

## Vale's production and sales in 4Q22 and 2022

Rio de Janeiro, January 31<sup>st</sup>, 2023

- Vale's Q4 performance was marked by strong iron ore fines and nickel sales, up 24% and 30% q/q respectively, converting into sales the inventories formed in the previous quarter.
- Iron ore production totaled 308 Mt in 2022, 2% lower y/y, mainly due to (i) licensing delays at Serra Norte; and (ii) jaspilite waste processing and operational performance at S11D. This was partially offset by (i) continued production ramp-up at Vargem Grande; (ii) higher dry processing production at Brucutu; and (iii) higher third-party purchase.
- Pellets production totaled 32 Mt in 2022, up 1% y/y, with an improved mix of direct reduction pellets (49% of total production vs. 41% in 2021), leveraging on the higher-quality feed and taking advantage of better market premiums.
- Nickel production grew 6% in 2022 to 179 kt, largely due to the stabilization of Sudbury operations after the labor strike in 2021, as well as consistent and strong performance at Onça Puma. This was partially offset by lower feed availability owing to PTVI furnace rebuild and the later ramp-up of VBME.
- Copper production decreased 15%, totaling 253 kt in 2022, due to extended maintenance at Sossego mill during the first half of the year, and additional maintenance required at both Sossego and Salobo. This was partially offset by higher production in Canada owing to the stabilization of Sudbury mines and the recovery of copper from copper precipitates in Thompson, reducing waste as part of our approach to circular mining.

### Production summary

000' metric tons	4Q22	3Q22	4Q21	2022	2021	% change			2022 guidance	2023 guidance
						4Q22/3Q22	4Q22/4Q21	2022/2021		
Iron ore <sup>1</sup>	80,852	89,701	81,678	307,793	312,901	-9.9%	-1.0%	-1.6%	~310 Mt	310-320 Mt
Pellets	8,261	8,256	9,073	32,111	31,708	0.1%	-8.9%	1.3%	~33 Mt	36-40 Mt <sup>2</sup>
Nickel	47.4	51.8	48.0	179.1	168.3	-8.5%	-1.3%	6.4%	~180 kt	160-175 kt
Copper	66.3	74.3	77.5	253.1	296.8	-10.8%	-14.5%	-14.7%	~260 kt	335-370 kt

<sup>1</sup> Including third-party purchases, run-of-mine and feed for pelletizing plants. Excluding Midwestern System volumes.

<sup>2</sup> Iron ore agglomerates guidance, including iron ore pellets and briquettes.

### Sales summary

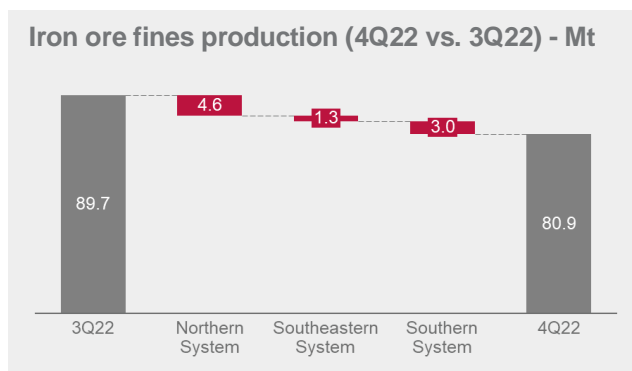
000' metric tons	4Q22	3Q22	4Q21	2022	2021	% change		
						4Q22/3Q22	4Q22/4Q21	2022/2021
Iron ore fines <sup>1</sup>	81,202	65,381	81,749	260,663	270,885	24.2%	-0.7%	-3.8%
Iron ore pellets	8,789	8,521	10,351	33,164	32,306	3.1%	-15.1%	2.7%
Iron ore ROM	1,963	3,668	607	8,216	2,052	-46.5%	223.4%	300.4%
Nickel	58.2	44.3	44.7	180.8	181.7	31.4%	30.2%	-0.5%
Copper	71.6	70.5	73.7	243.9	284.5	1.6%	-2.8%	-14.3%

<sup>1</sup> Including third-party purchases. Excluding Midwestern System volumes.

## Businesses' highlights in 4Q22

### Iron Ore and Pellets operations

- **Iron ore fines and pellets sales increased 22% q/q**, totaling 90 Mt, boosted by the drawdown of in-transit inventories formed in Q3. **All-in premium totaled US\$ 5.4/t**<sup>1</sup> (vs. US\$ 6.6/t in 3Q22), mainly due to lower contractual pellet premiums, after record premiums in Q3.
- **Northern System production decrease q/q** is largely explained by seasonally higher rainfall level<sup>2</sup> and Serra Norte's performance, impacted by (i) lower ROM availability as a result of slower licensing processes; and (ii) processing plants' conveyor belts maintenance in October and November.
- **Southeastern System and Southern Systems' production decreased q/q**, impacted by seasonally higher rainfall level<sup>3</sup> in Minas Gerais region. Additionally, Southeastern performance was affected by a planned maintenance carried out in Alegria's mining equipment, while Southern System results were impacted by lower third-party purchase.
- **Pellet production was flat q/q**, driven by the higher pellet feed availability for Tubarão plants and the resumption of Plant #5, increasing Tubarão pellet production, which was offset by a maintenance carried out at Plant #7 in Tubarão complex and São Luis plant.



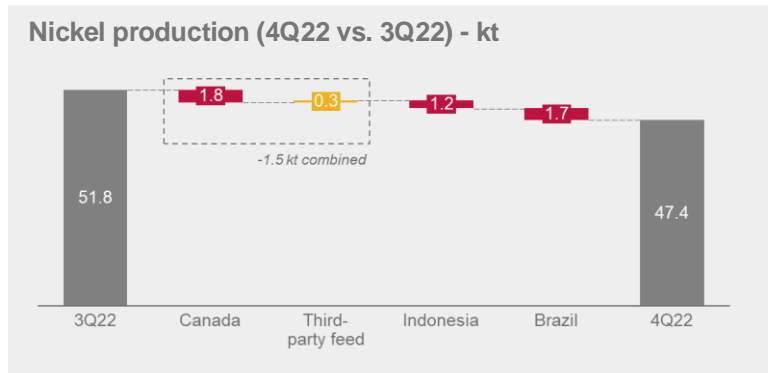
<sup>1</sup> Iron ore premium of US\$ 1.6/t and weighted average contribution of pellets of US\$ 3.8/t.

<sup>2</sup> Rainfall level: 472 mm at Serra Norte in 4Q22 (vs. 31 mm in 3Q22) and 421 mm at S11D in 4Q22 (vs. 36 mm in 3Q22).

<sup>3</sup> Rainfall level: 577 mm at Mariana Complex in Southeastern System in 4Q22 (vs. 35 mm in 3Q22) and 716 mm at Vargem Grande Complex in Southern System 4Q22 (vs. 44 mm in 3Q22).

## Nickel operations

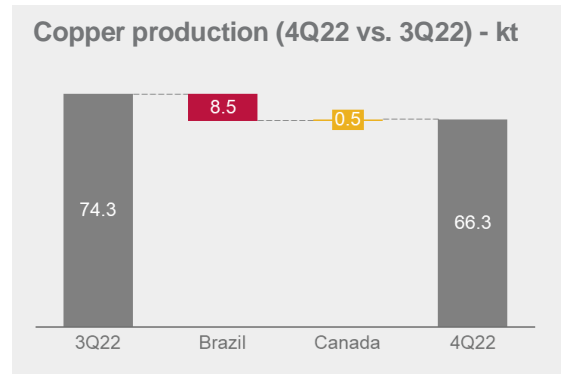
- **Nickel sales were 31% higher q/q and 23% greater than the quarterly production**, as expected, following the inventory buildup in Q3 to meet sales commitments during planned maintenance at Long Harbour and Matsusaka in Q4.



- **Finished nickel production from Sudbury-sourced ore decreased 9% q/q**, as mine and mill maintenance activities in Q3 limited finished production in Q4. During Q4, Sudbury mines achieved the highest quarterly production rates since 2Q19, which is expected to be translated into better finished nickel production in 1H23.
- **Finished nickel production from Thompson-sourced ore declined 11% q/q** attributed to scheduled maintenance at the Long Harbour Refinery during the quarter.
- **Finished nickel production from Voisey's Bay-sourced ore was 10% lower q/q**, partially reflecting scheduled maintenance at the Long Harbour Refinery during the quarter, in addition to the production gap created by the depletion of Ovoid mine and the ramp-up of the Voisey's Bay underground project.
- **Finished nickel production from third parties increased 5% q/q**, which was planned to offset lower production from Voisey's Bay ore in the quarter. Consumption of third-party feed is expected to remain higher than in recent years, aiming to maximize the utilization and performance of our downstream operations.
- **Finished nickel production from Indonesia-sourced material was 6% lower q/q**, reflecting lower nickel-in-matte production due to furnace corrective maintenance. Nickel in matte production was 16.2 kt in the quarter, 8% lower q/q.
- **Nickel production at Onça Puma decreased 25% q/q** as the kiln underwent a planned maintenance, which impacted 18 days in the quarter.

## Copper operations

- **Copper sales<sup>4</sup> were in line q/q**, despite lower production mainly due to the sale of inventories of Thompson copper precipitate and Voisey's Bay concentrate, in-line with sales commitments.
- **Sossego copper production decreased 18% q/q**, impacted by planned and corrective maintenance work conducted during the quarter, primarily related to crushing activities.
- **Salobo copper production decreased 15% q/q**, due to planned and corrective maintenance, impacting plant availability.
- **Salobo III project successful started-up in the end of 2022 on time and on budget**. The project will add 30-40 ktpy in additional copper production and it will achieve full capacity in 4Q24.
- **Copper production in Canada increased 2% q/q**. Sudbury mines improved performance following scheduled maintenance in 3Q22. This was offset by a decrease in Thompson copper production, reflecting the winter season stoppage of copper precipitate recovery, and ongoing ramp-up of the underground mine at Voisey's Bay.



<sup>4</sup> Sales volumes are lower compared to production volumes due to payable copper vs. contained copper: part of the copper contained in the concentrates is lost in the smelting and refining process, hence payable quantities of copper are approximately 3.5% lower than contained volumes.

## ANNEX – Production and sales summary

### Iron ore

000' metric tons	4Q22	3Q22	4Q21	2022	2021	% change		
						4Q22/3Q22	4Q22/4Q21	2022/2021
<b>Northern System</b>	<b>45,097</b>	<b>49,652</b>	<b>50,021</b>	<b>171,555</b>	<b>188,835</b>	<b>-9.2%</b>	<b>-9.8%</b>	<b>-9.2%</b>
Serra Norte and Serra Leste	26,486	30,678	30,958	102,298	115,135	-13.7%	-14.4%	-11.1%
S11D	18,611	18,974	19,062	69,257	73,699	-1.9%	-2.4%	-6.0%
<b>Southeastern System</b>	<b>18,405</b>	<b>19,725</b>	<b>18,659</b>	<b>72,644</b>	<b>69,780</b>	<b>-6.7%</b>	<b>-1.4%</b>	<b>4.1%</b>
Itabira (Cauê, Conceição and others)	7,007	7,017	7,987	27,283	28,696	-0.1%	-12.3%	-4.9%
Minas Centrais (Brucutu and others)	5,395	5,845	4,664	20,759	19,306	-7.7%	15.7%	7.5%
Mariana (Alegria, Timbopeba and others)	6,003	6,864	6,008	24,602	21,778	-12.5%	-0.1%	13.0%
<b>Southern System</b>	<b>17,350</b>	<b>20,324</b>	<b>12,999</b>	<b>63,594</b>	<b>54,285</b>	<b>-14.6%</b>	<b>33.5%</b>	<b>17.1%</b>
Paraopeba (Mutuca, Fábrica and others)	8,403	10,725	4,892	30,106	22,975	-21.7%	71.8%	31.0%
Vargem Grande (Vargem Grande, Pico and others)	8,947	9,599	8,106	33,488	31,310	-6.8%	10.4%	7.0%
<b>IRON ORE PRODUCTION<sup>1</sup></b>	<b>80,852</b>	<b>89,701</b>	<b>81,678</b>	<b>307,793</b>	<b>312,901</b>	<b>-9.9%</b>	<b>-1.0%</b>	<b>-1.6%</b>
<b>IRON ORE SALES<sup>2</sup></b>	<b>91,954</b>	<b>77,569</b>	<b>92,706</b>	<b>302,042</b>	<b>305,293</b>	<b>18.5%</b>	<b>-0.8%</b>	<b>-1.1%</b>
<b>FINES AND PELLETS SALES</b>	<b>89,991</b>	<b>73,902</b>	<b>92,099</b>	<b>293,827</b>	<b>303,241</b>	<b>21.8%</b>	<b>-2.3%</b>	<b>-3.1%</b>
<b>FINES SALES<sup>3</sup></b>	<b>81,202</b>	<b>65,381</b>	<b>81,749</b>	<b>260,663</b>	<b>270,935</b>	<b>24.2%</b>	<b>-0.7%</b>	<b>-3.8%</b>
<b>PELLETS SALES</b>	<b>8,789</b>	<b>8,521</b>	<b>10,351</b>	<b>33,164</b>	<b>32,306</b>	<b>3.1%</b>	<b>-15.1%</b>	<b>2.7%</b>
<b>ROM SALES</b>	<b>1,963</b>	<b>3,668</b>	<b>607</b>	<b>8,216</b>	<b>2,052</b>	<b>-46.5%</b>	<b>223.4%</b>	<b>300.4%</b>

<sup>1</sup> Including third party purchases, run-of-mine and feed for pelletizing plants. Excluding Midwestern System volumes. Vale's product portfolio Fe content reached 62.0%, alumina 1.3% and silica 6.7% in 4Q22.

<sup>2</sup> Including sales of iron ore fines, pellets, run-of-mine and third-party purchase.

<sup>3</sup> Including third-party purchases. Excluding Midwestern System volumes.

### Pellets

000' metric tons	4Q22	3Q22	4Q21	2022	2021	% change		
						4Q22/3Q22	4Q22/4Q21	2022/2021
<b>Northern System</b>	<b>739</b>	<b>899</b>	<b>895</b>	<b>3,212</b>	<b>3,624</b>	<b>-17.8%</b>	<b>-17.4%</b>	<b>-11.4%</b>
São Luis	739	899	895	3,212	3,624	-17.8%	-17.4%	-11.4%
<b>Southeastern System</b>	<b>3,616</b>	<b>3,284</b>	<b>4,807</b>	<b>14,677</b>	<b>16,736</b>	<b>10.1%</b>	<b>-24.8%</b>	<b>-12.3%</b>
Itabasco (Tubarão 3)	960	525	1,089	2,725	3,389	82.9%	-11.8%	-19.6%
Hispanobras (Tubarão 4)	-	-	-	-	169	-	-	-100.0%
Nibrasco (Tubarão 5 and 6)	1,131	349	1,052	3,465	3,794	224.1%	7.5%	-8.7%
Kobrasco (Tubarão 7)	178	924	989	3,034	3,225	-80.7%	-82.0%	-5.9%
Tubarão 8	1,347	1,485	1,677	5,451	6,162	-9.3%	-19.7%	-11.5%
<b>Southern System</b>	<b>1,222</b>	<b>1,268</b>	<b>745</b>	<b>4,305</b>	<b>3,179</b>	<b>-3.6%</b>	<b>64.0%</b>	<b>35.4%</b>
Fábrica	-	-	-	-	-	-	-	-
Vargem Grande	1,222	1,268	745	4,305	3,179	-3.6%	64.0%	35.4%
<b>Oman</b>	<b>2,684</b>	<b>2,805</b>	<b>2,625</b>	<b>9,919</b>	<b>8,169</b>	<b>-4.3%</b>	<b>2.2%</b>	<b>21.4%</b>
<b>PELLETS PRODUCTION</b>	<b>8,261</b>	<b>8,256</b>	<b>9,073</b>	<b>32,111</b>	<b>31,708</b>	<b>0.1%</b>	<b>-8.9%</b>	<b>1.3%</b>
<b>PELLETS SALES</b>	<b>8,789</b>	<b>8,521</b>	<b>10,351</b>	<b>33,164</b>	<b>32,306</b>	<b>3.1%</b>	<b>-15.1%</b>	<b>2.7%</b>

### Nickel – Finished production by source

000' metric tons	4Q22	3Q22	4Q21	2022	2021	% change		
						4Q22/3Q22	4Q22/4Q21	2022/2021
<b>Canada</b>	<b>18.2</b>	<b>20.0</b>	<b>18.3</b>	<b>73.3</b>	<b>76.4</b>	<b>-9.0%</b>	<b>-0.5%</b>	<b>-4.1%</b>
Sudbury	11.1	12.2	8.8	39.0	32.2	-9.0%	26.1%	21.1%
Thompson	2.4	2.7	1.2	9.9	6.0	-11.1%	100.0%	65.0%
Voisey's Bay	4.6	5.1	8.4	24.4	38.2	-9.8%	-45.2%	-36.1%
<b>Indonesia</b>	<b>18.0</b>	<b>19.2</b>	<b>21.7</b>	<b>63.9</b>	<b>66.7</b>	<b>-6.3%</b>	<b>-17.1%</b>	<b>-4.2%</b>
<b>Brazil</b>	<b>5.1</b>	<b>6.8</b>	<b>5.4</b>	<b>23.6</b>	<b>19.1</b>	<b>-25.0%</b>	<b>-5.6%</b>	<b>23.6%</b>
Feed from third-parties <sup>1</sup>	6.1	5.8	2.6	18.3	6.1	5.2%	134.6%	200.0%
<b>NICKEL PRODUCTION</b>	<b>47.4</b>	<b>51.8</b>	<b>48.0</b>	<b>179.1</b>	<b>168.3</b>	<b>-8.5%</b>	<b>-1.3%</b>	<b>6.4%</b>
<b>NICKEL SALES</b>	<b>58.2</b>	<b>44.3</b>	<b>44.7</b>	<b>180.8</b>	<b>181.7</b>	<b>31.4%</b>	<b>30.2%</b>	<b>-0.5%</b>

<sup>1</sup> External feed purchased from third parties and processed into finished nickel in our Canadian operations.

## Copper – Finished production by source

000' metric tons	4Q22	3Q22	4Q21	2022	2021	% change		
						4Q22/3Q22	4Q22/4Q21	2022/2021
<b>Brazil</b>	<b>44.9</b>	<b>53.4</b>	<b>57.7</b>	<b>171.0</b>	<b>226.4</b>	<b>-15.9%</b>	<b>-22.2%</b>	<b>-24.5%</b>
Salobo	29.6	34.7	33.8	127.8	144.6	-14.7%	-12.4%	-11.6%
Sossego	15.3	18.7	24.0	43.2	81.8	-18.2%	-36.3%	-47.2%
<b>Canada</b>	<b>21.4</b>	<b>20.9</b>	<b>19.7</b>	<b>82.1</b>	<b>70.4</b>	<b>2.4%</b>	<b>8.6%</b>	<b>16.1%</b>
Sudbury	16.1	12.3	12.9	59.2	46.2	30.9%	24.8%	28.1%
Thompson	1.2	3.6	0.2	5.3	0.4	-66.7%	500.0%	1,225.0%
Voisey's Bay	1.9	3.3	5.1	10.8	20.2	-42.4%	-62.7%	-46.8%
Feed from third parties	2.2	1.7	1.6	6.8	3.6	29.4%	37.5%	88.9%
<b>COPPER PRODUCTION</b>	<b>66.3</b>	<b>74.3</b>	<b>77.5</b>	<b>253.1</b>	<b>296.8</b>	<b>-10.8%</b>	<b>-14.5%</b>	<b>-14.7%</b>
<b>COPPER SALES</b>	<b>71.6</b>	<b>70.5</b>	<b>73.7</b>	<b>243.9</b>	<b>284.5</b>	<b>1.6%</b>	<b>-2.8%</b>	<b>-14.3%</b>
Copper Sales Brazil	44.7	52.9	52.7	166.3	216.2	-15.5%	-15.2%	-23.1%
Copper Sales Canada	26.9	17.6	21.0	77.5	68.3	52.8%	28.1%	13.5%

## Base Metals by-products – Finished production

	4Q22	3Q22	4Q21	2022	2021	% change		
						4Q22/3Q22	4Q22/4Q21	2022/2021
COBALT (000' metric tons)	529	609	603	2,434	2,521	-13.1%	-12.3%	-3.5%
PLATINUM (000' oz troy)	25	32	17	102	79	-21.9%	47.1%	29.1%
PALLADIUM (000' oz troy)	33	37	19	127	98	-10.8%	73.7%	29.6%
GOLD (000' oz troy) <sup>1</sup>	74	84	89	289	364	-11.9%	-16.9%	-20.6%
<b>TOTAL BY-PRODUCTS</b> (000' metric tons Cu eq.) <sup>2 3</sup>	<b>34</b>	<b>41</b>	<b>29</b>	<b>134</b>	<b>137</b>	<b>-17.1%</b>	<b>17.2%</b>	<b>-2.2%</b>

<sup>1</sup> Includes gold from Copper and Nickel operations.

<sup>2</sup> Includes iridium, rhodium, ruthenium and silver.

<sup>3</sup> Copper equivalent tons calculated using average market metal prices for each quarter. Market reference prices: for copper, cobalt, gold and silver: LME spot; for Platinum and Palladium: NYMEX spot; for other PGMs: Johnson Matthey.

**Further information on Vale can be found at: [vale.com](http://vale.com)**

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