39.7	271	35.8	596	45.9	1,225	38.8	1,189	41.1
Nickel	469	36.3	225	29.7	536	41.3	1,068	33.8	1,027	35.5
Copper	52	4.0	46	6.1	61	4.7	157	5.0	162	5.6
Energy and others	2	0.2	5	0.7	4	0.3	10	0.3	6	0.2
Total	**1,292**	**100.0**	**756**	**100.0**	**1,298**	**100.0**	**3,160**	**100.0**	**2,896**	**100.0**

Investments in Health and Safety

Investments in Health & Safety reached US$ 279 million in 2019, an increase of 20% compared to 2018, mainly due to the undergoing review of safety standards and procedures by the Safety and Operational Excellence Office.

In 2020, investments are expected to increase 57% compared to 2019, with the execution of structural rehabilitation and operational adequacy, fire prevention and firefighting systems, as well as other initiatives aimed at mitigating risks and increasing health & safety levels.

US$ million	2016	2017	2018	2019
Investments in H&S	**198**	**207**	**233**	**279**

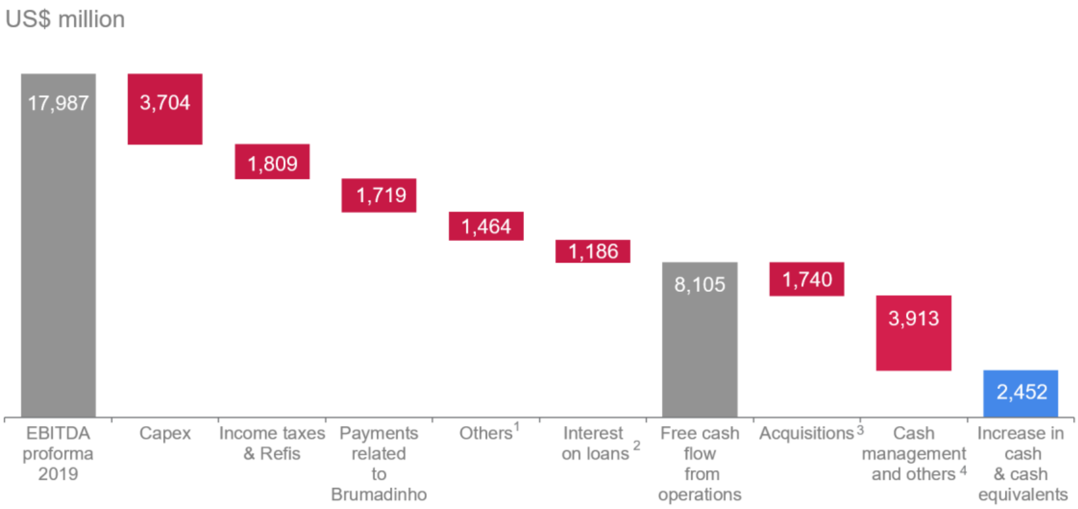
Free cash flow

Vale generated US$ 8.105 billion in Free Cash Flow from Operations in 2019, enabling:

- the repurchase of US$ 2.270 billion of bonds, with gross debt totaling US$ 13.056 billion in 4Q19, a decrease of US$ 2.410 billion in relation to 4Q18;
- the increase in cash and cash equivalents to US$ 8.176 billion, US$ 2.452 billion higher than 4Q18, and the decrease in net debt to US$ 4.880 billion, US$ 4.770 billion lower than 4Q18 and the lowest level since 2008;
- the redemption and cancelation of MBR preferred shares, which paid dividends to non-controlling interest of US$ 162 million and US$ 168 million in 2019 and 2018, reducing future cash-flow commitments.

Interest paid on loans totaled US$ 921 million in 2019, the lowest level since 2010 and 45% lower than the peak level of US$ 1.663 billion in 2016, reflecting the deleveraging and strengthening process of Vale's balance sheet in the last three years.

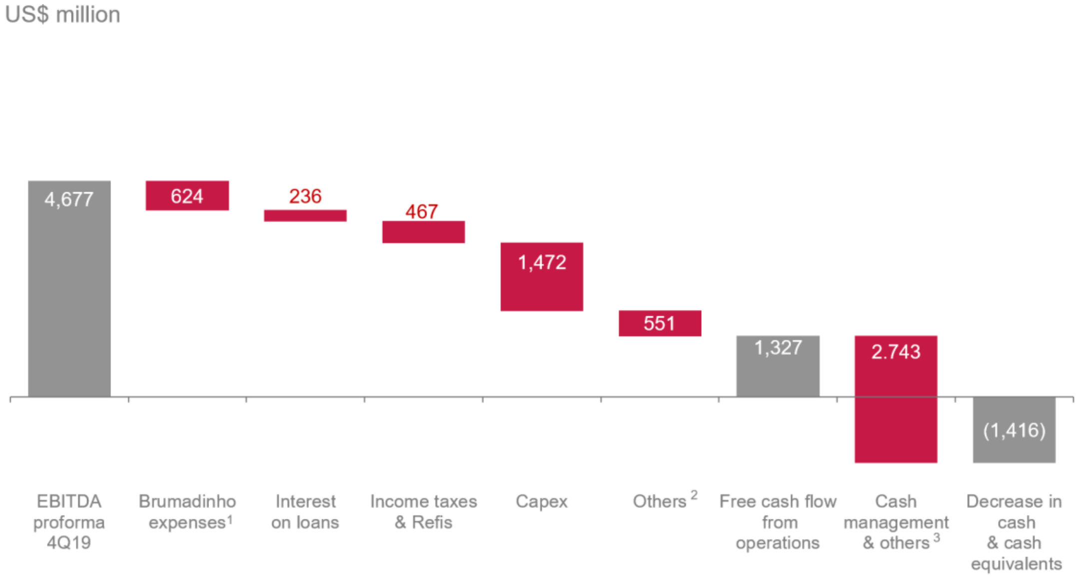
Free Cash Flow 2019



[1] Includes working capital, derivatives, Samarco, dividends and interest on capital paid to noncontrolling interest and others.
[2] Includes US$ 921 million of interest paid on loans and US$ 265 million of expenses of bonds repurchase
[3] Includes US$ 432 million of Ferrous, US$ 496 million of New Steel and US$ 812 million of MBR acquisitions
[4] Includes US$ 2,275 million of net debt repayments and US$ 1,638 million restricted cash and judicial deposits

In 4Q19, Free Cash Flow from Operations was US$ 1.327 billion, US$ 1.623 billion lower than in 3Q19 mainly due to (i) the positive one-off effect of working capital in 3Q19 due to suppliers' accounts and clients' receipts in that quarter (totaling US$ 939 million in 3Q19 vs. negative US$ 82 million in 4Q19) and (ii) seasonally higher investments of US$ 1,472 million in 4Q19.

Free Cash Flow 4Q19



[1] Includes US$ 243 million of incurred expenses and US$ 381 million disbursement of provisioned expenses.
[2] Includes working capital, derivatives, Samarco, dividends and interest on capital paid to noncontrolling interest and others.
[3] Includes US$ 1.871 billion of net debt repayments, US$ 812 million on minority stake of MBR and others

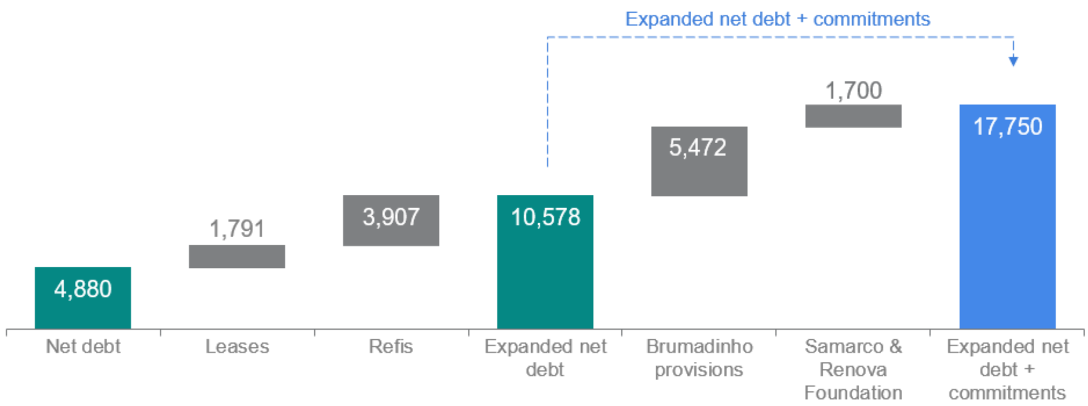
Debt indicators

Gross debt totaled US$ 13.056 billion as of December 31st, 2019, decreasing by US$ 2.410 billion from December 31st, 2018, mainly as a result of net debt repayments of US$ 2.275 billion, mostly related to the early repurchase of US$ 2.270 billion of bonds during the year.

Net debt totaled US$ 4.880 billion as of December 31st, 2019, a substantial decrease of US$ 4.770 billion when compared to US$ 9.650 billion as of December 31st, 2018. The reduction in net debt is mainly due to strong cash generation during the year.

Net debt has reached the lowest level since 2008. Nevertheless, in a broader view, considering leases and Refis obligations, the expanded net debt is US$ 10.578 billion as of December 31st, 2019. Furthermore, taking into consideration other relevant commitments, such as the provisions for Brumadinho and Samarco and Renova obligations, the total amount would be US$ 17.750 billion as of December 31st, 2019.

Expanded net debt[1]
US$ million



[1] As of December 31st, 2019.

In December 2019, Vale completed the sindication of a US$ 3.0 billion revolving credit facility, which will be available for five years. The new line, together with the existing US$ 2.0 billion facility that expires in 2022, preserves the total available amount of US$ 5.0 billion in revolving credit facilities.

Average debt maturity decreased to 8.5 years on December 31st, 2019, when compared to 8.9 years on December 31st, 2018. Likewise, average cost of debt, after currency and interest rate swaps, decreased to 4.87% per annum on December 31st, 2019 when compared to 5.07% per annum on December 31st, 2018, mainly due to the repurchase of higher yield and longer-term bonds during the year.

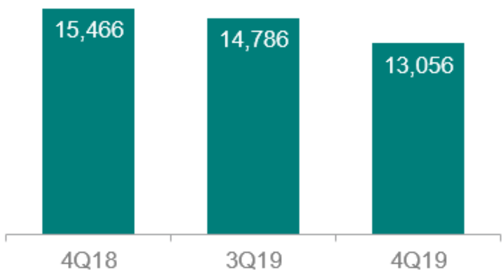
Leverage measured by net debt to LTM[11] adjusted EBITDA slightly decreased to 0.5x, and interest coverage, measured by the ratio of the LTM adjusted EBITDA to LTM gross interest, decreased to 10.7x on December 31st, 2019 against 14.0x on December 31st, 2018.

Debt indicators

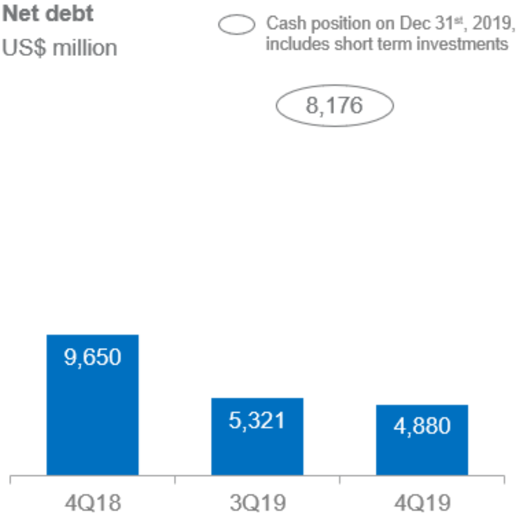
US$ million	4Q19	3Q19	4Q18
Gross debt [1]	13,056	14,786	15,466
Net debt [1]	4,880	5,321	9,650
Leases (IFRS 16)	1,791	1,811	-
Total debt / adjusted LTM EBITDA (x)	1.2	1.3	0.9
Net debt / adjusted LTM EBITDA (x)	0.5	0.5	0.6
Adjusted LTM EBITDA / LTM gross interest (x)	10.7	10.8	14.0

[1] Does not include leases (IFRS 16).

Gross debt
US$ million

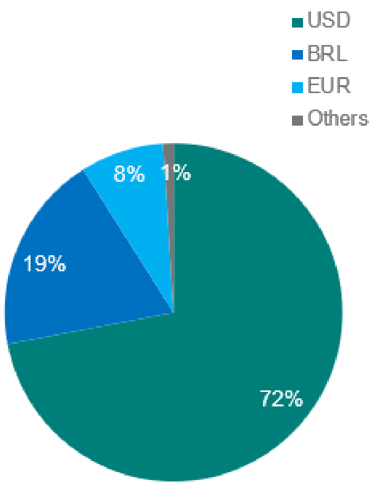


Net debt
US$ million



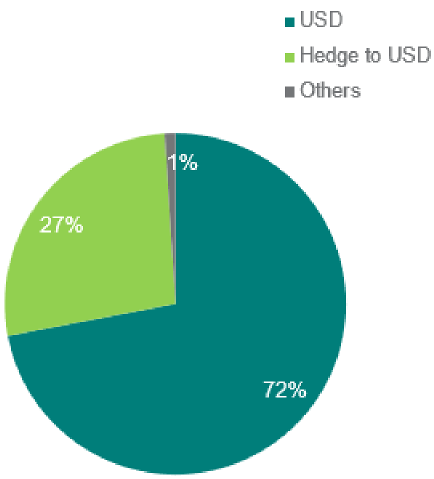
Debt position breakdown by currency (before hedge)

%



Debt position breakdown by currency (after hedge)

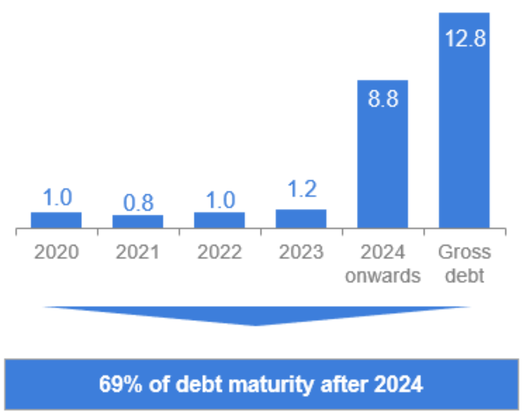
%



[11] Last twelve months.

Debt amortization schedule[1]

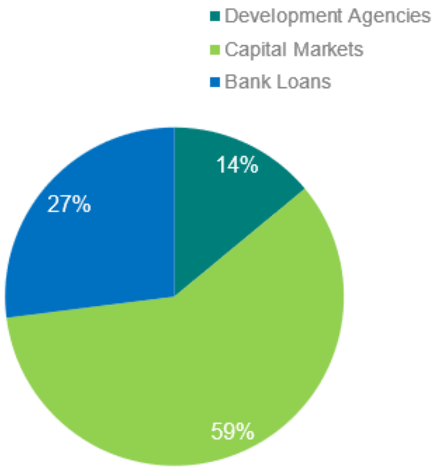
US$ billion



[1] As of December 31st, 2019. Does not include accrued charges.

Debt breakdown by instrument

%



Performance of the business segments

Segment information — 2019, as per footnote of financial statements

US$ million	Net Revenues	Cost¹	SG&A and others¹	R&D¹	Pre operating & stoppage¹	Dividends and interest on associates and JVs	Adjusted EBITDA
		Expenses					
Ferrous Minerals	30,005	(11,988)	(351)	(142)	(823)	296	16,997
Iron ore fines	23,343	(8,778)	(323)	(123)	(750)	29	13,398
ROM	35	-	-	-	-	-	35
Pellets	5,948	(2,666)	(20)	(16)	(72)	258	3,432
Others ferrous	397	(324)	-	(1)	-	9	81
Mn & Alloys	282	(220)	(8)	(2)	(1)	-	51
Base Metals	6,161	(3,772)	(80)	(87)	(48)	-	2,174
Nickel²	4,257	(2,867)	(75)	(44)	(28)	-	1,243
Copper³	1,904	(905)	(5)	(43)	(20)	-	931
Coal	1,021	(1,638)	1	(30)	-	113	(533)
Others	383	(390)	(506)	(184)	(11)	57	(651)
Brumadinho impact	-	-	(7,402)	-	-	-	(7,402)
Total	37,570	(17,788)	(8,338)	(443)	(882)	466	10,585

¹ Excluding depreciation, depletion and amortization.

² Including copper and by-products from our nickel operations.

³ Including by-products from our copper operations.

Segment information — 4Q19, as per footnote of financial statements

US$ milhões	Net Revenues	Cost¹	SG&A and others¹	R&D¹	Pre operating & stoppage¹	Dividends and interest on associates and JVs	Adjusted EBITDA
		Expenses					
Ferrous Minerals	8,020	(3,275)	(92)	(53)	(214)	152	4,538
Iron ore fines	6,451	(2,514)	(82)	(52)	(191)	29	3,641
ROM	5	-	-	-	-	-	5
Pellets	1,378	(614)	(5)	(1)	(22)	114	850
Others ferrous	106	(78)	(1)	1	-	9	37
Mn & Alloys	80	(69)	(4)	(1)	(1)	-	5
Base Metals	1,643	(909)	(29)	(36)	(20)	-	649
Nickel²	1,167	(709)	(29)	(18)	-	-	411
Copper³	476	(200)	-	(18)	(20)	-	238
Coal	191	(392)	(5)	(8)	-	28	(186)
Others	110	(113)	(263)	(61)	(5)	8	(324)
Brumadinho impact	-	-	(1,141)	-	-	-	(1,141)
Total	9,964	(4,689)	(1,530)	(158)	(239)	188	3,536

¹ Excluding depreciation, depletion and amortization.

² Including copper and by-products from our nickel operations.

³ Including by-products from our copper operations.

Ferrous Minerals

ANNUAL PERFORMANCE

2019 was a challenging year for the Ferrous Minerals business. The trajectory after the Dam I rupture was focused on recovering business reliability, enhancing safety levels, reviewing production standards, reducing risks and resuming production capacity.

Adjusted EBITDA of the Ferrous Minerals business segment was US$ 16.997 billion in 2019, 16% higher than in 2018, mainly due to higher prices (US$ 6.099 billion), which was offset by lower volumes (US$ 2.463 billion) and higher costs (US$ 885 million), following Dam I rupture impacts.

Following the Dam I rupture, Vale's iron ore production capacity was significantly impacted in 2019 by the stoppage of operations with interdictions on Brucutu, Vargem Grande, Alegria, Timbopeba and Fábrica operations. Over the year, Vale has made progress as regards the resumption of the stopped production capacity.

Vale expects to resume the remaining interrupted capacity of approximately 40 Mtpy, enabling additional 15 Mt and 25 Mt production in 2020 and 2021, respectively, as several milestones have been achieved, and work towards the others is ongoing while discussions with the ANM, MPMG and the external audit firms are in progress:

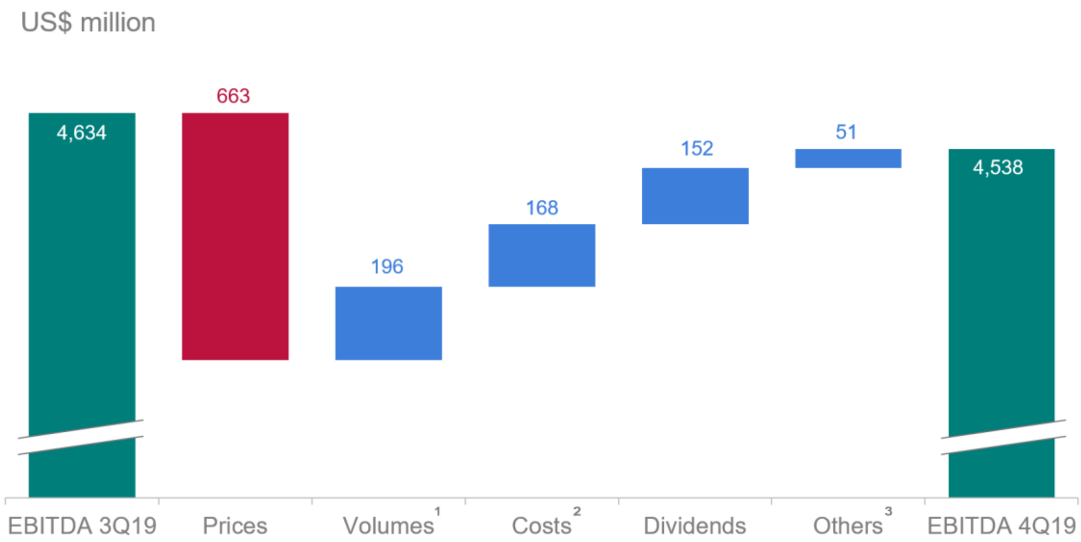
- Vale expects to receive the necessary authorization from the MPMG to restart the Timbopeba site in 1Q20 using dry processing, after the appraisal of the external audit by the MPMG. Wet processing activities are expected to be resumed in 4Q20 following the completion of a pipeline to dispose of tailings at Timbopeba pit. Alternatives are being evaluated to anticipate the use of wet processing.

- The Fábrica operation is expected to be resumed in 2Q20. Firstly, it is necessary to run vibration trigger tests to certify the absence of impacts on the site's structures, which relies on approval by the ANM and the MPMG's external audit. Vale expects to operate using wet processing with tailings disposal at Forquilha V dam, starting in 3Q20.

- The Vargem Grande pellet plant is expected to be resumed in 3Q20. The pellet feed for pellet production will be sourced from the site's beneficiation plant, which will require tailings disposal at the Maravilhas I dam and Cianita waste dump until the start-up of the Maravilhas III dam, which is expected for 4Q20. Running trigger tests at the pellet plant relies on approval by MPMG's external audit, while the beneficiation plant restart and its economic mining plan depends on approval by the ANM.

QUARTERLY PERFORMANCE

Adjusted EBITDA of the Ferrous Minerals business segment was US$ 4.538 billion in 4Q19, in line with 3Q19, despite a decrease in prices (US$ 663 million), which was offset by the impact of higher sales volumes on revenues and costs (US$ 196 million), lower costs (US$ 168 million) and higher dividends received (US$ 152 million).



[1] Including resumption of halted operations related to Brumadinho event.
[2] Excluding volume effect, FX and freight costs.
[3] Including FX effect (US$ 44 million) and Brumadinho stoppage expenses (US$ 25 million).

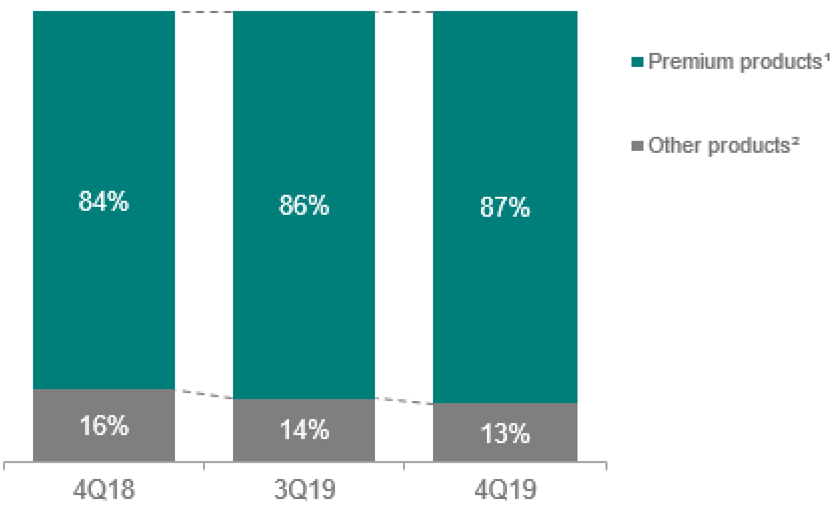
The share of premium products[12] in total sales was 87% in 4Q19, in line with 3Q19. Iron ore fines and pellets quality premiums reached US$ 6.4/t in 4Q19 vs. US$ 5.9/t in 3Q19, mainly due to seasonal dividends received, which were partially offset by lower quality premiums and lower premiums from pellets sales[13] due to market conditions.

Iron ore fines and pellets quality premium

US$/t	4Q19	3Q19	4Q18	2019	2018
Iron ore fines quality premium	3.8	4.0	8.1	4.6	7.3
Pellets weighted average contribution	2.6	1.9	3.4	3.7	2.9
Iron ore fines and pellets total quality premium	**6.4**	**5.9**	**11.5**	**8.3**	**10.2**

[12] Pellets, Carajás, BRBF (Brazilian Blend Fines) and pellet feed.
[13] Average pellets realized premium was US$31/t in 4Q19 on top of Iron Ore Metal Bulletin 65% index.

Sales composition - %



¹ Composed of pellets, Carajás, Brazilian Blend Fines (BRBF), pellet feed and Sinter Feed Low Alumina (SFLA)
² Composed of standard sinter feed, lump and high silica

FERROUS MINERALS ADJUSTED EBITDA MARGIN[14]

Adjusted EBITDA per ton for Ferrous Minerals, excluding Manganese and Ferroalloys, was US$ 51.0/t in 4Q19, a decrease of US$ 3.3/t when compared to the US$ 54.3/t recorded in 3Q19, mainly as a result of lower prices, which was partially offset by lower C1 cash cost and dividends received.

Iron ore fines (excluding Pellets and ROM)

ADJUSTED EBITDA

Adjusted EBITDA of iron ore fines was US$ 3.641 billion in 4Q19, 3% lower than in 3Q19, mainly due to lower sales prices (US$ 445 million), which was partially offset by higher sales volumes (US$ 204 million), lower costs (US$ 68 million) and lower freight costs (US$ 51 million).

SALES REVENUES AND VOLUME

Net sales revenues of iron ore fines, excluding pellets and run of mine (ROM), decreased to US$ 6.451 billion in 4Q19 vs. US$ 6.566 billion in 3Q19, as a result of lower sales prices (US$ 445 million), which was partially offset by higher sales volumes (US$ 330 million).

Sales volumes of iron ore fines totaled 77.3 Mt in 4Q19, 3.7 Mt higher than in 3Q19, mainly due to inventory drawdowns, reflecting Vale's supply chain flexibility.

[14] Excluding Manganese and Ferroalloys.

CFR sales of iron ore fines totaled 60.0 Mt in 4Q19, representing 78% of all iron ore fines sales volumes, in line with 3Q19.

Net operating revenue by product

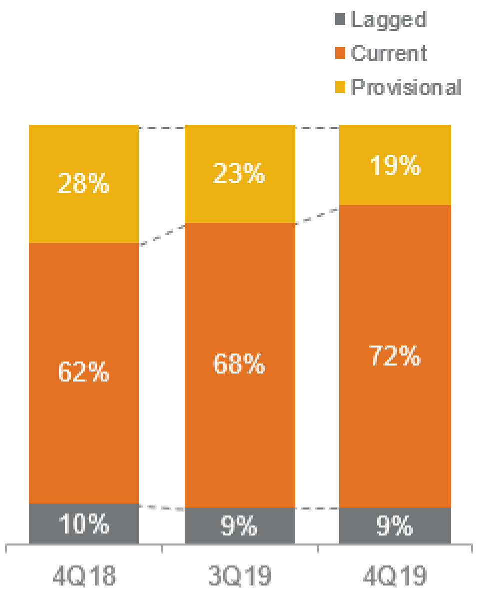
US$ million	4Q19	3Q19	4Q18	2019	2018
Iron ore fines	6,451	6,566	5,487	23,343	20,354
ROM	5	14	9	35	35
Pellets	1,378	1,596	1,921	5,948	6,651
Manganese & Ferroalloys	80	48	111	282	454
Others	106	103	118	397	439
Total	**8,020**	**8,327**	**7,646**	**30,005**	**27,933**

Volume sold

'000 metric tons	4Q19	3Q19	4Q18	2019	2018
Iron ore fines	77,301	73,614	80,201	267,992	307,433
ROM	605	425	294	1,314	1,548
Pellets	10,966	11,077	15,987	43,199	56,592
Manganese ore	570	150	442	1,063	1,572
Ferroalloys	35	29	36	127	141

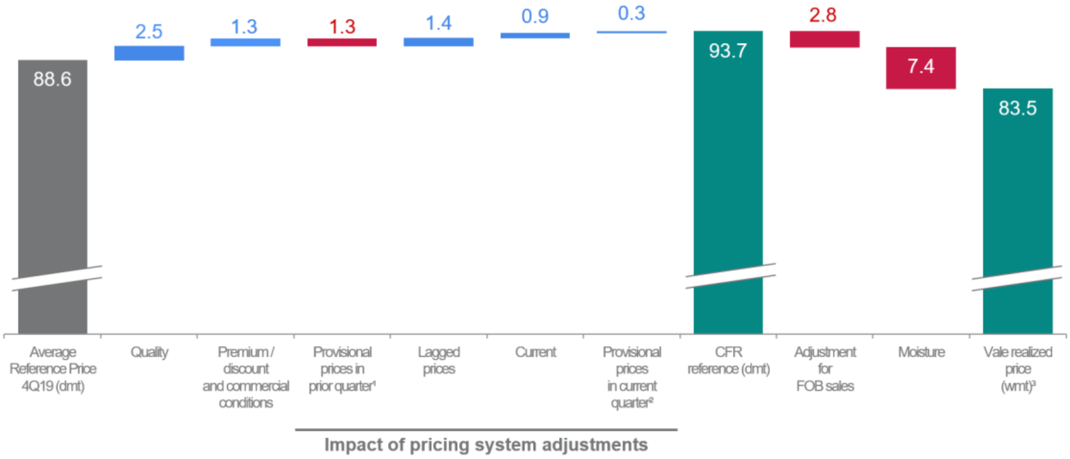
REALIZED PRICES

Pricing system breakdown - %



Price realization – iron ore fines

US$/t, 4Q19



[1] Adjustment as a result of provisional prices booked in 3Q19 at US$ 91.8/t.
[2] Difference between the weighted average of the prices provisionally set at the end of 4Q19 at US$ 90.3/t based on forward curves and US$ 88.6/t from the 4Q19 62% Fe reference price.
[3] Vale price is net of taxes.

In 4Q19, Vale's realized price CFR/FOB totaled US$ 83.5/t. Despite a lower 62% Fe reference price, 13% lower than in 3Q19, Vale's realized price CFR/FOB decreased only 6% vs. 3Q19, due to the positive effect of the pricing system mechanisms impacted by the strong price volatility within the quarter together with a higher forward price curve.

Average prices

US$/ metric ton	4Q19	3Q19	4Q18	2019	2018
Iron ore - Metal Bulletin 65% index	98.6	109.8	91.6	104.5	90.4
Iron ore - Metal Bulletin 62% low alumina index	88.3	101.8	75.2	94.5	73.9
Iron ore - 62% Fe reference price	88.6	102.0	71.6	93.4	69.5
Provisional price at the end of the quarter[1]	90.3	91.8	69.3	90.3	69.3
Iron ore fines CFR reference (dmt)	93.7	100.2	78.3	98.0	76.0
Iron ore fines CFR/FOB realized price	83.5	89.2	68.4	87.1	66.2
Pellets CFR/FOB (wmt)	125.7	144.1	120.1	137.7	117.5
Manganese ore	80.2	118.7	158.9	139.0	162.5
Ferroalloys	969.9	1,051.3	1,141.0	1,057.2	1,178.5

1 Provisional price reconciled in previous periods

COSTS

Costs for iron ore fines amounted to US$ 2.514 billion (or US$ 2.869 billion with depreciation charges) in 4Q19, a reduction of US$ 140 million vs. 3Q19 after adjusting for the impact of higher sales volumes.

IRON ORE COGS - 3Q19 x 4Q19

US$ million	3Q19	Variance drivers				4Q19
		Volume	Exchange rate	Others	Total variation	
C1 cash costs	1,126	55	(20)	(39)	(4)	1,122
Freight	1,089	56	-	(52)	4	1,093
Others	312	16	-	(29)	(13)	299
Total costs before depreciation and amortization	**2,527**	**127**	**(20)**	**(120)**	**(13)**	**2,514**
Depreciation	338	16	(24)	25	17	355
Total	**2,865**	**143**	**(44)**	**(95)**	**4**	**2,869**

C1 cash cost FOB port per metric ton for iron ore fines ex-royalties decreased to US$ 14.5/t in 4Q19 from US$ 15.3/t in 3Q19, mainly due to lower volumes and prices of third-party purchases and favorable foreign exchange effects.

Unit maritime freight cost per iron ore metric ton decreased US$ 0.9/t, totaling US$ 18.2/t in 4Q19, mainly due to lower exposure to the spot market (US$ 0.5/t) and mix of routes/fleet (US$ 0.5/t), which were partially offset by higher average bunker fuel costs (US$ 0.2/t), a result of IMO 2020 regulation, impacting vessels refueling in December 2019.

During 2020, Vale expects to continue gradually offsetting the impact of the IMO through scrubber installations in long term contracts and delivery of newbuilds.

Vale expects freight costs in 1Q20 to reduce in relation to 4Q19, mainly as a result of spot market volatility caused, among other factors, by uncertainties related to coronavirus.

Iron ore fines cash cost and freight

	4Q19	3Q19	4Q18	2019	2018
Costs (US$ million)					
COGS, less depreciation and amortization	2,514	2,527	2,367	8,779	9,048
(-) Distribution costs	73	80	80	282	253
(-) Maritime freight costs (A)	1,093	1,089	1,089	3,644	3,950
FOB at port costs (ex-ROM)	**1,348**	**1,358**	**1,198**	**4,853**	**4,845**
(-) Royalties	226	232	175	744	665
FOB at port costs (ex-ROM and ex-royalties) (B)	**1,122**	**1,126**	**1,023**	**4,109**	**4,179**
Sales volumes (Mt)					
Total iron ore volume sold	77.9	74.0	80.5	269.3	308.9
(-) Total ROM volume sold	0.6	0.4	0.3	1.3	1.5
Volume sold (ex-ROM) (C)	77.3	73.6	80.2	268.0	307.4
Vale's iron ore cash cost (ex-ROM, ex-royalties), FOB (US$ /t) (B/C)	**14.5**	**15.3**	**12.8**	**15.3**	**13.6**
Freight					
Maritime freight costs (A)	1,093	1,089	1,089	3,644	3,950
% of CFR sales (D)	78%	78%	72%	76%	71%
Volume CFR (Mt) (E = C x D)	60.0	57.1	58.0	204.9	219.0
Vale's iron ore unit freight cost (US$/t) (A/E)	18.2	19.1	18.8	17.8	18.0

Iron Ore Fines Costs and Expenses in BRL

R$/t	4Q19	3Q19	4Q18	2019	2018
C1 cash costs[1]	59.8	60.9	48.7	60.8	49.8
Stoppage expenses related to Brumadinho[1]	10.4	11.2	-	13.4	-
Other expenses[1]	5.3	3.6	3.6	3.8	3.2
Total	**75.5**	**75.7**	**52.3**	**78.0**	**53.0**

[1] Net of depreciation

EXPENSES

Iron ore fines expenses, net of depreciation, totaled US$ 325 million in 4Q19, increasing US$ 51 million vs. 3Q19, mainly as a result of higher R&D expenses and higher Brumadinho stoppage expenses.

R&D amounted to US$ 52 million, 86% higher than 3Q19 as result of greater drilling activities.

Pre-operating and stoppage expenses excluding the stoppage expenses related to Brumadinho, net of depreciation, amounted to US$ 23 million in 4Q19, 64% higher than 3Q19 mainly as a result of the stoppage of the Viga concentration plant of Ferrous Resources do Brasil. As previously announced, the resumption of the Viga operation occurred at the end of November 2019.

Expenses - iron ore fines

US$ millions	4Q19	3Q19	4Q18	2019	2018
Selling	**11**	**13**	**15**	**50**	**44**
R&D	**52**	**28**	**38**	**123**	**110**
Pre-operating and stoppage expenses	**191**	**166**	**29**	**750**	**115**
Brumadinho stoppage expenses	168	152	0	696	0
Others	23	14	29	54	115
Extraordinary logistics expenses	**28**	**55**	**0**	**209**	**0**
Other expenses	**43**	**12**	**21**	**64**	**32**
Total expenses	**325**	**274**	**103**	**1196**	**301**

Iron ore pellets

Adjusted EBITDA for pellets was US$ 850 million in 4Q19, in line with 3Q19, mainly as a result of seasonal dividends received[15] (US$ 114 million), cost reduction (US$ 73 million), which were offset by lower sales prices (US$ 211 million).

Pellets sales totaled 11.0 Mt in 4Q19, in line with 3Q19. Due to the suspension of tailings disposal at the Laranjeiras dam and the consequent impact to the Brucutu mine operation, an important pellet feed source, Vale reviewed its pellet production guidance to 44 Mt from 49 Mt in 2020.

CFR pellets sales of 5.0 Mt in 4Q19 represented 46% of total pellets sales. FOB pellets sales amounted to 6.0 Mt in 4Q19.

[15] Dividends from leased pelletizing plants, which are usually paid every 6 months (in 2Q and 4Q).

Realized prices in 4Q19 were an average CFR/FOB of US$ 125.7/t, decreasing US$ 18.4/t vs. 3Q19, mainly due to lower premiums received.

Costs totaled US$ 614 million (or US$ 733 million with depreciation charges) in 4Q19. Excluding the impact of lower sales volumes (US$ 23 million), costs decreased US$ 86 million when compared with 3Q19 (including foreign exchange variation effects).

Expenses and pre-operational & stoppage expenses totaled US$ 28 million in 4Q19, decreasing US$ 12 million when compared with 3Q19, mainly due to lower expenses from the Vargem Grande and Fábrica stoppages.

Pellets - EBITDA

	4Q19		3Q19	
	US$ million	US$/wmt	US$ million	US$/wmt
Net revenues / Realized price	1,378	125.7	1,596	144.1
Dividends received (Leased pelletizing plants)	114	10.4	-	-
Cash costs (Iron ore, leasing, freight, overhead, energy and other)	(614)	(56.0)	(723)	(65.3)
Pre-operational & stoppage expenses	(22)	(2.0)	(27)	(2.4)
Expenses (Selling, R&D and other)	(6)	(0.5)	(13)	(1.2)
EBITDA	**850**	**77.5**	**833**	**75.2**

Iron ore fines and pellets cash break-even[16]

In 4Q19, Vale's iron ore fines and pellets EBITDA breakeven decreased US$ 2.5/t, totaling US$ 37.6/t, mainly as a result of lower freight costs (US$ 0.9/t), lower C1 cash cost (US$ 0.8/t) and higher pellets contribution (US$ 0.7/t).

Iron ore and pellets cash break-even landed in China[1]

US$/t	4Q19	3Q19	4Q18	2019	2018
Vale's iron ore cash cost (ex-ROM, ex-royalties), FOB (US$ /t)	14.5	15.3	12.8	15.3	13.6
Iron ore fines freight cost (ex-bunker oil hedge)	18.2	19.1	18.8	17.8	18.0
Iron ore fines distribution cost	0.9	1.1	1.0	1.1	0.8
Iron ore fines stoppage expenses[2] related to Brumadinho	2.5	2.8	-	3.4	-
Iron ore fines expenses[2] & royalties	4.3	4.0	3.1	3.7	3.1
Iron ore fines moisture adjustment	3.6	3.6	3.1	3.5	3.1
Iron ore fines quality adjustment	(3.8)	(4.0)	(8.1)	(4.6)	(7.3)
Iron ore fines EBITDA break-even (US$/dmt)	**40.2**	**42.0**	**30.7**	**40.2**	**31.3**
Iron ore fines pellet adjustment	(2.6)	(1.9)	(3.4)	(3.7)	(2.9)
Iron ore fines and pellets EBITDA break-even (US$/dmt)	**37.6**	**40.1**	**27.3**	**36.5**	**28.5**
Iron ore fines sustaining investments	8.0	4.7	6.7	5.5	4.3
Iron ore fines and pellets cash break-even landed in China (US$/dmt)	**45.6**	**44.8**	**34.0**	**42.0**	**32.8**

[1] Measured by unit cost + expenses + sustaining investment adjusted for quality

[2] Net of depreciation and includes dividends received

[16] Does not include the impact from the iron ore fines and pellets pricing system mechanism.

Manganese and ferroalloys

Adjusted EBITDA of manganese ore and ferroalloys was US$ 5 million in 4Q19, 38% lower than in 3Q19, mainly due to lower ferroalloys sales prices.

Manganese ore sales volumes reached 570,000 t in 4Q19, 280% higher than in 3Q19, mainly due to unusual weather-related conditions affecting the Ponta da Madeira port in the first half of 2019, which were normalized and ramped up in the second half of 2019.

Ferroalloys sales volumes totaled 35,000 t in 4Q19, 23% higher than in 3Q19, recovering after the weak domestic client demand quarter in 3Q19.

Volume sold by destination – Iron ore and pellets

'000 metric tons	4Q19	3Q19	4Q18	2019	2018
Americas	**7,736**	**7,644**	**10,413**	**32,927**	**41,051**
Brazil	6,437	6,005	7,547	25,422	28,915
Others	1,299	1,639	2,866	7,505	12,136
Asia	**70,304**	**67,515**	**67,075**	**235,097**	**255,803**
China	58,143	56,906	53,172	190,229	203,206
Japan	6,529	5,347	6,764	23,494	29,031
Others	5,632	5,262	7,139	21,374	23,566
Europe	**7,684**	**6,650**	**12,344**	**30,925**	**48,419**
Germany	3,661	3,215	3,926	13,432	17,135
France	1,101	833	2,035	4,408	7,082
Others	2,922	2,602	6,383	13,085	24,202
Middle East	**2,014**	**2,435**	**4,153**	**8,182**	**12,313**
Rest of the World	**1,134**	**872**	**2,497**	**5,374**	**7,987**
Total	**88,872**	**85,116**	**96,482**	**312,505**	**365,573**

Selected financial indicators - Ferrous Minerals

US$ million	4Q19	3Q19	4Q18	2019	2018
Net Revenues	8,020	8,327	7,646	30,005	27,933
Costs[1]	(3,275)	(3,375)	(3,489)	(11,988)	(13,044)
Expenses[1]	(92)	(90)	(37)	(351)	(94)
Pre-operating and stoppage expenses[1]	(214)	(193)	(34)	(823)	(135)
R&D expenses	(53)	(35)	(47)	(142)	(138)
Dividends and interests on associates and JVs	152	-	76	296	189
Adjusted EBITDA	4,538	4,634	4,115	16,997	14,711
Depreciation and amortization	(556)	(548)	(407)	(2,063)	(1,672)
Adjusted EBIT	3,982	4,086	3,708	14,934	13,039
Adjusted EBIT margin (%)	49.7	49.1	48.5	49.8	46.7

[1] Net of depreciation and amortization

Selected financial indicators - Iron ore fines

US$ million	4Q19	3Q19	4Q18	2019	2018
Adjusted EBITDA (US$ million)	3,641	3,765	3,044	13,398	11,033
Volume Sold (Mt)	77.3	73.6	80.2	268.0	307.4
Adjusted EBITDA (US$/t)	47	51	38	50	36

Selected financial indicators - Pellets

US$ million	4Q19	3Q19	4Q18	2019	2018
Adjusted EBITDA (US$ million)	850	833	996	3,432	3,356
Volume Sold (Mt)	11.0	11.1	16.0	43.2	56.6
Adjusted EBITDA (US$/t)	78	75	62	79	55

Selected financial indicators - Ferrous ex Manganese and Ferroalloys

US$ million	4Q19	3Q19	4Q18	2019	2018
Adjusted EBITDA (US$ million)	4,533	4,626	4,083	16,946	14,551
Volume Sold (Mt)[1]	88.9	85.1	96.5	312.5	365.6
Adjusted EBITDA (US$/t)	51	54	42	54	40

[1] Volume including iron ore fines, pellets and ROM.

Base Metals

Annual performance

Base Metals adjusted EBITDA totaled US$ 2.174 billion in 2019, vs. US$ 2.542 billion in 2018. The decrease was mainly due to higher costs (US$ 387 million) mostly related to VNC, Onça Puma and Sossego operations, lower cobalt realized prices (US$ 157 million), lower copper realized prices (US$ 45 million) and higher expenses (US$ 73 million) mostly for research expenses related to Hu'u project, which were partially offset by favourable exchange rate variations (US$ 132 million), higher nickel realized prices (US$ 81 million) and higher gold realized prices (US$ 76 million).

Nickel operations are progressing towards higher reliability with production at the refineries going back to regular operating rates after the scheduled and unscheduled maintenance activities at the Copper Cliff Nickel Refinery, in Sudbury, and at the Clydach, Matsusaka and Long Harbour refineries. Likewise, production at Onça Puma mine and plant was resumed after a judicial authorization granted in September.

The performance of copper operations was supported by Salobo's solid performance during the year, reaching close to zero unit cash costs after by-products in 2H19, notwithstanding the impact of unscheduled maintenance in Sossego.

Quarterly performance

Base Metals adjusted EBITDA was US$ 649 million in 4Q19 vs. US$ 555 million in 3Q19, mainly due to higher nickel and copper realized prices (US$ 139 million), higher by-products volumes (US$ 100 million) and favourable exchange rate variations (US$ 8 million), partially offset by higher costs (US$ 78 million), lower nickel and copper volumes (US$ 42 million) and higher expenses (US$ 33 million), mainly as a result of stoppage expenses related to unscheduled maintenance at Sossego.

Average prices

US$/ metric ton	4Q19	3Q19	4Q18	2019	2018
Nickel - LME	15,450	15,540	11,516	13,936	13,122
Copper - LME	5,881	5,802	6,172	6,000	6,523
Nickel - realized prices	16,251	14,859	12,133	14,064	13,667
Copper - realized prices[1]	5,732	4,918	5,673	5,445	5,638
Gold (US$/oz)	1,542	1,485	1,179	1,419	1,254
Silver (US$/oz)	17.60	15.15	13.42	15.44	14.43
Cobalt (US$/t)	29,860	24,901	49,090	26,093	62,911

[1]Considers Salobo and Sossego operations.

Base Metals EBITDA overview – 4Q19

US$ million	North Atlantic	PTVI Site	VNC Site	Onça Puma	Sossego	Salobo	Others Ni & Cu	Total Base Metals
Net Revenues	**869**	**276**	**81**	**16**	**47**	**429**	**(75)**	**1,643**
Costs	(497)	(144)	(142)	(15)	(47)	(153)	89	(909)
Selling and other expenses	(1)	-	-	(3)	3	(3)	(25)	(29)
Pre-operating and stoppage expenses	-	-	-	-	(20)	-	-	(20)
R&D	(10)	(2)	(2)	(1)	(2)	-	(19)	(36)
EBITDA	**361**	**130**	**(63)**	**(3)**	**(19)**	**273**	**(30)**	**649**

Nickel operations

Nickel operations – EBITDA by operation

US$ million	4Q19	3Q19	4Q18	2019	2018
North Atlantic operation[1]	361	294	223	1,210	1,022
PTVI	130	66	57	233	236
VNC	(63)	(22)	(50)	(237)	(63)
Onça Puma	(3)	(8)	26	8	105
Others Nickel[2]	(14)	(11)	23	29	131
Total	**411**	**319**	**279**	**1,243**	**1,431**

[1] Includes the operations in Canada and in the United Kingdom.

[2] Includes the PTVI and VNC off-takes, intercompany sales eliminations and purchase of finished nickel.

Nickel operations – unit cash cost of sales, net of by-product credits

US$/t	4Q19	3Q19	4Q18	2019	2018
North Atlantic operations[1]	3,672	5,607	4,703	4,612	6,227
PTVI	6,784	6,947	6,897	7,457	7,090
VNC	18,415	20,331	13,793	21,753	12,405
Onça Puma	14,924	10,368	7,517	9,965	7,751

[1] North Atlantic figures include Clydach refining costs.

Details of nickel operations' adjusted EBITDA by operation are as follows:

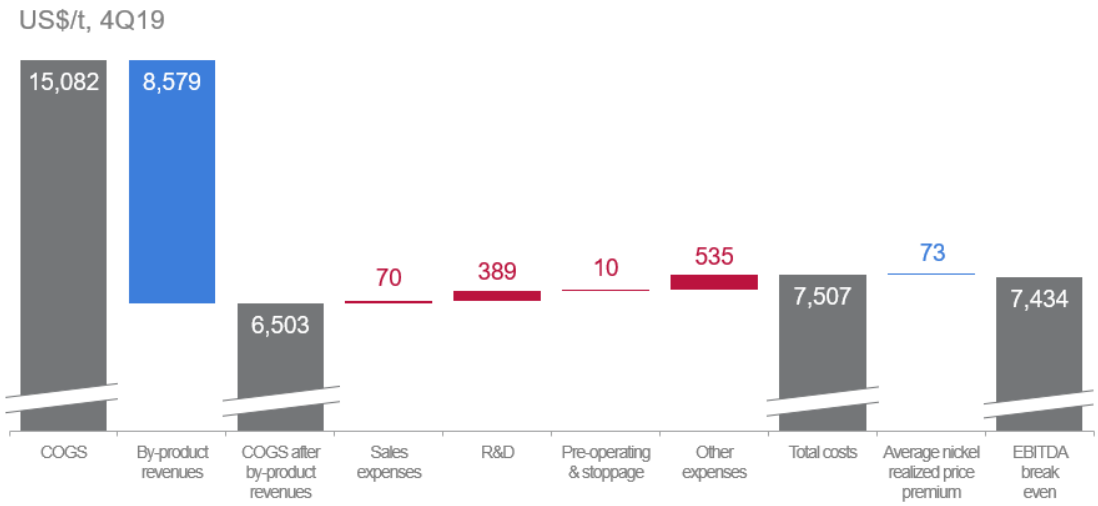
- The North Atlantic operations' EBITDA was US$ 361 million, increasing US$ 67 million vs. 3Q19 mainly due to higher by-products sales volumes (US$ 103 million) and higher copper realized prices (US$ 20 million), which were partially offset by higher costs (US$ 56 million). Unit cash costs after by-products decreased to US$ 3,672/t. The after by-products decrease reflects the positive effect of by-products revenues in the quarter.

- PTVI's EBITDA was US$ 130 million, increasing by US$ 64 million compared to 3Q19, mainly due to higher nickel realized prices (US$ 48 million), lower expenses (US$ 7 million), higher sales volumes (US$ 5 million) and lower costs (US$ 3 million). Unit cash costs decreased slightly to US$ 6,784/t in 4Q19 as a result of better dilution of fixed costs.

- VNC's EBITDA was negative US$ 63 million, decreasing by US$ 41 million when compared to 3Q19, mainly due to lower nickel realized prices (US$ 49 million), as a result of revenue adjustments and negative PPA[17] impact as a consequence of the decrease in LME prices throughout the fourth quarter. Unit cash costs decreased to US$ 18,415/t in 4Q19 mainly as a result of higher productivity due to increased volumes at the site.

- Onça Puma's EBITDA was negative US$ 3 million, increasing by US$ 5 million compared to 3Q19, mainly as a result of stoppage expenses that were discontinued as production resumed after a favorable decision by the courts in September 2019. Unit cash costs increased to US$ 14,924/t, as expected during the ramp-up of mining and processing activities at the site.

EBITDA breakeven – nickel operations[18]



SALES REVENUES AND VOLUMES

In October 2019, Vale decided to extend the hedge operation until 2021. As of December 31st, 2019, the average strike price for the put positions is US$ 15,714/t and the average strike price of the call options is US$ 18,739/t with a hedged volume equivalent to approximately 40% of the forecast nickel production in the period. The effect of the derivatives settled in the quarter on Vale's nickel realized price was positive US$ 279/t, reflecting the lower LME prices vis a vis the floor price of the collar structure.

Nickel sales revenues were US$ 764 million in 4Q19, increasing US$ 7 million vs. 3Q19 as a result of higher realized prices (US$ 65 million) offset by lower sales volumes (US$ 58 million).

[17] Provisional Price Adjustment
[18] Considering only the cash effect of US$ 400/oz that Wheaton Precious Metals pays for 70% of Sudbury's gold by-product, nickel operations EBITDA breakeven would increase to US$ 7,604/t.

Sales volumes of nickel were 47.0 kt in 4Q19, 3.9 kt lower than in 3Q19, reflecting management's decision to hold inventory for better market conditions.

Copper by-product from nickel operations generated sales revenues of US$ 185 million in 4Q19, increasing US$ 72 million vs. 3Q19 as a result of higher sales volumes (US$ 41 million) and higher copper realized prices (US$ 31 million). Sales volumes of copper by-product totaled 32.8 kt in 4Q19, 8.7 kt higher than in 3Q19 mainly due to maintenance activities in 3Q19 and timing of sales deliveries.

Net operating revenue by product - Nickel operations

US$ million	4Q19	3Q19	4Q18	2019	2018
Nickel	764	757	723	2,892	3,231
Copper	185	113	160	659	573
Gold as by-product	31	22	16	87	68
Silver as by-product	5	3	6	15	19
PGMs	148	105	78	469	382
Cobalt	28	27	64	112	313
Others Nickel	6	7	5	23	24
Total	**1,167**	**1,034**	**1,052**	**4,257**	**4,610**

Volume sold - Nickel operations

'000 metric tons	4Q19	3Q19	4Q18	2019	2018
Nickel	47	51	60	206	236
Upper Class I nickel [1]	21	25	24	100	106
Lower Class I nickel [1]	6	6	7	24	29
Class II nickel [1]	12	13	19	57	68
Intermediates [1]	8	7	10	25	33
Copper	33	24	30	122	105
Gold as by-product ('000 oz)	21	15	12	63	57
Silver as by-product ('000 oz)	283	224	474	1,012	1,309
PGMs ('000 oz)	90	61	72	319	374
Cobalt (metric ton)	941	1,086	1,306	4,273	4,974

[1] Previous periods reconciled as per new classification.

REALIZED NICKEL PRICES

In view of the potential trifurcation across the nickel markets, between stainless steel (Class II), electric vehicle battery (nickel sulphate) and the high value applications (Class I), Vale is adopting a new commercial strategy for its Base Metals business, which includes: (i) preserving and recovering participation in the high value segments, through a recovery of market share in the Upper Class I nickel market (electroplating, powder) and an increase of presence in the Lower Class I nickel market (melting, foundry); and, (ii) maintaining its product portfolio optionality for a potential surge in electric vehicle battery demand, while continuing to be present in the Class II market (mainly stainless steel) globally, with ferronickel, utility nickel and Tonimet sales.

The quality of the nickel products determines their market suitability. In line with the new commercial strategy, Vale's nickel products are currently classified as Upper Class I, Lower Class I, Class II and Intermediates.

In 4Q19, 56% of our sales were Upper Class I and Lower Class I nickel products.

Upper Class I products, which have higher nickel content and lower levels of deleterious elements, are more suitable for high end nickel applications, such as utilization in the specialties industries (e.g.: aircraft and spacecraft) and as a result receive a higher premium. Upper Class I products were sourced from 77% of North Atlantic operations and 30% of PTVI operations in 4Q19.

Lower Class I products have slightly more impurities compared to Upper Class I products, and are suitable for more general nickel applications, such as foundry alloys and generally receive a lower premium compared to Upper Class I products. Lower Class I products were sourced from 23% of North Atlantic operations in 4Q19.

Part of the Upper Class I and Lower Class I nickel products is sold at higher premiums for the specialties/high-quality markets, but part of it is sold to stainless-steel markets with lower premiums.

Class II nickel products, which present lower nickel content and higher levels of deleterious elements, are mostly used in the making of stainless steel. The majority of the world nickel production is composed of Class II nickel products (55% of the global market in 2019), which include nickel pig iron (NPI, with nickel content under 15%).

The Class II products were sourced from 100% of Onça Puma operations, 61% of VNC operations and 50% of PTVI operations in 4Q19.

Intermediate products were sourced from 39% of VNC operations and 20% of PTVI production in 4Q19. These products do not represent finished nickel production and are generally sold at a discount given that they still need to be processed before being sold to end customers.

Premiums / discount by nickel product

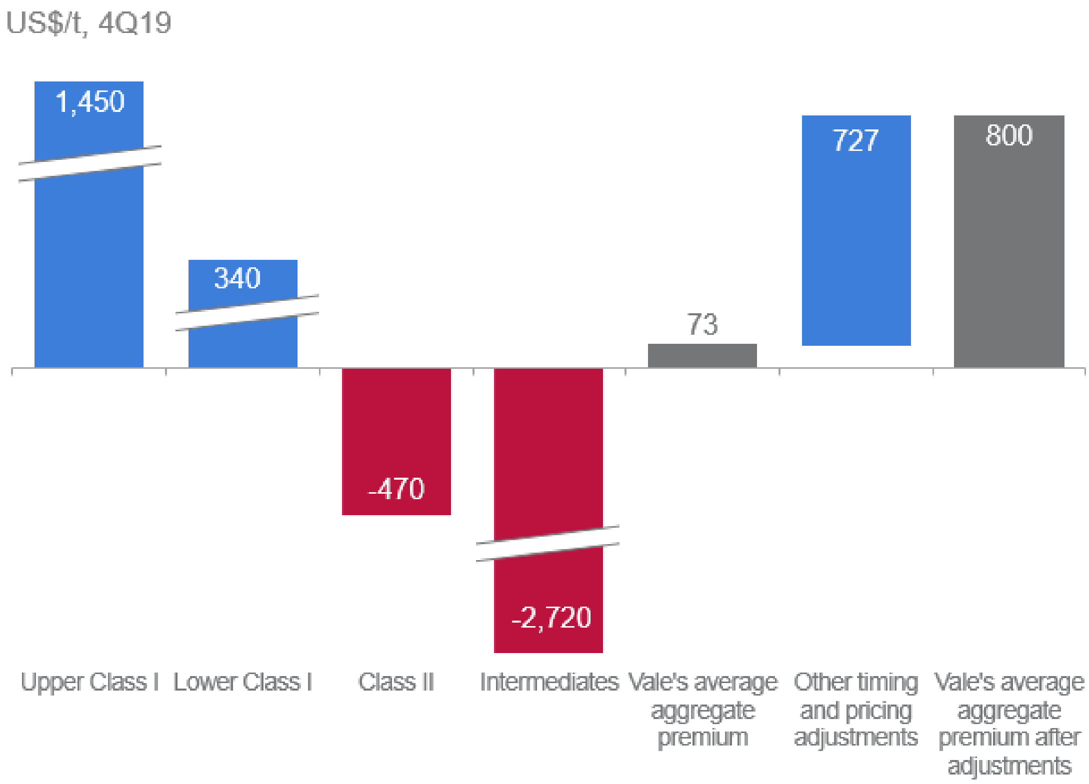
US$/t	4Q19	3Q19	4Q18
Upper Class I nickel	1,450	1,520	1,470
Lower Class I nickel	340	340	430
Class II nickel	(470)	60	120
Intermediates	(2,720)	(3,000)	(2,870)

[1] Previous periods reconciled as per new classification.

The average nickel realized price was US$ 16,251/t, US$ 801/t higher than the average LME nickel price of US$ 15,450/t in 4Q19. The aggregate impact of the above-mentioned premiums and discounts (considering their respective volumes in the sales mix) was:

- Premium for Upper Class I nickel products for 44% of sales, with aggregate impact of US$ 633/t;
- Premium for Lower Class I nickel products for 12% of sales, with aggregate impact of US$ 42/t;
- Discount for Class II nickel products for 26% of sales, with aggregate impact of -US$ 124/t;
- Discount for Intermediates for 18% of sales, with aggregate impact of -US$ 479/t; and,
- Other timing and pricing adjustments with an aggregate positive impact of US$ 727/t. The main drivers for this positive adjustment in 4Q19 are (i) the Quotational Period carryover effects (based on sales volume distribution in the last three months, as well as the differences between the LME price at the moment of sale and the LME average price), with an impact of approximately US$ 439/t; (ii) fixed price sales, with impact of approximately US$ 10/t; and, (iii) the above-mentioned effect of the hedging on Vale's nickel price realization, with an impact of US$ 279/t in the quarter.

Nickel premium/discount by product and average aggregate premiums



Nickel COGS - 3Q19 x 4Q19

		Variance drivers				
US$ million	3Q19	Volume	Exchange rate	Others	Total variation	4Q19
Nickel operations	676	(23)	(1)	57	33	709
Depreciation	235	(6)	-	54	48	283
Total	**911**	**(29)**	**(1)**	**111**	**81**	**992**

EXPENSES

Selling expenses and other expenses totaled US$ 29 million in 4Q19, including other expenses related to provisions for asset closure (US$ 20 million) and related to mines under care and maintenance in North Atlantic (US$ 7 million).

No pre-operating and stoppage expenses were incurred in the quarter as Onça Puma resumed operation in 4Q19.

R&D expenses were US$ 18 million in 4Q19, higher than the US$ 11 million recorded in 3Q19. These expenses encompass R&D initiatives for further operational improvements, with the main expenses associated with North Atlantic, PTVI, VNC and Onça Puma, corresponding to US$ 10 million, US$ 2 million, US$ 2 million and US$ 1 million, respectively, in the quarter.

Selected financial indicators - Nickel operations

US$ million	4Q19	3Q19	4Q18	2019	2018
Net Revenues	1,167	1,034	1,052	4,257	4,610
Costs[1]	(709)	(676)	(741)	(2,867)	(3,060)
Expenses[1]	(29)	(12)	(11)	(75)	(47)
Pre-operating and stoppage expenses[1]	-	(16)	(10)	(28)	(33)
R&D expenses	(18)	(11)	(11)	(44)	(39)
Dividends and interests on associates and JVs	-	-	-	-	-
Adjusted EBITDA	411	319	279	1,243	1,431
Depreciation and amortization	(283)	(247)	(237)	(1,099)	(1,162)
Adjusted EBIT	128	72	42	144	269
Adjusted EBIT margin (%)	11.0	7.0	4.0	3.4	5.8

[1] Net of depreciation and amortization

Copper operations – Salobo and Sossego

Copper – EBITDA by operation

US$ million	4Q19	3Q19	4Q18	2019	2018
Salobo	273	227	251	877	882
Sossego	(19)	19	62	86	229
Others Copper[1]	(16)	(10)	-	(32)	-
Total	**238**	**236**	**313**	**931**	**1,111**

[1] Includes research expenses related to the Hu'u project.

Copper operations – unit cash cost of sales, net of by-product credits

US$/t	4Q19	3Q19	4Q18	2019	2018
Salobo	53	298	624	525	747
Sossego	6,409	3,830	2,941	3,765	3,049

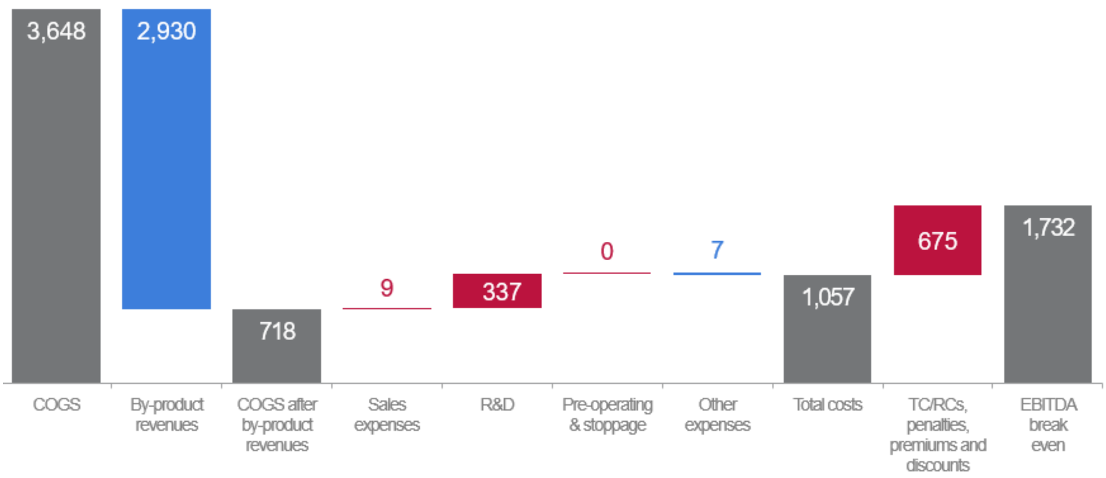
Details of copper operations adjusted EBITDA by operation are as follows:

- Salobo's EBITDA was US$ 273 million, increasing by US$ 46 million vs. 3Q19, mainly due to higher realized prices (US$ 43 million) and positive exchange rate variations (US$ 4 million). Unit cash costs decreased to US$ 53/t due to higher gold by-product credits and higher grades.

- Sossego's EBITDA was negative US$ 19 million, decreasing by US$ 38 million vs. 3Q19, mainly as a result of higher costs (US$ 22 million), higher expenses (US$ 16 million) related to the stoppage in the quarter, and lower volumes (US$ 11 million), which were partially offset by higher realized prices (US$ 9 million) and positive exchange rate variations (US$ 3 million). Unit cash costs increased to US$ 6,409/t due to lower volumes as well as an unscheduled maintenance at the conveyor belt and the sag mill in the quarter.

EBITDA breakeven – copper operations[19]

US$/t, 4Q19



The realized price to be used against the EBITDA break-even should be the copper realized price before discounts (US$ 6,407/t), given that TC/RCs, penalties and other discounts are already part of the EBITDA break-even build-up.

SALES REVENUES AND VOLUMES

Copper sales revenues were US$ 315 million in 4Q19, decreasing by US$ 19 million vs. 3Q19 as a result of lower volumes (US$ 65 million) which were offset by higher realized prices (US$ 46 million). Copper sales volumes were 55.0 kt in 4Q19, 12.9 kt lower than in 3Q19, mainly due to the unscheduled maintenance shutdown at the processing plant in Sossego carried out in the quarter.

By-product revenues were US$ 161 million in 4Q19, in line with 3Q19. Sales volumes of gold by-product were 101 koz in 4Q19, 4 koz lower than in 3Q19 and sales volumes of silver by-product were 231 koz in 4Q19, 12 koz higher than in 3Q19.

Net operating revenue by product - Copper operations

US$ million	4Q19	3Q19	4Q18	2019	2018
Copper	315	334	422	1,327	1,542
Gold as by-product	157	157	136	564	538
Silver as by-product	4	4	3	13	13
Total	**476**	**495**	**561**	**1,904**	**2,093**

Volume sold - Copper operations

'000 metric tons	4Q19	3Q19	4Q18	2019	2018
Copper	55	68	74	244	274
Gold as by-product ('000 oz)	101	105	117	396	427
Silver as by-product ('000 oz)	231	219	217	818	860

[19] Considering only the cash effect of US$ 400/oz that Wheaton Precious Metals pays for 75% of Salobo's gold by-product, copper operations EBITDA breakeven would increase to US$ 2,874/t.

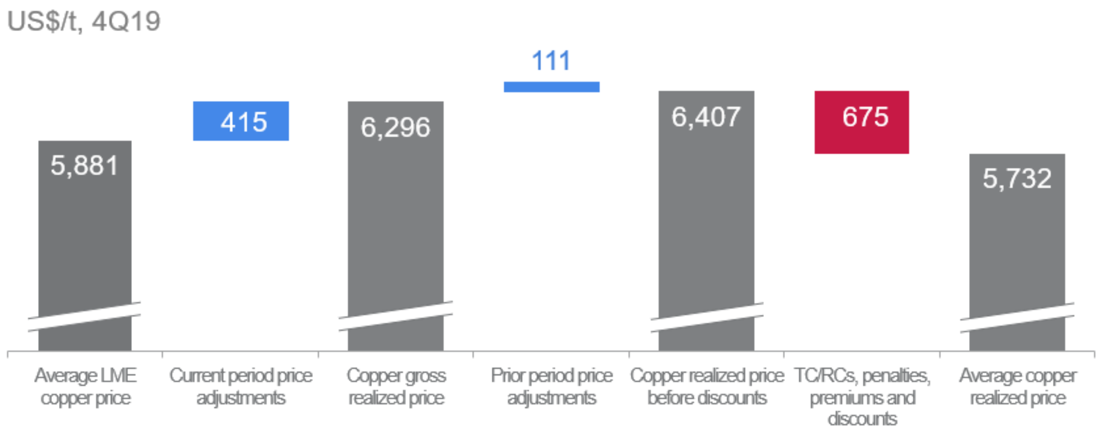
REALIZED COPPER PRICES

The realized copper price for copper operations in 4Q19 was US$ 5,732/t, US$ 149/t lower than the average LME copper price of US$ 5,881/t in the quarter. Vale's copper products are sold on a provisional pricing basis during the quarter with final prices determined in a future period, generally one to four months forward.

The realized copper price differed from the average LME price in 4Q19 due to the following factors[20]:

- Current period price adjustments: mark-to-market of invoices still open in the quarter based on the copper price forward curve at the end of the quarter (+US$ 415/t);
- Prior period price adjustment: variance between the price used in final invoices (and in the mark-to-market of invoices from previous quarters still open at the end of the quarter) and the provisional prices used for sales in previous quarters (+US$ 111/t); and,
- TC/RCs, penalties, premiums and discounts for intermediate products (-US$ 675/t).

Price realization – copper operations



Copper COGS - 3Q19 x 4Q19

		Variance drivers				
US$ million	3Q19	Volume	Exchange rate	Others	Total variation	4Q19
Copper operations	244	(59)	(7)	22	(44)	200
Depreciation	49	(11)	(1)	9	(3)	46
Total	**293**	**(70)**	**(8)**	**31**	**(47)**	**246**

[20] On December 31st, 2019, Vale had provisionally priced copper sales from Sossego and Salobo totaling 70,069 tons valued at an LME forward price of US$ 6,231/t, subject to final pricing over the following months.

EXPENSES

Pre-operating and stoppage expenses totaled US$ 20 million in 4Q19, as a result of the maintenance stoppage at the Sossego plant. Research and development expenses were US$ 18 million in 4Q19, with Hu'u-related expenditures amounting to US$ 16 million and Sossego corresponding to US$ 2 million in the quarter.

Selected financial indicators - Copper operations

US$ million	4Q19	3Q19	4Q18	2019	2018
Net Revenues	476	495	561	1,904	2,093
Costs[1]	(200)	(244)	(241)	(905)	(960)
Expenses[1]	-	(2)	(1)	(5)	(4)
Pre-operating and stoppage expenses[1]	(20)	-	-	(20)	-
R&D expenses	(18)	(13)	(6)	(43)	(18)
Dividends and interests on associates and JVs	-	-	-	-	-
Adjusted EBITDA	238	236	313	931	1,111
Depreciation and amortization	(53)	(49)	(43)	(195)	(189)
Adjusted EBIT	185	187	270	736	922
Adjusted EBIT margin (%)	38.9	37.8	48.1	38.7	44.1

[1] Net of depreciation and amortization

Coal

ADJUSTED EBITDA

Coal adjusted EBITDA was negative US$ 186 million in 4Q19, US$ 14 million lower than in 3Q19, mainly as a result of lower volumes (US$ 13 million) and prices (US$ 8 million), which were partially offset by lower costs (US$ 8 million).

Vale reviewed its business plan in 2019 and expects that the new mining plan and operational strategy for the processing plants will produce sustainable results starting 2H20.

For further information, please see Vale's 4Q19 production report, available on the Vale's investors website.

Volume sold

'000 metric tons	4Q19	3Q19	4Q18	2019	2018
Metallurgical coal	1,017	1,083	1,790	4,427	6,240
Thermal coal	1,025	1,172	1,643	4,356	5,393
Total	**2,042**	**2,255**	**3,433**	**8,783**	**11,633**

Revenues and price realization

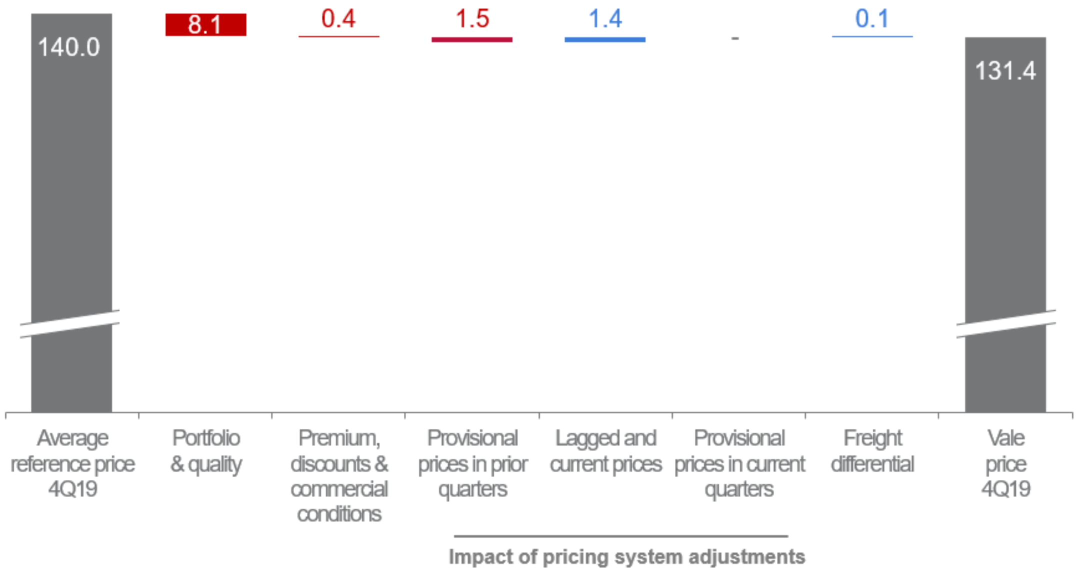
Revenues decreased by US$ 50 million to US$ 191 million in 4Q19 from US$ 241 million in 3Q19, due to lower volumes (US$ 42 million) and lower realized prices (US$ 8 million).

Net operating revenue by product

US$ million	4Q19	3Q19	4Q18	2019	2018
Metallurgical coal	134	178	351	764	1,189
Thermal coal	57	63	131	257	454
Total	**191**	**241**	**482**	**1,021**	**1,643**

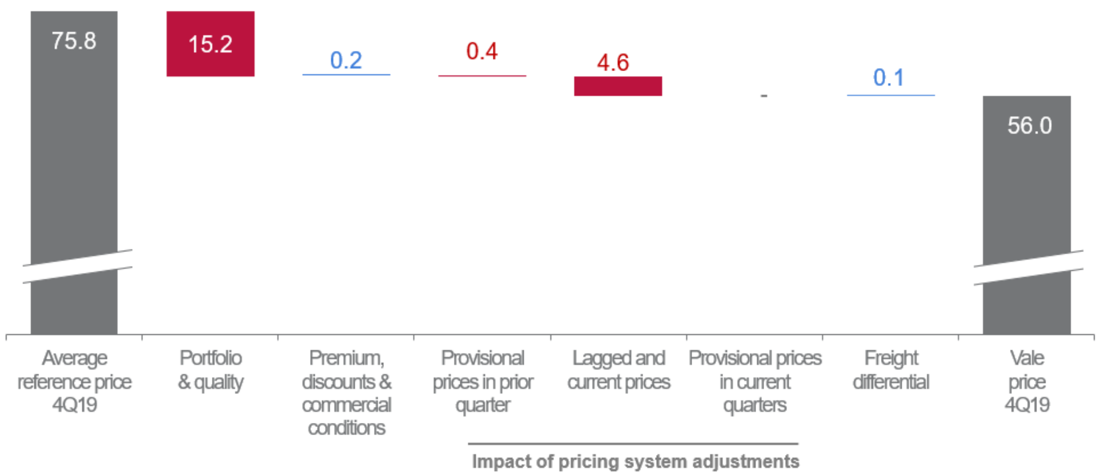
Price realization – Metallurgical coal

US$/t 4Q19



Price realization – Thermal coal

US$/t, 4Q19



Coal prices

US$/ metric ton	4Q19	3Q19	4Q18	2019	2018
Metallurgical coal index price[1]	140.0	161.5	221.5	177.0	207.2
Vale's metallurgical coal realized price	131.4	164.5	196.4	172.5	190.6
Thermal coal index price[2]	75.8	61.2	95.9	71.5	98.1
Vale's thermal coal realized price	56.0	53.9	79.5	59.1	84.2
Vale's average realized price	**93.5**	**107.0**	**140.4**	**116.3**	**141.2**

[1] Reference price Premium Low Vol Hard Coking Coal FOB Australia.

[2] McCloskey FOB Richards Bay

Costs and expenses

Costs totaled US$ 392 million in 4Q19, US$ 45 million lower than in 3Q19, mainly due to lower volumes. Pro-forma C1 cash cost totaled US$ 177.8/t in 4Q19, in line with 3Q19.

Pro-forma cash cost

US$/ metric ton	4Q19	3Q19	4Q18	2019	2018
Pro-forma operational costs[1] (A)	143.1	139.3	87.1	132.0	89.8
Nacala non-operational tariff [2] [3] (B)	55.6	48.5	53.4	50.8	43.3
Other costs (C)	(7.2)	5.4	(2.9)	2.5	-
Cost at Nacala Port (D = A+B+C)	191.5	193.2	137.5	185.3	133.1
NLC's debt service to Vale (E)	13.7	12.9	8.2	12.9	12.3
Pro-forma C1 cash cost (F = D-E)	177.8	180.3	129.4	172.5	120.8

[1] Includes the inferred NLC tariff components related to fixed and variable costs and excludes royalties

[2] Includes the inferred NLC tariff components related to sustaining capex, working capital, taxes and other financial items

[3] Reallocation of US$ 4.3/t in 4Q18, US$ 5.6/t in 2018 between pro-forma operational costs and Nacala non-operational tariff lines.

Selected financial indicators - Coal

US$ million	4Q19	3Q19	4Q18	2019	2018
Net Revenues	191	241	482	1,021	1,643
Costs[1]	(392)	(437)	(480)	(1,638)	(1,575)
Expenses[1]	(5)	5	(6)	1	(9)
Pre-operating and stoppage expenses[1]	-	-	-	-	-
R&D expenses	(8)	(10)	(8)	(30)	(21)
Dividends and interests on associates and JVs	28	29	28	113	143
Adjusted EBITDA	(186)	(172)	16	(533)	181
Depreciation and amortization	(61)	(67)	(65)	(237)	(252)
Adjusted EBIT	(247)	(239)	(49)	(770)	(71)
Adjusted EBIT margin (%)	(129.3)	(99.2)	(10.2)	(75.4)	(4.3)

[1] Net of depreciation and amortization

ANNEXES

SIMPLIFIED FINANCIAL STATEMENTS

Income Statement

US$ million	4Q19	3Q19	4Q18	2019	2018
Net operating revenue	**9,964**	**10,217**	**9,813**	**37,570**	**36,575**
Cost of goods sold and services rendered	(5,632)	(5,681)	(5,752)	(21,187)	(22,109)
Gross profit	**4,332**	**4,536**	**4,061**	**16,383**	**14,466**
Gross margin (%)	43.5	44.4	41.4	43.6	39.6
Selling and administrative expenses	(139)	(128)	(141)	(487)	(523)
Research and evaluation expenses	(158)	(124)	(125)	(443)	(373)
Pre-operating and operational stoppage	(314)	(290)	(66)	(1,153)	(271)
Brumadinho event	(1,141)	(225)	-	(7,402)	-
Other operational expenses, net	(264)	(122)	(150)	(505)	(445)
Impairment and disposal of non-current assets	(4,731)	(30)	(714)	(5,074)	(899)
Operating income	**(2,415)**	**3,617**	**2,865**	**1,319**	**11,955**
Financial income	176	132	113	527	423
Financial expenses	(1,163)	(1,084)	(550)	(3,806)	(2,345)
Other financial items, net	147	(187)	422	(134)	(3,035)
Equity results and other results in associates and joint ventures	(154)	132	105	(681)	(182)
Income (loss) before income taxes	**(3,409)**	**2,610**	**2,955**	**(2,775)**	**6,816**
Current tax	(52)	(858)	(609)	(1,522)	(752)
Deferred tax	1,465	(119)	1,485	2,117	924
Net income (loss) from continuing operations	**(1,996)**	**1,633**	**3,831**	**(2,180)**	**6,988**
Net income (loss) attributable to noncontrolling interests	(434)	(21)	45	(497)	36
Gain (loss) from discontinued operations	-	-	-	-	(92)
Net income (loss) attributable to Vale's stockholders	**(1,562)**	**1,654**	**3,786**	**(1,683)**	**6,860**
Earnings (loss) per share (attributable to the Company's stockholders - US$)	(0.30)	0.32	0.73	(0.33)	1.32
Basic and diluted earnings (loss) per share (attributable to the Company's stockholders - US$)	(0.30)	0.32	0.73	(0.33)	1.32

Equity income (loss) by business segment

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
Ferrous Minerals	11	183	90	360	125	85	254	111	417	137
Coal	-	-	-	-	3	2	(2)	(1)	16	5
Base Metals	-	-	-	-	(1)	(1)	-	-	1	0
Others	(5)	(83)	(65)	(260)	20	14	(24)	(11)	(129)	(42)
Total	**6**	**100**	**25**	**100**	**147**	**100**	**228**	**100**	**305**	**100**

Balance sheet

US$ million	12/31/2019	9/30/2019	12/31/2018
Assets			
Current assets	**17,042**	**18,486**	**15,292**
Cash and cash equivalents	7,350	8,559	5,784
Short term investments	826	906	32
Accounts receivable	2,529	2,297	2,648
Other financial assets	759	412	403
Inventories	4,274	4,629	4,443
Prepaid income taxes	370	559	543
Recoverable taxes	552	642	883
Others	382	482	556
Non-current assets	**16,798**	**15,235**	**13,326**
Judicial deposits	3,159	3,044	1,716
Other financial assets	2,722	2,895	3,144
Prepaid income taxes	597	591	544
Recoverable taxes	607	514	751
Deferred income taxes	9,217	7,786	6,908
Others	496	405	263
Fixed assets	**57,873**	**60,175**	**59,572**
Total assets	**91,713**	**93,896**	**88,190**
Liabilities			
Current liabilities	**13,845**	**13,430**	**9,111**
Suppliers and contractors	4,107	4,251	3,512
Loans and borrowing	1,214	1,332	1,003
Leases	225	236	-
Other financial liabilities	1,074	1,016	1,604
Taxes payable	512	1,066	428
Settlement program (REFIS)	431	414	432
Provisions	1,230	1,019	1,363
Liabilities related to associates and joint ventures	516	450	289
Liabilities related to Brumadinho	1,568	2,085	-
Decharacterization of dams	309	451	-
Interest on capital	1,571	-	-
Others	1,088	1,110	480
Non-current liabilities	**38,875**	**37,785**	**34,247**
Loans and borrowing	11,842	13,454	14,463
Leases	1,566	1,575	-
Other financial liabilities	4,372	3,571	2,877
Settlement program (REFIS)	3,476	3,441	3,917
Deferred income taxes	1,882	1,758	1,532
Provisions	8,493	8,043	7,095
Liabilities related to associates and joint ventures	1,184	1,107	832
Liabilities related to Brumadinho	1,415	846	-
Decharacterization of dams	2,180	1,387	-
Streaming transactions	2,063	2,076	2,293
Others	402	527	1,238
Total liabilities	**52,720**	**51,215**	**43,358**
Stockholders' equity	**38,993**	**42,681**	**44,832**
Total liabilities and stockholders' equity	**91,713**	**93,896**	**88,190**

Cash flow

US$ million	4Q19	3Q19	4Q18	2019	2018
Cash flow from operations	**3,782**	**5,128**	**3,856**	**15,608**	**15,330**
Interest on loans and borrowings paid	(236)	(467)	**(217)**	(1,186)	(1,121)
Derivatives received (paid), net	(115)	(88)	(32)	(324)	(67)
Interest paid on shareholders debentures	(89)	-	(41)	(179)	(113)
Income taxes (including settlement program)	(467)	(493)	(277)	(1,809)	(1,128)
Net cash provided by operating activities	**2,875**	**4,080**	**3,289**	**12,110**	**12,901**
Cash flows from investing activities:					
Capital expenditures	(1,472)	(891)	(1,497)	(3,704)	(3,784)
Additions to investments	**(1)**	(74)	**-**	(76)	(23)
Acquisition of subsidiary, net of cash	(13)	(417)	-	(926)	-
Proceeds from disposal of assets and investments	18	20	5	142	1,481
Dividends received from joint ventures and associates	160	-	92	353	245
Restricted cash and judicial deposits	(45)	1,773	-	(1,638)	-
Short term investments (including Brazilian treasury securities)	98	(895)	(6)	(828)	(50)
Other investment activities, net	(157)	**(34)**	(137)	(312)	2,290
Net cash used in investing activities	**(1,412)**	**(518)**	**(1,543)**	**(6,989)**	**159**
Cash flows from financing activities:					
Loans and financing:					
Loans and borrowings from third-parties	(1,871)	(694)	(1,547)	(2,275)	(6,616)
Payments of leasing	(93)	(53)	-	(224)	-
Payments to stockholders:					
Dividends and interest on capital paid to stockholders	**-**	**-**	**-**	**-**	(3,313)
Dividends and interest on capital paid to noncontrolling interest	(3)	(104)	(3)	(184)	(182)
Share buyback program	-	-	(511)	-	(1,000)
Transactions with noncontrolling stockholders	(812)	-		(812)	(17)
Net cash provided by (used in) financing activities	**(2,779)**	**(851)**	**(2,061)**	**(3,495)**	**(11,128)**
Net cash used in discontinued operations	**-**	**-**	**-**	**-**	**(46)**
Increase (decrease) in cash and cash equivalents	**(1,316)**	**2,711**	**(315)**	**1,626**	**1,886**
Cash and cash equivalents in the beginning of the period	8,559	6,048	6,100	5,784	4,328
Effect of exchange rate changes on cash and cash equivalents	107	(200)	(1)	(60)	(313)
Effects of disposals of subsidiaries and merger, net of cash and cash equivalents	-	-		-	(117)
Cash and cash equivalents at the end of period	**7,350**	**8,559**	**5,784**	**7,350**	**5,784**
Non-cash transactions:					
Additions to property, plant and equipment - interest capitalization	29	34	40	140	194
Cash flows from operating activities:					
Income (loss) before income taxes from continuing operations	**(3,409)**	**2,610**	**2,956**	**(2,775)**	**6,816**
Adjusted for:					
Provisions related to Brumadinho	898	-	-	6,550	-
Equity results and other results in associates and joint ventures	154	(132)	(148)	681	182
Impairment and disposal of non-current assets	4,731	30	758	5,074	899
Depreciation, depletion and amortization	1,032	927	768	3,726	3,351
Financial results, net	840	1,139	15	3,413	4,957
Change in assets and liabilities					
Accounts receivable	(296)	523	(225)	(25)	(156)
Inventories	411	(69)	(411)	110	(817)
Suppliers and contractors	(88)	412	(335)	655	(376)
Provision - Payroll, related charges and other remunerations	13	187	155	(94)	(11)
Proceeds from streaming transactions	-	-	-	-	690
Payments related to Brumadinho	(381)	(386)	-	(989)	-
Other assets and liabilities, net	(123)	(113)	323	(718)	(205)
Cash flow from operations	**3,782**	**5,128**	**3,856**	**15,608**	**15,330**

REVENUES, VOLUMES SOLD, PRICES AND MARGINS

Net operating revenue by destination

US$ million	4Q19	%	3Q19	%	4Q18	%	2019	%	2018	%
North America	**576**	**5.8**	**533**	**5.2**	**438**	**4.5**	**2,199**	**5.9**	**2,138**	**5.8**
USA	349	3.5	312	3.1	313	3.2	1,335	3.6	1,353	3.7
Canada	169	1.7	191	1.9	106	1.1	717	1.9	657	1.8
Mexico	58	0.6	30	0.3	19	0.2	147	0.4	128	0.3
South America	**870**	**8.7**	**990**	**9.7**	**1,098**	**11.2**	**3,842**	**10.2**	**3,941**	**10.8**
Brazil	793	8.0	849	8.3	897	9.1	3,348	8.9	3,248	8.9
Others	77	0.8	141	1.4	201	2.0	494	1.3	693	1.9
Asia	**6,829**	**68.5**	**6,855**	**67.1**	**5,738**	**58.5**	**24,157**	**64.3**	**21,651**	**59.2**
China	5,182	52.0	5,473	53.6	4,118	42.0	18,242	48.6	15,242	41.7
Japan	796	8.0	586	5.7	682	6.9	2,603	6.9	2,743	7.5
South Korea	325	3.3	341	3.3	331	3.4	1,278	3.4	1,299	3.6
Others	526	5.3	455	4.5	607	6.2	2,034	5.4	2,367	6.5
Europe	**1,272**	**12.8**	**1,244**	**12.2**	**1,663**	**16.9**	**5,194**	**13.8**	**6,107**	**16.7**
Germany	471	4.7	379	3.7	462	4.7	1,683	4.5	1,653	4.5
Italy	58	0.6	80	0.8	191	1.9	356	0.9	553	1.5
Others	743	7.5	785	7.7	1,010	10.3	3,155	8.4	3,901	10.7
Middle East	**247**	**2.5**	**427**	**4.2**	**524**	**5.3**	**1,282**	**3.4**	**1,604**	**4.4**
Rest of the World	**170**	**1.7**	**168**	**1.6**	**352**	**3.6**	**896**	**2.4**	**1,134**	**3.1**
Total	**9,964**	**100.0**	**10,217**	**100.0**	**9,813**	**100.0**	**37,570**	**100.0**	**36,575**	**100.0**

Volume sold - Minerals and metals

'000 metric tons	4Q19	3Q19	4Q18	2019	2018
Iron ore fines	77,301	73,614	80,201	267,992	307,433
ROM	605	425	294	1,314	1,548
Pellets	10,966	11,077	15,987	43,199	56,592
Manganese ore	570	150	442	1,063	1,572
Ferroalloys	35	29	36	127	141
Thermal coal	1,025	1,172	1,643	4,356	5,393
Metallurgical coal	1,017	1,083	1,790	4,427	6,240
Nickel	47	51	60	206	236
Copper	88	92	104	365	379
Gold as by-product ('000 oz)	122	120	129	458	484
Silver as by-product ('000 oz)	514	443	691	1,830	2,169
PGMs ('000 oz)	90	61	72	319	374
Cobalt (metric ton)	941	1,086	1,306	4,273	4,974

Average prices

US$/ton	4Q19	3Q19	4Q18	2019	2018
Iron ore fines CFR reference (dmt)	93.7	100.2	78.3	98.0	76.0
Iron ore fines CFR/FOB realized price	83.5	89.2	68.4	87.1	66.1
Pellets CFR/FOB (wmt)	125.7	144.1	120.1	137.7	117.5
Manganese ore	80.2	118.7	158.9	139.0	162.5
Ferroalloys	969.9	1,051.3	1,141.1	1,057.2	1,179.0
Thermal coal	56.0	53.9	79.5	59.1	84.2
Metallurgical coal	131.4	164.5	196.3	172.5	190.6
Nickel	16,251	14,859	12,133	14,064	13,667
Copper[1]	5,693	4,857	5,591	5,436	5,583
Gold (US$/oz)	1,542	1,485	1,179	1,419	1,254
Silver (US$/oz)	17.60	15.15	13.42	15.44	14.43
Cobalt (US$/t)	29,860	24,901	49,090	26,093	62,911

[1]Considers Salobo, Sossego and North Atlantic operations.

Operating margin by segment (EBIT adjusted margin)

%	4Q19	3Q19	4Q18	2019	2018
Ferrous Minerals	49.7	49.1	48.5	49.8	46.7
Coal	(129.3)	(99.2)	(10.2)	(75.4)	(4.3)
Base Metals	19.1	17.0	19.3	14.3	17.8
Total[1]	**25.1**	**36.0**	**38.3**	**18.3**	**36.2**

[1] Excluding non-recurring effects

RECONCILIATION OF IFRS AND "NON-GAAP" INFORMATION

(a) Adjusted EBIT

US$ million	4Q19	3Q19	4Q18
Net operating revenues	9,964	10,217	9,813
COGS	(5,632)	(5,681)	(5,752)
Sales and administrative expenses	(139)	(128)	(141)
Research and development expenses	(158)	(124)	(125)
Pre-operating and stoppage expenses	(314)	(290)	(66)
Brumadinho event	(1,141)	(225)	-
Other operational expenses, net	(264)	(122)	(150)
Dividends received and interests from associates and JVs	188	29	120
Adjusted EBIT	**2,504**	**3,676**	**3,699**

(b) Adjusted EBITDA

EBITDA defines profit or loss before interest, tax, depreciation, depletion and amortization. The definition of Adjusted EBITDA for the Company is the operating income or loss plus dividends received and interest from associates and joint ventures, and excluding the amounts charged as (i) depreciation, depletion and amortization and (ii) impairment and disposal of non-current assets. However, our adjusted EBITDA is not the measure defined as EBITDA under IFRS and may possibly not be comparable with indicators with the same name reported by other companies. Adjusted EBITDA should not be considered as a substitute for operational profit or as a better measure of liquidity than operational cash flow, which are calculated in accordance with IFRS. Vale provides its adjusted EBITDA to give additional information about its capacity to pay debt, carry out investments and cover working capital needs. The following tables shows the reconciliation between adjusted EBITDA and operational cash flow and adjusted EBITDA and net income, in accordance with its statement of changes in financial position:

Reconciliation between adjusted EBITDA and operational cash flow

US$ million	4Q19	3Q19	4Q18
Adjusted EBITDA	**3,536**	**4,603**	**4,467**
Working capital:			
Accounts receivable	(296)	523	(225)
Inventories	411	(69)	(411)
Suppliers and contractors	(88)	412	(335)
Provision - Payroll, related charges and other remunerations	13	187	155
Payments related to Brumadinho	(381)	(386)	-
Others	587	(142)	205
Cash provided from operations	**3,782**	**5,128**	**3,856**
Income taxes paid - including settlement program	(467)	(493)	(277)
Interest on loans and borrowings paid	(236)	(467)	(217)
Participative stockholders' debentures paid	(89)	-	(41)
Derivatives received (paid), net	(115)	(88)	(32)
Net cash provided by (used in) operating activities	**2,875**	**4,080**	**3,289**

Reconciliation between adjusted EBITDA and net income (loss)

US$ million	4Q19	3Q19	4Q18
Adjusted EBITDA	**3,536**	**4,603**	**4,467**
Depreciation, depletion and amortization	(1,032)	(927)	(768)
Dividends received and interest from associates and joint ventures	(188)	(29)	(120)
Impairment and disposal of non-current assets	(4,731)	(30)	(714)
Operating income	**(2,415)**	**3,617**	**2,865**
Financial results	(840)	(1,139)	(15)
Equity results and other results in associates and joint ventures	(154)	132	105
Income taxes	1,413	(977)	876
Net income (loss) from continuing operations	**(1,996)**	**1,633**	**3,831**
Net income (loss) attributable to noncontrolling interests	(434)	(21)	45
Net income (loss) attributable to Vale's stockholders	**(1,562)**	**1,654**	**3,786**

(c) Net debt

US$ million	4Q19	3Q19	4Q18
Total debt	13,056	14,786	15,466
Cash and cash equivalents[1]	8,176	9,465	5,816
Net debt	4,880	5,321	9,650

[1] Including financial investments

(d) Gross debt / LTM Adjusted EBITDA

US$ million	4Q19	3Q19	4Q18
Gross debt / LTM Adjusted EBITDA (x)	1.2	1.3	0.9
Gross debt / LTM operational cash flow (x)	1.1	1.2	1.2

(e) LTM Adjusted EBITDA / LTM interest payments

US$ million	4Q19	3Q19	4Q18
Adjusted LTM EBITDA / LTM gross interest (x)	10.7	10.8	14.0
LTM adjusted EBITDA / LTM interest payments (x)	8.9	9.9	14.8
LTM operational profit / LTM interest payments (x)	1.5	6.0	11.2