



December 2, 2019

## Copper building momentum going into 2020

### RBC Base Metals Outlook

We believe copper is poised for a rally back to \$3.00/lb in 2020 as economic conditions improve (modestly) and we expect limited supply growth before 2021. The trade war remains the wild card; however, we believe both sides are motivated to complete at least a phase one deal which would be a positive catalyst for base metals prices (to the extent it's not already priced in). Global PMIs have shown modest signs of improvement from a low base and we believe fiscal stimulus efforts can continue to drive a gradual improvement in 2020. Our view is not premised on robust global growth, rather a gradual improvement and specifically an improvement in key copper demand drivers. On the supply side, we forecast modest supply growth but key risks are building, including limited acid availability in certain regions, the ongoing protests in Chile and geopolitical issues in other key producing areas.

**Valuations attractive for base metals stocks:** The copper stocks in our North American coverage universe are up 8% in Q4/2019 along with improving macro sentiment; however, we see further upside with the group trading at 0.6x our NAVPS estimates compared to the historical average of 0.8x. See Appendix III for details of our estimate, NAV and price target revisions.

#### Key copper demand drivers showing signs of improvement

**Expecting stronger copper demand following a weak 2019:** We expect stronger copper demand growth of 1.8% vs. 0.5% in 2019 due to a modest improvement in the global economy and more specifically Chinese electrical grid spending (~40% of Chinese copper demand) is rising to reach the government's targets, and property completions (more copper intensive) which have lagged property starts have crept up from a low base.

**Zinc smelters slowly catching up:** Chinese zinc production has gradually increased which has weighed on the price, despite inventories remaining at historically low levels. We expect this to continue and forecast prices fading towards our long term price of \$1.00/lb; however, there have been smelter shutdowns outside of China and it could take time to rebuild inventories which keeps our estimates above marginal cost support which we see at \$0.80-0.90/lb.

**Nickel fades as inventories stabilize:** Following the announcement of the Indonesian ore export ban and significant draw downs in inventories nickel reached \$8.45/lb in September; however, it has fallen 26% to \$6.26/lb as inventories have stabilized and the Indonesian ban may not tighten the market until 2021. We believe nickel prices are likely to remain supported and forecast a return to \$7.00/lb in 2020 after the current seasonally weak period.

**Iron ore expected to remain strong in H1/2020:** The Chinese property market remains relatively healthy after stimulus from 2016-2018 and supply has yet to normalize which points to elevated iron ore prices in H1/2020 before potentially fading later next year (more details in today's iron ore [note](#)). We expect met coal to rise on healthier steel margins, recent supply reductions in China and Mozambique, and potential re-stocking under 2020 import quotas in China. We forecast \$150/t in 2020 which is near cost support in a roughly balanced market (recent met coal update [here](#)).

#### Recommended Equities

In North America, **Lundin Mining** remains a preferred copper name due to improving FCF and production growth in 2020 along with **First Quantum** where a continued successful ramp at Cobre Panama can drive a re-rating. **Teck** remains undervalued compared to global diversified peers and more stability in met coal and an improvement in copper prices could drive better share price performance in 2020. **Ivanhoe** continues to create value at the Kakula deposit and more news around the high grade Kamo a North discovery could provide catalysts in 2020.



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## Equity Recommendation Summary

### North America

**Lundin Mining (Outperform, C\$9.00 target price)** remains a preferred copper name as we forecast increasing production and FCF in 2020 as capital investment rolls off. The company recently announced they intend to increase the quarterly dividend to \$0.04 from \$0.03 as they anticipate rising FCF in 2020. The ramp up has been impressive at **First Quantum's (Outperform, C\$18.00 target)** Cobre Panama mine, in particular the cash costs are below expectations and we believe continued success can drive a further re-rating. **Teck (Outperform, C\$31.00 target)** remains undervalued and finding stability in the underlying commodity price and continuing to execute on their business plan can help to close this gap. We see some risk around Teck's Q4 release in February as we anticipate an increase in capital expenditures at QB2 and we currently model \$5.5B (including cost inflation) vs. the prior estimate of \$4.7B + \$300-470M of capital inflation. **Ivanhoe (Outperform, C\$7.00 target)** can continue to outperform in 2020 with several catalysts on the horizon, notably more details on the high grade Kamo a North discovery. **Freeport (Sector Perform, \$14.00 target)** remains a good way to get leverage to a rising copper price and while FCF is muted in 2020 as Grasberg transitions to underground mining, we believe the market could start to price in the 2021 production growth some time next year. **Hudbay (Sector Perform, C\$6.00 target)** is trading at an attractive valuation and could start to demonstrate additional value in Peru; however, this could take time. **Turquoise Hill (Sector Perform, \$1.50 target)** has a pivotal year to resolve the outstanding political, financing, and engineering issues.

### European Miners

We continue to prefer **Anglo American**, which we rate Top Pick, PT 2,650p (prev 2,450p) and **BHP Group** which we rate Outperform, PT 2,000p (prev 1,900p). We have upgraded **Glencore** to Outperform PT 290p from PT 310p ([link](#)) today on improved risk/reward. We also tactically upgrade our recommendation for **Rio Tinto** to Sector Perform PT 3,900p (prev 3,700p) ([link](#)) and have an improved target price for **Vale** PT \$14.00 (prev \$12.00) in front of today's Vale Day being held in NY. **Antofagasta** remains Sector Perform rated with PT 900p (prev 940p). We continue to like **Central Asia Metals** Outperform, PT 285p (prev 300p) and rate **KAZ Minerals** at Sector Perform, PT 600p.

See our London Team's [note](#) for more details



### Commodity Price Revisions – Trimming medium term base metals prices

We have maintained our 2020 copper price at \$3.00/lb but tweaked prices lower from 2021-2023 as we expect additional supply to put the market back into a small surplus. We have lowered zinc prices as Chinese smelters have started to increase production while the Indonesian ban has resulted in higher nickel prices. We have raised our 2020 iron ore price as we anticipate a tighter market before supply comes back online and brings the price back towards marginal cost in 2021 (Exhibit 2). Met coal, thermal coal prices are unchanged (see our recent met coal outlook [here](#)) and precious metals were not included in this update.

#### Exhibit 1: Commodity Price Revisions

		Current Spot Price	Average YTD 2019	Q4/19	2019E	2020E	2021E	2022E	2023E	2019 US\$ Long Term
Aluminum (US\$/lb)	to	\$0.79	\$0.81	\$0.80	\$0.81	\$0.80	\$0.83	\$0.90	\$0.90	\$0.90
	from			\$0.80	\$0.81	\$0.80	\$0.83	\$0.90	\$0.90	\$0.90
Copper (US\$/lb)	to	\$2.64	\$2.72	\$2.65	\$2.72	\$3.00	\$2.75	\$2.75	\$2.75	\$3.00
	from			\$2.75	\$2.74	\$3.00	\$3.00	\$3.00	\$3.25	\$3.00
Nickel (US\$/lb)	to	\$6.26	\$6.30	\$7.20	\$6.36	\$7.00	\$7.00	\$8.00	\$8.00	\$8.00
	from			\$5.75	\$6.00	\$6.00	\$6.50	\$7.00	\$8.00	\$8.00
Zinc (US\$/lb)	to	\$1.06	\$1.17	\$1.10	\$1.16	\$1.05	\$1.00	\$1.00	\$1.00	\$1.00
	from			\$1.25	\$1.20	\$1.25	\$1.15	\$1.10	\$1.10	\$1.00
Platinum (US\$/oz)	to	\$912	\$857	\$900	\$861	\$950	\$1,000	\$1,075	\$1,075	\$1,050
	from			\$850	\$849	\$900	\$950	\$1,025	\$1,025	\$1,050
Palladium (US\$/oz)	to	\$1,764	\$1,497	\$1,750	\$1,526	\$1,575	\$1,500	\$1,350	\$1,150	\$1,000
	from			\$1,550	\$1,476	\$1,500	\$1,313	\$1,000	\$1,000	\$1,000
Alumina - Spot	to	\$280	\$338	\$282	\$333	\$325	\$325	\$325	\$325	\$325
	from			\$325	\$343	\$325	\$325	\$325	\$325	\$325
Iron Ore (US/tonne)	to	\$85.65	\$93.78	\$95.00	\$94.97	\$77.50	\$60.00	\$60.00	\$65.00	\$65.00
	from			\$75.00	\$86.64	\$65.00	\$60.00	\$60.00	\$65.00	\$65.00
Metallurgical Coal (US/tonne)	to	\$133.00	\$182.19	\$140.00	\$177.62	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
	from			\$140.00	\$177.71	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Thermal Coal (US/tonne)	to	\$66.50	\$75.81	\$67.00	\$75.50	\$75.00	\$85.00	\$90.00	\$90.00	\$90.00
	from			\$70.00	\$76.25	\$75.00	\$85.00	\$90.00	\$90.00	\$90.00
Gold (US\$/oz)	to	\$1,469	\$1,383	\$1,500	\$1,396	\$1,500	\$1,450	\$1,450	\$1,400	\$1,400
	from			\$1,500	\$1,396	\$1,500	\$1,450	\$1,450	\$1,400	\$1,400
Silver (US\$/oz)	to	\$17.09	\$16.09	\$17.50	\$16.23	\$17.50	\$17.50	\$17.50	\$17.50	\$17.50
	from			\$17.50	\$16.23	\$17.50	\$17.50	\$17.50	\$17.50	\$17.50
Cobalt (US\$/lb)	to	\$17.50	\$16.48	\$15.00	\$16.34	\$17.50	\$20.00	\$22.50	\$25.00	\$25.00
	from			\$15.00	\$16.34	\$17.50	\$20.00	\$22.50	\$25.00	\$25.00
Molybdenum (US\$/lb)	to	\$9.60	\$11.54	\$10.00	\$11.40	\$9.50	\$9.50	\$9.50	\$9.50	\$8.50
	from			\$10.00	\$11.40	\$9.50	\$9.50	\$9.50	\$9.50	\$8.50

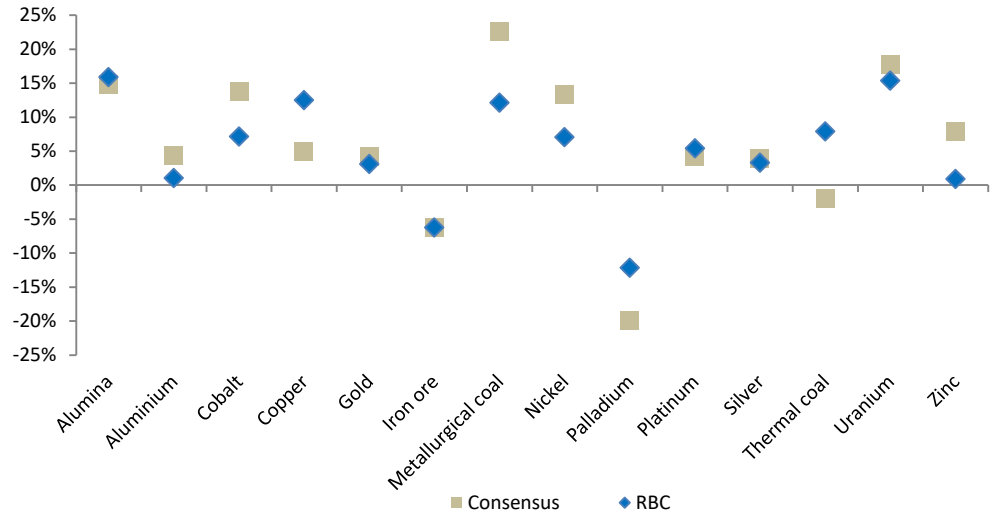
Priced as of November 26, 2019

Source: RBC Capital Markets estimates, Bloomberg, Platts



We are above consensus in 2020 for copper, inline for iron ore, and below for nickel, zinc, and met coal.

Exhibit 2: 2020 RBC Commodity Price Forecasts vs. Consensus and above/below spot levels



Note – priced at market close November 26, 2019  
Source: FocusEconomics, RBC Capital Markets estimates

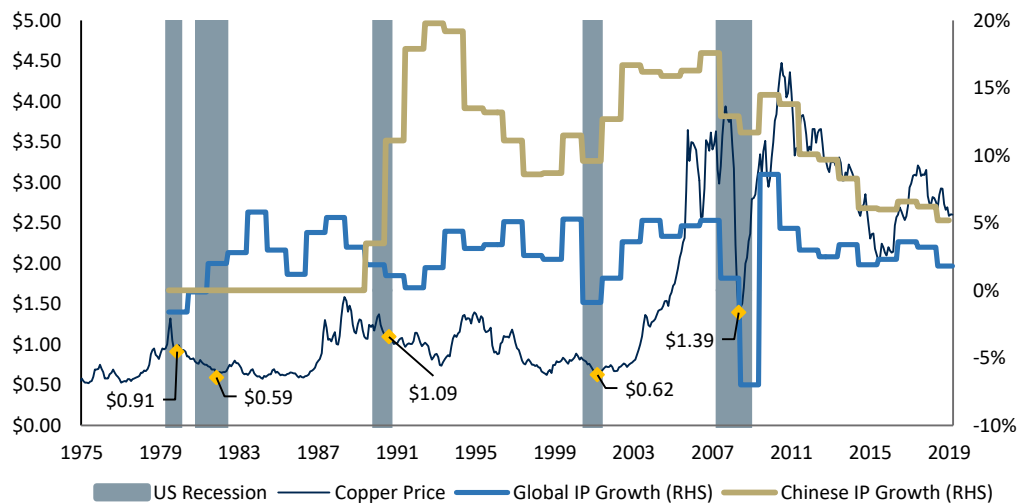


## Macro Context – not out of the woods yet

### Looking for a modest turn in global IP growth in 2020

We believe a combination of fiscal stimulus and progress on the trade war can push IP growth up modestly in 2020 from a low base in 2019, which would be supportive for base metals prices. While not our base case, a US recession would be a key risk and could push copper down to cost support in the \$2.00-\$2.25/lb range.

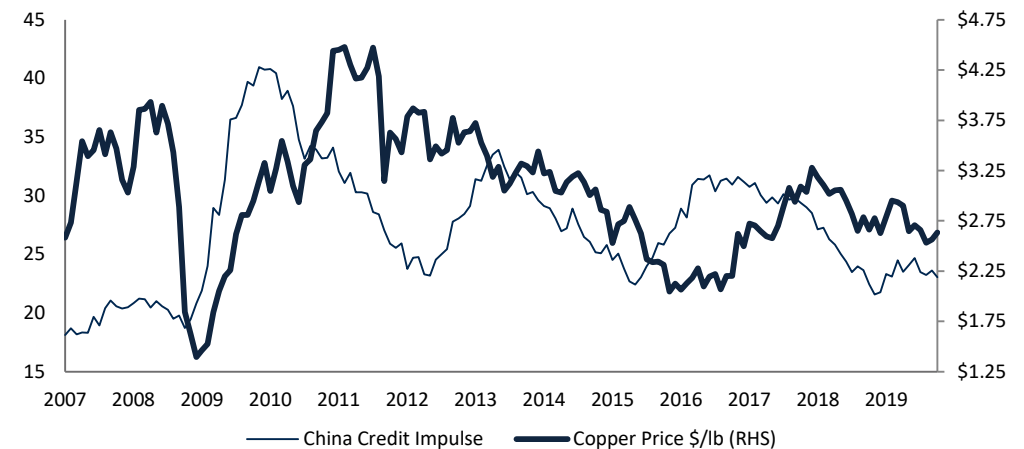
Exhibit 3: Copper prices tend to bottom during US recessions



Source: Bloomberg, Wood Mackenzie

China has made modest stimulus announcements over the last year but appears reluctant to really ‘open up the taps’ with regards to credit. Nevertheless, we have seen a modest uplift in credit impulse (new credit as a percentage of GDP) that has helped support the Chinese economy. Any more substantial stimulus announcements in 2020 would clearly be positive for commodity prices.

Exhibit 4: China has been reluctant to increase credit substantially



Source: Bloomberg



**Global PMIs remain lackluster but with signs of improvement**

57% of global PMIs remained in contraction in October 2019; however, we have seen some signs of improvement, notably in China.

Exhibit 5: Some modest improvement in Global PMIs

Global Manufacturing PMIs					
	Oct-19	Sep-19	Aug-19	Jul-19	Oct-18
<b>Global</b>	49.8	49.7	49.5	49.3	52.0
US	48.3	47.8	49.1	51.2	57.5
Canada	51.2	51.0	49.1	50.2	53.9
<b>Euro Area</b>	45.9	45.7	47.0	46.5	52.0
Austria	45.5	45.1	47.9	47.0	53.8
France	50.7	50.1	51.1	49.7	51.2
Germany	42.1	41.7	43.5	43.2	52.2
Greece	53.5	53.6	54.9	54.6	53.1
Ireland	50.7	48.7	48.6	48.7	54.9
Italy	47.7	47.8	48.7	48.5	49.2
Netherlands	50.3	51.6	51.6	50.7	57.1
Spain	46.8	47.7	48.8	48.2	51.8
Denmark	49.5	50.2	48.5	49.0	66.6
Hungary	51.9	51.7	52.5	51.1	57.3
Norway	54.9	51.8	54.5	47.8	54.0
Switzerland	49.4	44.6	47.2	44.7	57.8
UK	49.6	48.3	47.4	48.0	51.1
Australia	51.6	54.7	53.1	51.3	54.7
New Zealand	52.6	48.8	48.6	48.2	53.0
Japan	48.4	48.9	49.3	49.4	52.9
Singapore	49.6	49.5	49.9	49.8	51.9
Israel	51.8	50.3	44.3	52.2	52.7
<b>Emerging Markets</b>	51.0	51.0	50.4	50.1	50.5
Brazil	52.2	53.4	52.5	49.9	51.1
Mexico	50.4	49.1	49.0	49.8	50.7
Czech	45.0	44.9	44.9	43.1	52.5
Poland	45.6	47.8	48.8	47.4	50.4
Russia	47.2	46.3	49.1	49.3	51.3
Turkey	49.0	50.0	48.0	46.7	44.3
China	51.7	51.4	50.4	49.9	50.1
Hong Kong	39.3	41.5	40.8	43.8	48.6
India	50.6	51.4	51.4	52.5	53.1
Indonesia	47.7	49.1	49.0	49.6	50.5
Korea	48.4	48.0	49.0	47.3	51.0
Taiwan	49.8	50.0	47.9	48.1	48.7
Vietnam	50.0	50.5	51.4	52.6	53.9
Egypt	49.2	49.5	49.4	50.3	48.6
Saudi Arabia	57.8	57.3	57.0	56.6	53.8
South Africa	48.1	45.1	46.5	50.2	46.1
UAE	51.1	51.1	51.6	55.1	55.0
<b>Expanding</b>	14%	11%	16%	16%	54%
<b>Neutral</b>	30%	32%	16%	19%	30%
<b>Contracting</b>	57%	57%	68%	65%	16%
<b>MoM Increase</b>	18%	18%	18%	18%	18%

Note: Expanding ≥ 52; 52 > Neutral ≥ 50; Contracting < 50.

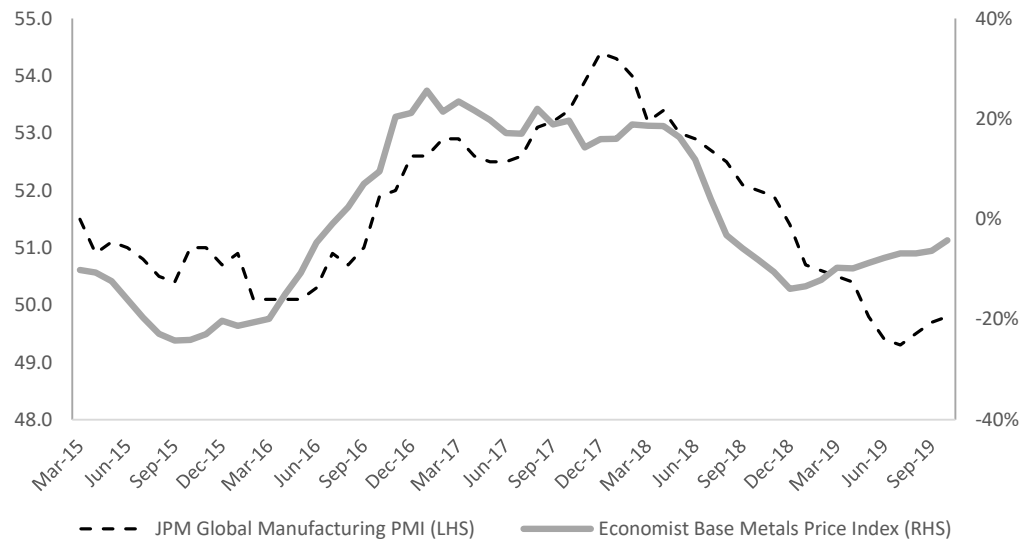
Source: Haver Analytics, Markit



**A modest improvement from a low base**

Supply issues have supported strong bulks prices, which has propped up the commodity index. Global Manufacturing PMIs have been creeping back towards positive territory (Exhibit 6).

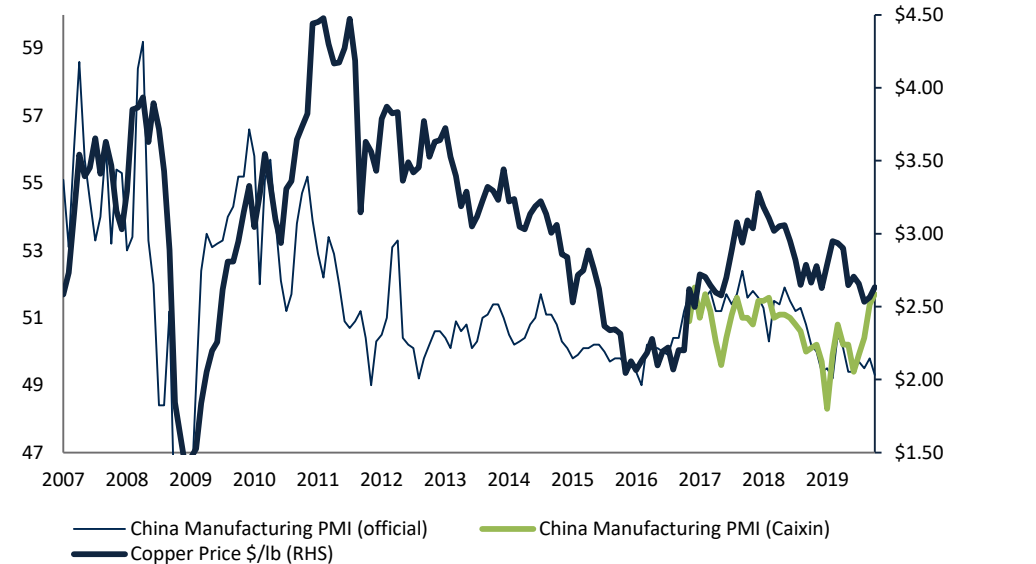
Exhibit 6: Global economy showing signs of improvement from a low base



Source: Bloomberg, The Economist

China’s official manufacturing PMI remains below 50 although the Caixin PMI (more focused on smaller private companies and tends to be more volatile) has returned to positive territory over the past 3 months.

Exhibit 7: China’s Official Manufacturing PMI remains in contractionary territory



Source: Bloomberg

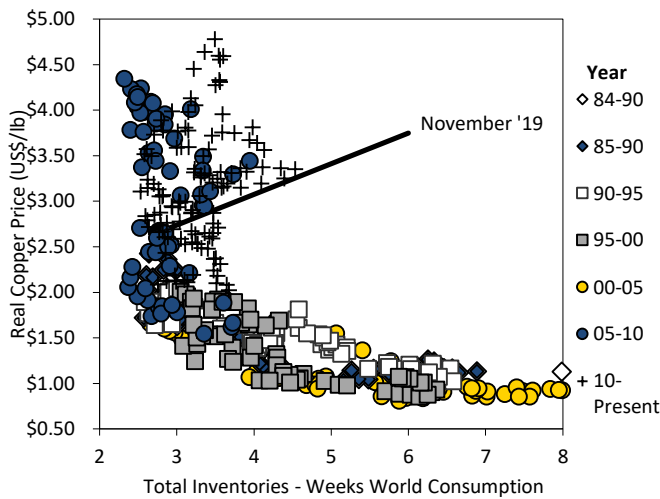


## Copper – Potential for a tighter market in 2020

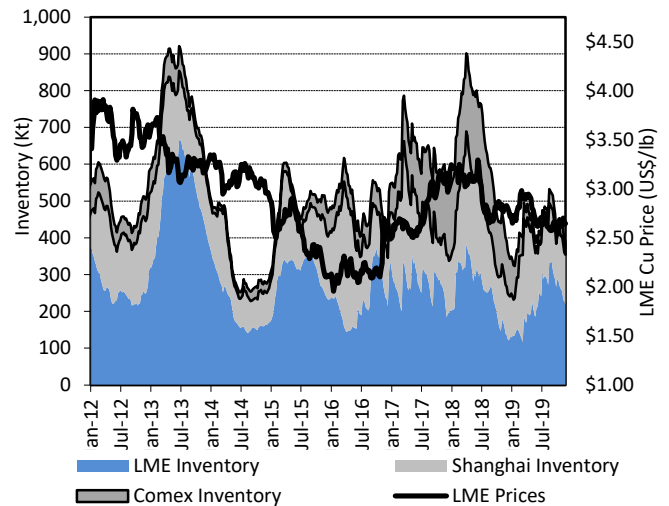
We expect copper prices to rise to \$3.00/lb in 2020 as demand recovers from a soft year in 2019 and limited supply growth could keep the market tight. Beyond 2020, we expect the market to return to surplus for 2-3 years as new mine supply ramps up, although we note there is execution risk inherent in our supply growth estimates. We continue to see potential for rising deficits in 2025 and beyond which would require an incentive price closer to \$3.50/lb to drive the next wave of project decisions.

Exhibit 8: Relatively stable inventory levels suggest a balanced market which could get tighter in 2020

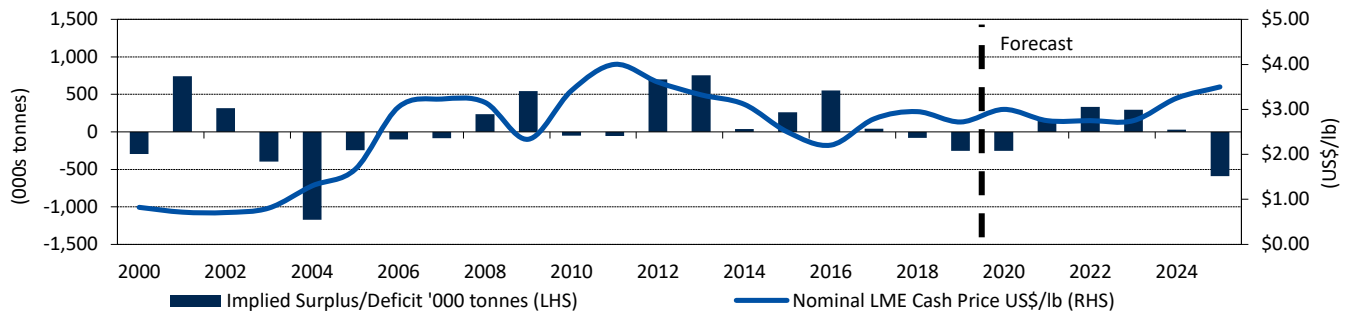
Copper price average of \$2.75/lb when inventories <3.0 weeks of global consumption



Inventories declining through H2/19



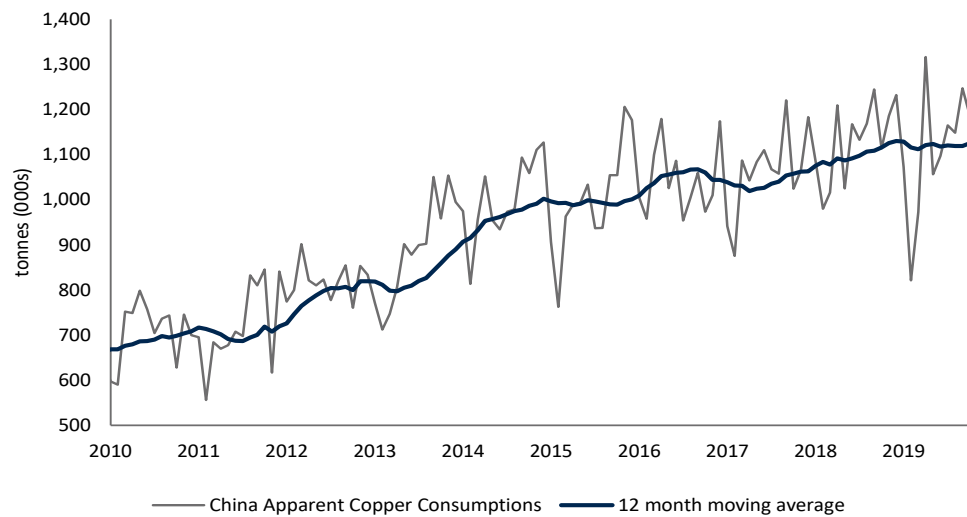
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
<b>Total Refined Production</b>	23,123	23,087	23,448	23,395	23,821	24,549	25,209	25,666	25,807	25,598
<i>Y/Y Change</i>	4.2%	(0.2%)	1.6%	(0.2%)	1.8%	3.1%	2.7%	1.8%	0.5%	(0.8%)
<b>Total Consumption</b>	22,569	23,043	23,530	23,648	24,073	24,386	24,874	25,372	25,777	26,190
<i>Y/Y Change</i>	2.9%	2.1%	2.1%	0.5%	1.8%	1.3%	2.0%	2.0%	1.6%	1.6%
<b>Surplus (Deficit)</b>	554	44	(82)	(253)	(252)	162	335	295	30	(592)
Global Stocks	1,401	1,387	1,145	892	640	802	1,137	1,432	1,462	870
Weeks of Consumption	3.2	3.1	2.5	2.0	1.4	1.7	2.4	2.9	2.9	1.7
<b>RBC Estimated Price</b>	\$2.21	\$2.79	\$2.95	\$2.72	\$3.00	\$2.75	\$2.75	\$2.75	\$3.25	\$3.50
<i>Old Estimate</i>				\$2.74	\$3.00	\$3.00	\$3.00	\$3.25	\$3.50	\$3.50
<b>Long Term Price 2026 and beyond</b>										\$3.00



Source: Wood Mackenzie, RBC Capital Markets estimates, Bloomberg, ICSG

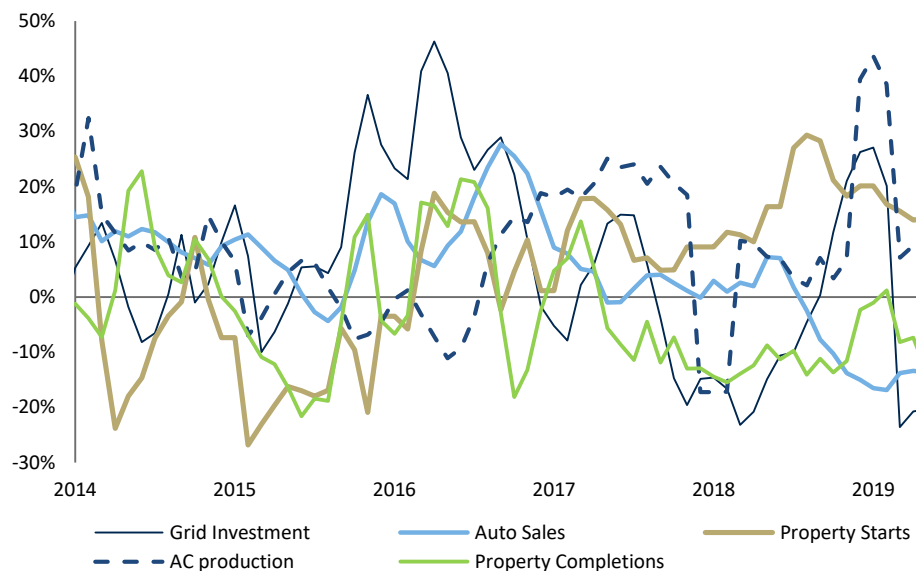
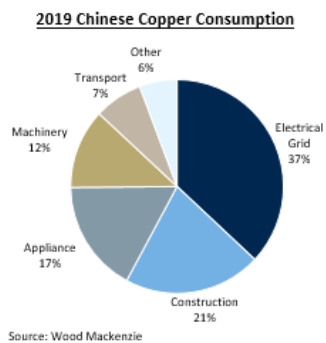
**Signs of improvement in key demand drivers:** Chinese apparent copper consumption has plateaued in 2019 leading to lackluster demand growth (Exhibit 9). However, there are signs of improvement for some of the bigger demand drivers including electrical grid spending, property completions, and auto sales (Exhibit 10). Grid spending was tracking below China's stated targets for most of 2019; however, this has rebounded and we expect this to continue in 2020 to meet government targets. Property starts have faded; however, property completions have increased modestly from a low base and this tends to be more copper intensive.

Exhibit 9: Chinese apparent copper consumption plateaued in 2019



Apparent consumptions = Refined imports + domestic production – exports – increase in stocks  
Source: Bloomberg

Exhibit 10: Chinese grid investment, property completions, and auto sales improving



All lines are 3 months moving averages  
Source: Bloomberg

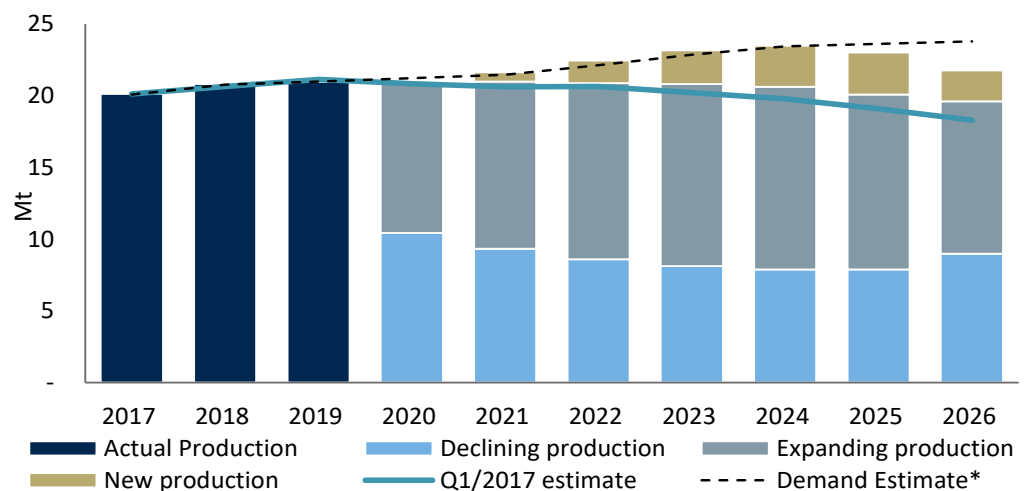


Over the past 2 years, nearly 3Mt/year of new copper supply has been sanctioned in response to higher copper prices and as such, we now forecast a slight surplus from 2021-2024 (at the start of 2017 we forecasted a deficit starting in 2020). We continue to forecast deficits returning in 2025 and the next round of projects would be that much harder and likely require an incentive price of closer to \$3.50/lb.

There is elevated execution risk with these new mine builds and historically, mine ramp ups have been the biggest source of production disruptions (Exhibit 12). If demand remains firm and there are any significant mine ramp up issues, the market could remain in deficit. Key mines expected to come online in 2021 include Spence, QB2, Kamoakakula and Mina Justa as well as increased production at Grasberg.

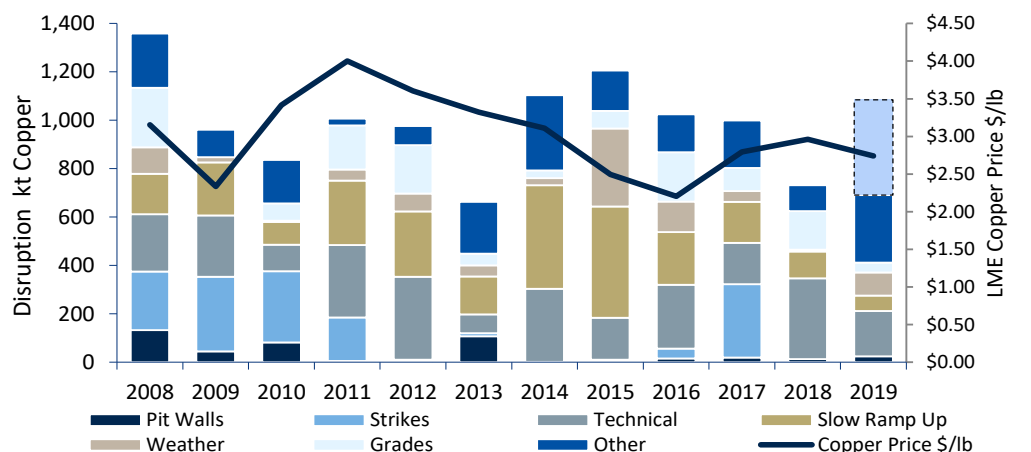
**Rising geopolitical risk** has also become another key source for reductions in supply with tax changes forcing shut downs in Zambia this year and protests in Peru have affected supply intermittently. The ongoing protests in Chile present a potential risk to supply going forward as Chile makes up roughly 30% of global copper mine supply.

Exhibit 11: New projects expected to balance the market from 2021-2024



Source: Wood Mackenzie, RBC Capital Markets estimates | \*Demand estimates include scrap demand

Exhibit 12: Production disruptions tracking towards a more normal 5-6% range in 2019

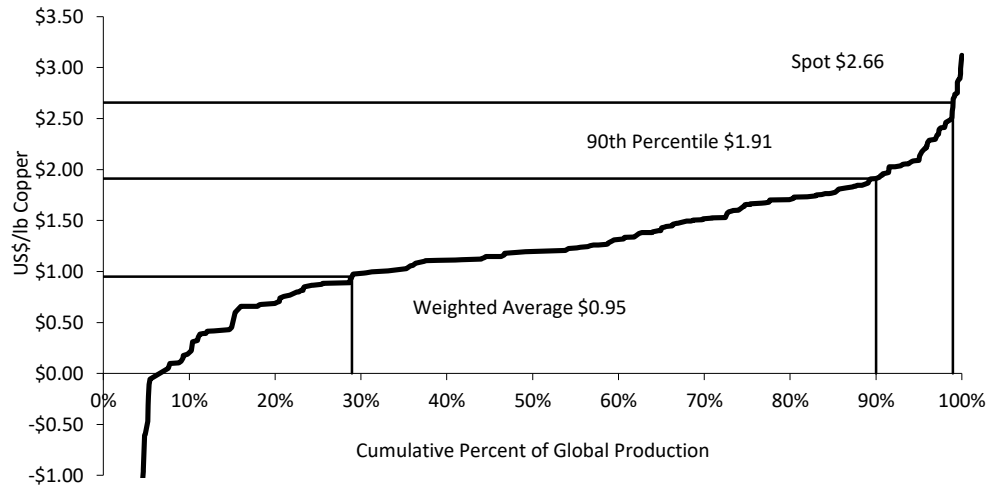


Source: Wood Mackenzie, RBC Capital Markets estimates



Spot copper prices remain above cost support of closer to \$2.00/lb.

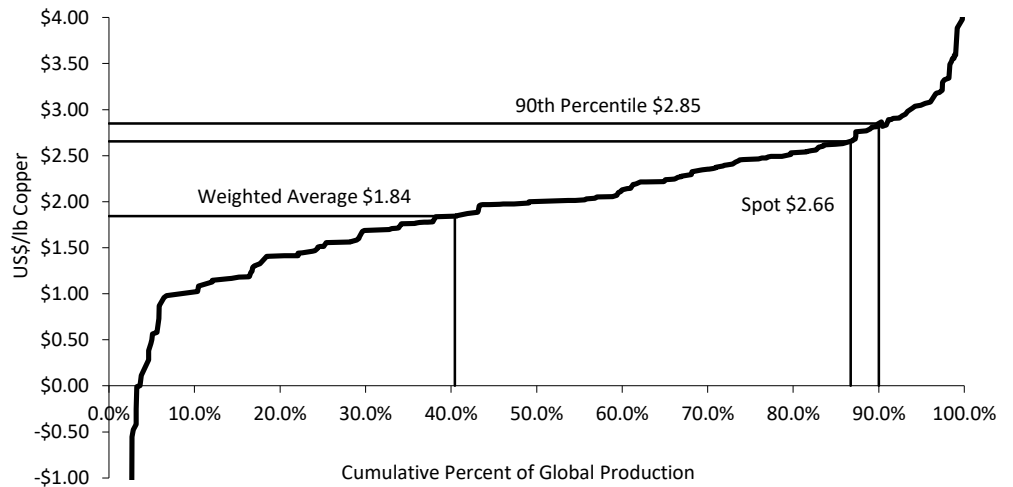
Exhibit 13: Spot prices remain well above cost support  
Copper C1 cash costs in 2020



Source: Wood Mackenzie, RBC Capital Markets estimates

The long term cost curve including sustaining capital supports our long term price of \$3.00/lb.

Exhibit 14: Long term cash costs including sustaining capex at \$2.85 at the 90th percentile  
Copper C3 cash costs in 2026

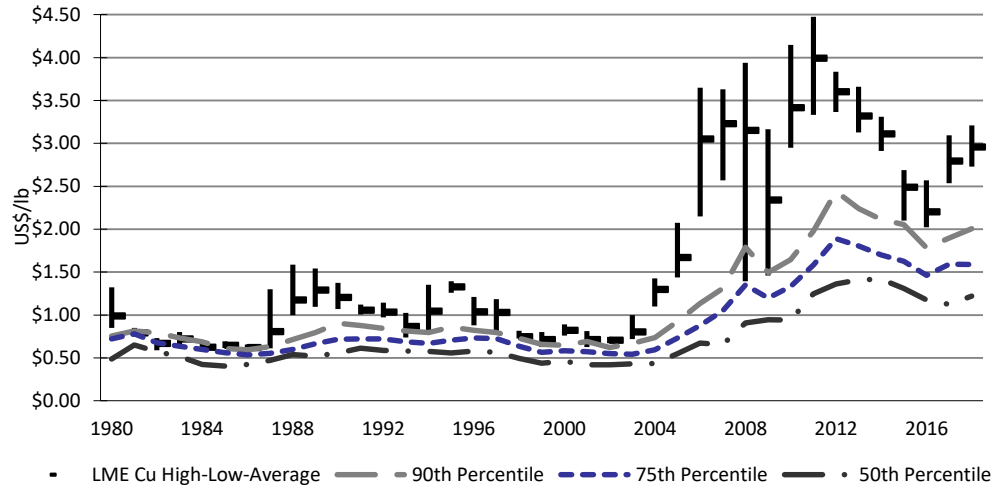


Source: Wood Mackenzie, RBC Capital Markets estimates



There have been some signs of cost inflation; however, technological advances and cost saving initiatives by the miners have kept costs relatively stable – as have low oil prices and weak currencies in key producing areas.

Exhibit 15: Copper prices have rarely fallen below cost support for any extended period



Source: Wood Mackenzie, RBC Capital Markets estimates

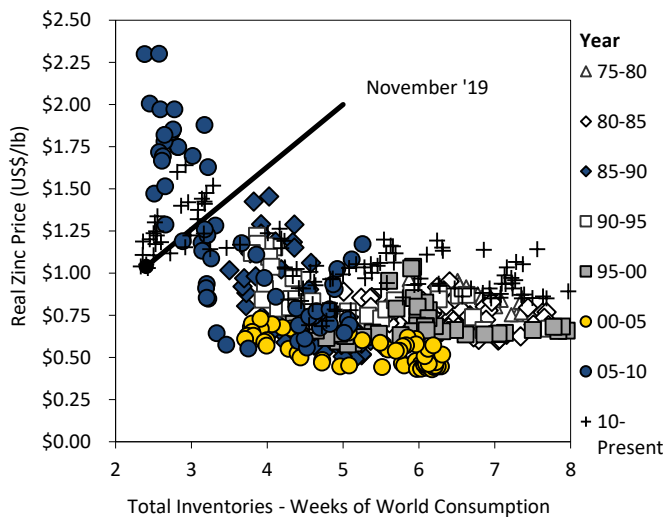
## Zinc – Smelters slowly responding but remain the bottleneck

The refined zinc market remains tight with inventories at historically low levels and smelter issues outside of China have supported the price; however, Chinese zinc production has increased and smelters are responding to higher treatment charges so we expect prices to fade towards our long term price of \$1.00/lb

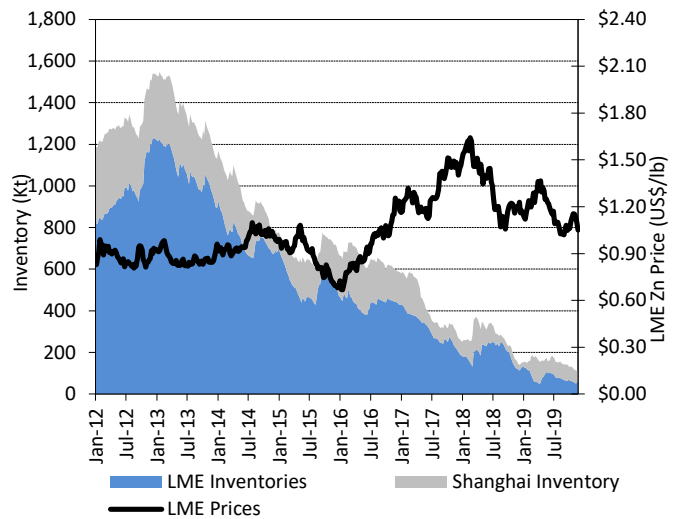
If demand remained soft in 2020, prices could fall further towards cost support, which we estimate in the \$0.80-0.90/lb range. However, we expect demand to return to positive territory in 2020 and while we anticipate a small surplus in 2020, inventory levels will only slowly return to normal levels, which we believe supports prices above \$1.00/lb.

Exhibit 16: Inventory levels remain at historically low levels although rising Chinese supply has weighed on prices

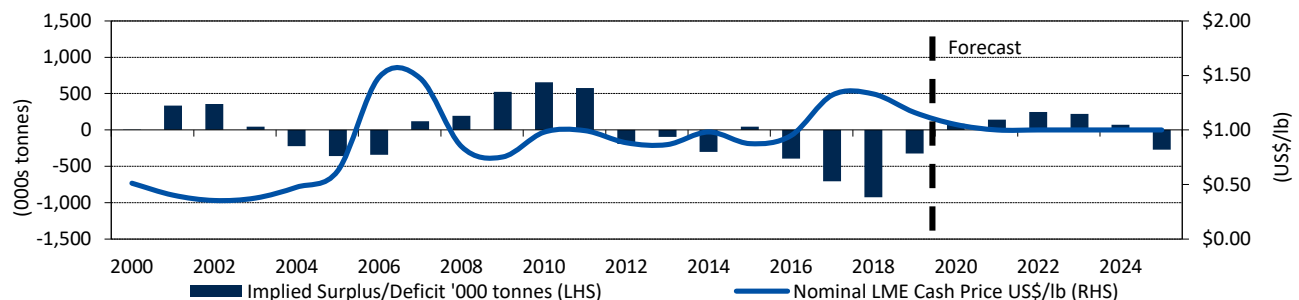
Zinc price average of \$1.38/lb when inventories <3.0 weeks of global consumption



Inventories steadily drawn down since a peak in 2013



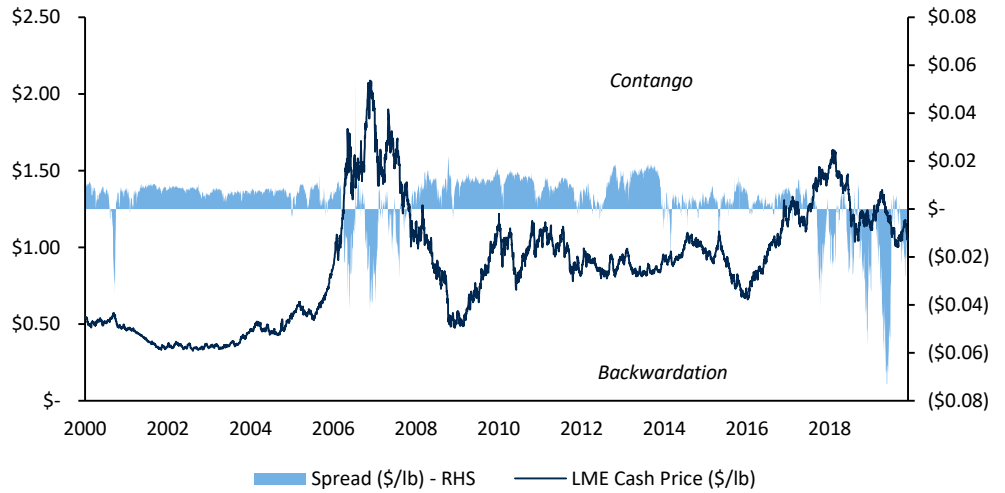
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Refined Production	13,582	13,517	13,267	13,726	14,276	14,544	14,866	15,060	15,130	15,014
YY Change	(1.0%)	(0.5%)	(1.8%)	3.5%	4.0%	1.9%	2.2%	1.3%	0.5%	(0.8%)
Total Consumption	13,974	14,223	14,191	14,049	14,189	14,402	14,618	14,837	15,060	15,286
YY Change	2.2%	1.8%	(0.2%)	(1.0%)	1.0%	1.5%	1.5%	1.5%	1.5%	1.5%
Surplus (Deficit)	(392)	(707)	(924)	(323)	86	142	248	223	70	(272)
Global Stocks	1,134	781	642	319	405	547	795	1,018	1,088	816
Weeks of Consumption	4.2	2.9	2.4	1.2	1.5	2.0	2.8	3.6	3.8	2.8
Real LME Cash Price	\$0.95	\$1.32	\$1.33	\$1.16	\$1.05	\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
Old Estimate				\$1.20	\$1.25	\$1.15	\$1.10	\$1.10	\$1.00	\$1.00
Long term price 2026 and beyond										\$1.00



Source: Wood Mackenzie, RBC Capital Markets estimates, Bloomberg, ILZSG

Backwardation has returned on the LME market after a brief period of contango suggesting the market remains tight and prices have rebounded from the lows.

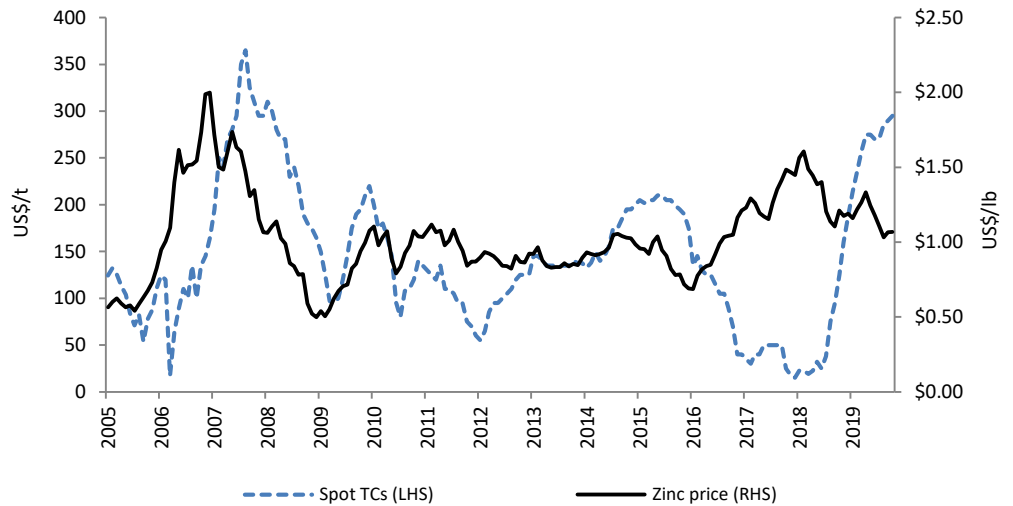
Exhibit 17: LME backwardation has returned after a brief period of contango



Source: Bloomberg

Treatment charges remain elevated at \$295/t in October, which we believe provides incentive to increase capacity utilization. This increase has been gradual as smelters adjust to stricter environmental standards in China.

Exhibit 18: Zinc TCs steadily rising this year from \$213/t to \$295/t in October

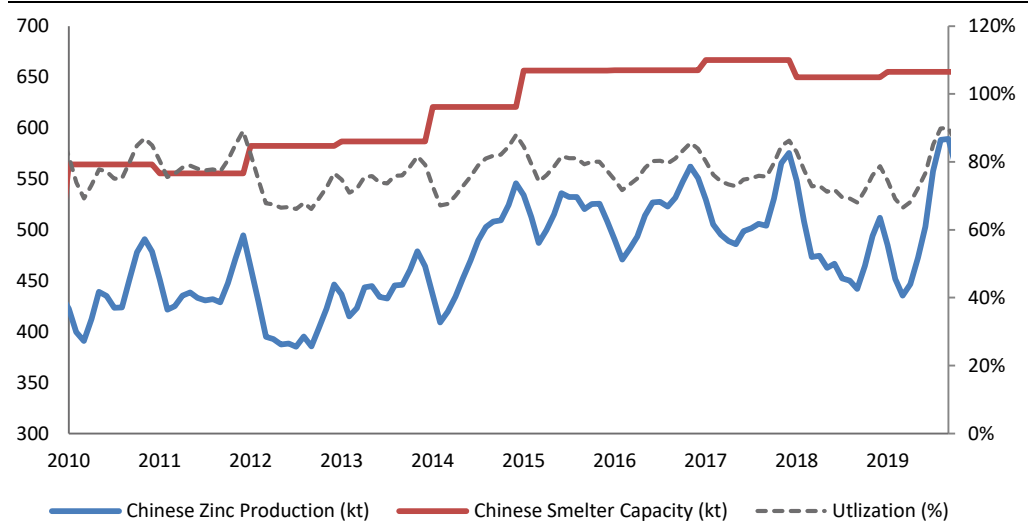


Source: Wood Mackenzie, Bloomberg



Chinese zinc production has risen in 2019 as smelters respond to higher treatment charges and we expect this to gradually balance the market and bring prices back towards our long term price of \$1.00/lb. Production issues at smelters outside of China has kept the market tight in 2019.

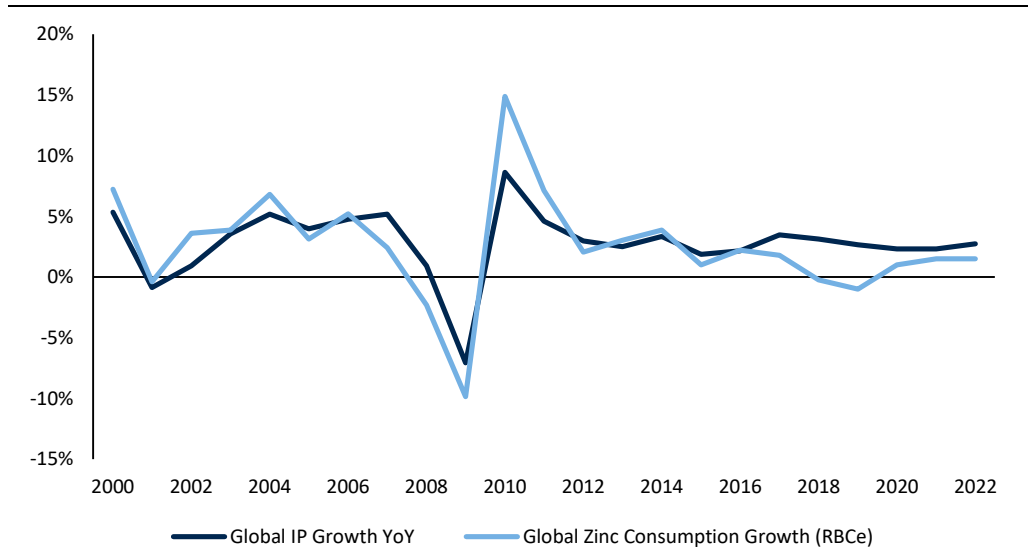
Exhibit 19: Chinese zinc production rising



Source: Bloomberg, China NBS, Wood Mackenzie

Our zinc consumption estimates are based on the close relationship with global IP growth. We believe slowing global auto sales were one reason for the recent disconnect in this relationship.

Exhibit 20: Zinc consumption closely related to global IP growth

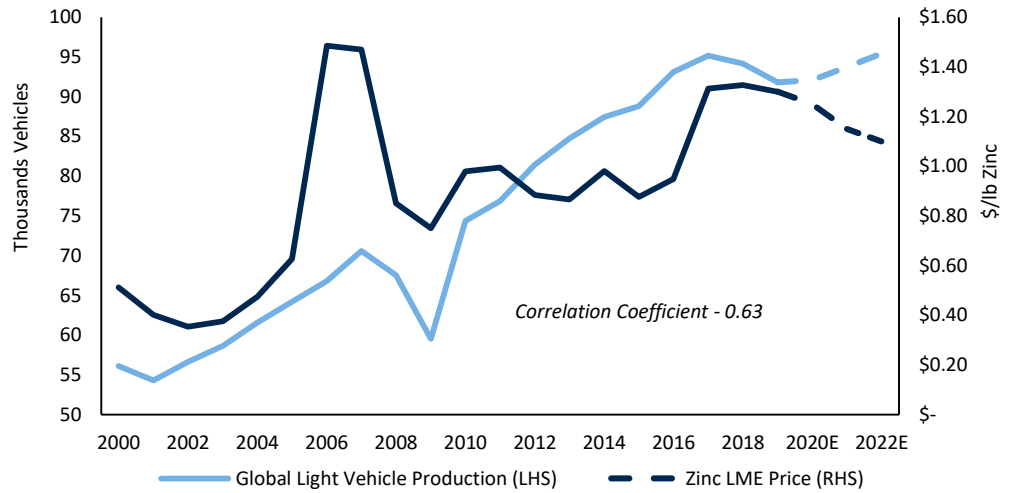


Source: Wood Mackenzie, RBC Capital Markets estimates



A decline in auto production has coincided with the fall in zinc demand and zinc prices. A return to modest growth in auto production would help support zinc prices, in our view.

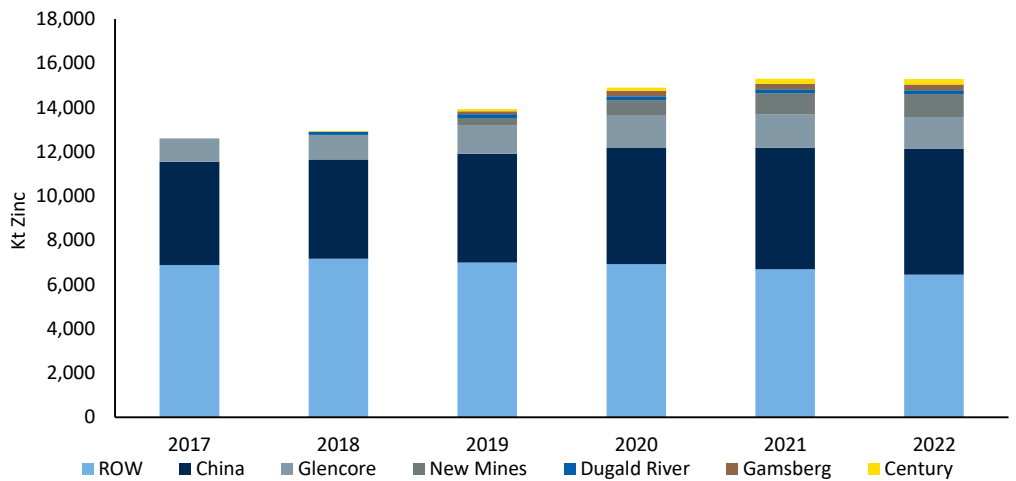
Exhibit 21: The decline in global auto production has weighed on zinc prices



Source: IHS, RBC Capital Markets estimates

New mines have ramped up and there appears to be adequate concentrate and mine supply in the near term.

Exhibit 22: Key projects contributing to increase refined zinc production

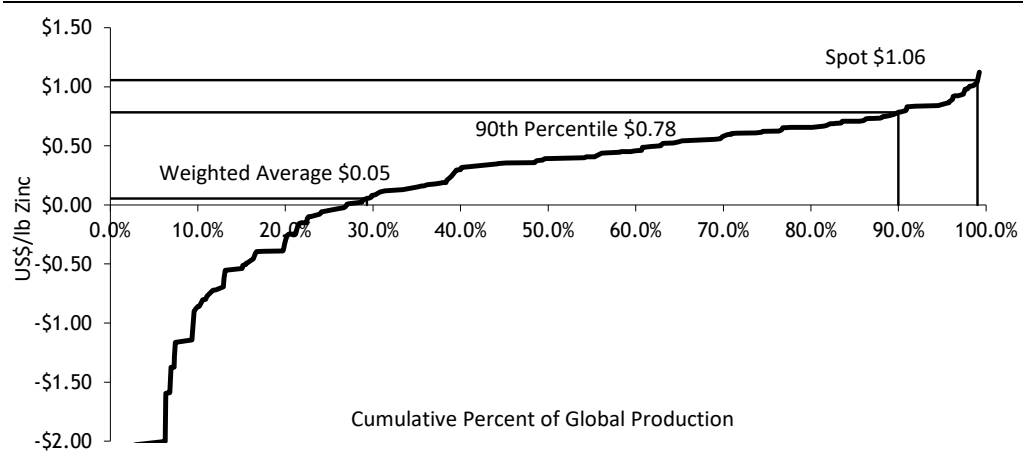


Source: Wood Mackenzie, RBC Capital Markets estimates



Spot prices remain above cash costs due to low inventory levels and a slow response from smelters.

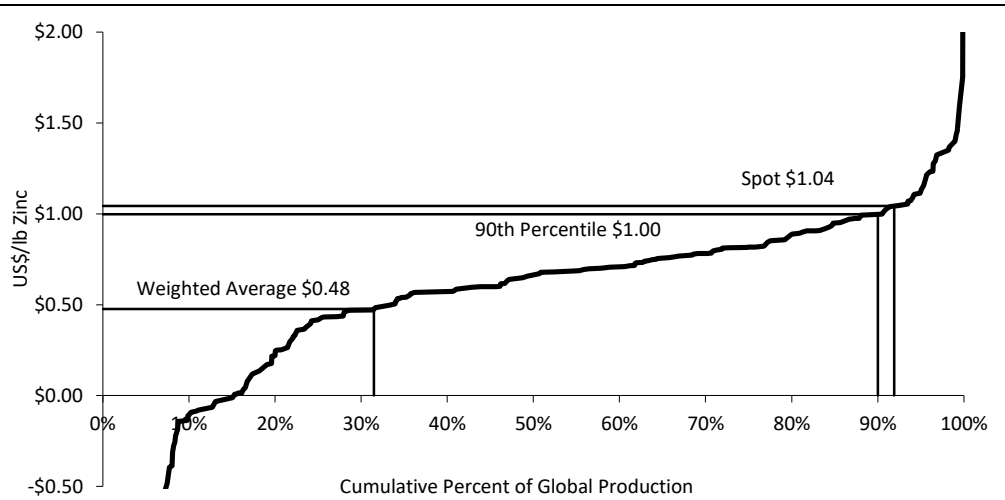
Exhibit 23: For 2020 we estimate cash costs of \$0.78/lb at the 90th percentile  
Zinc C1 cash costs for 2020



Source: Wood Mackenzie, RBC Capital Markets estimates

Our long term zinc price is based on our long term cost estimate including sustaining capex of \$1.00/lb at the 90<sup>th</sup> percentile in 2026.

Exhibit 24: Long term zinc costs including sustaining capital at \$1.00/lb in the long term  
Zinc C3 cash costs for 2026

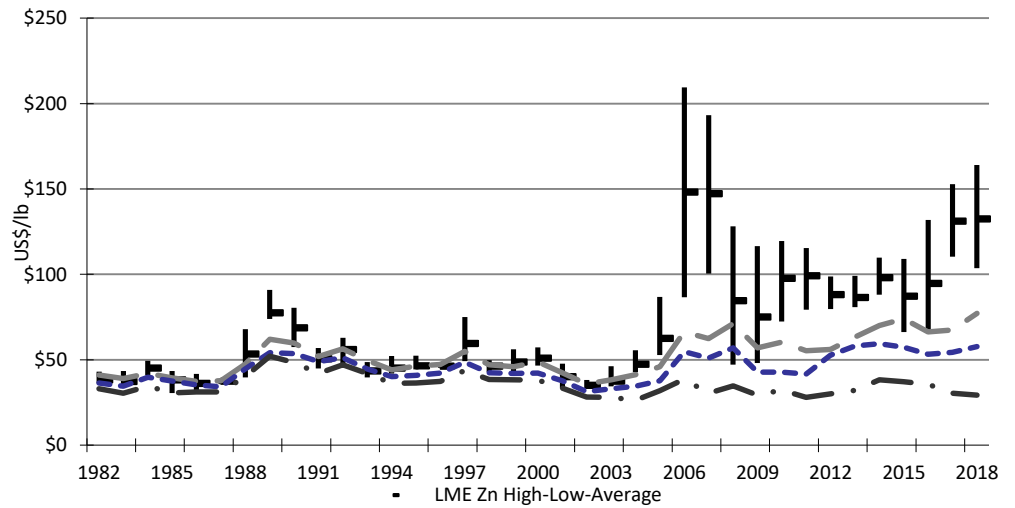


Source: Wood Mackenzie, RBC Capital Markets estimates



Since 2000, the average annual zinc price has remained above the 90<sup>th</sup> percentile of the cost curve. Prior to 2000, the average annual zinc price was below the 75<sup>th</sup> percentile 4 times.

Exhibit 25: Zinc has remained above cost support since 2000



Source: Wood Mackenzie, Bloomberg

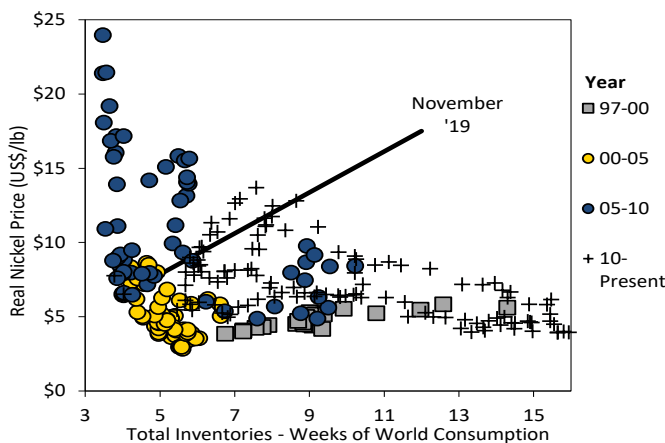
## Nickel – Prices come back to earth following the Indonesian ore ban

Prices have fallen as the spike from the Indonesian ore ban has faded and inventories have stabilized after large draw downs (reported by Bloomberg and others to be by Tsingshan to secure metal ahead of the export ban).

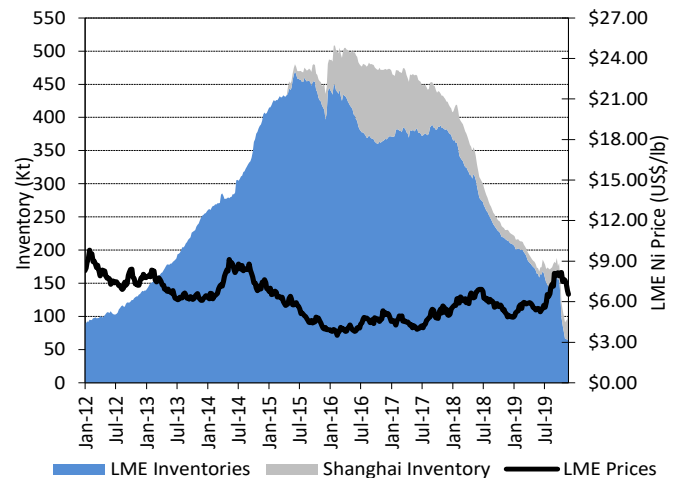
We have increased our near term zinc prices following the Indonesian ore export ban expected to take effect in January 2020. In reality, this may not have a significant impact until 2021 as inventories are drawn down. Within a few years, we expect new processing capacity in Indonesia to return the market to balance. After that the key question remains around how quickly battery demand rises and how quickly new capacity, largely through HPAL facilities in Indonesia can be built to meet that demand. We believe eventually this HPAL capacity can come online and NPI could be used for batteries, although this rising demand should be enough to support higher prices and we maintain our \$8.00/lb long term price.

Exhibit 26: After dropping significantly, nickel inventories have stabilized which has caused the price to fall

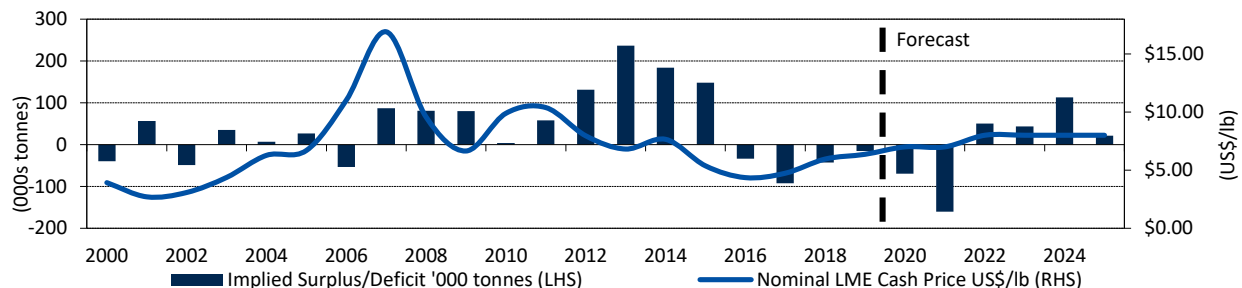
Since 2000, when nickel inventory has fallen below 4 weeks of global consumption the nickel price has averaged ~\$13/lb.



Inventories have fallen 53% so far in 2019



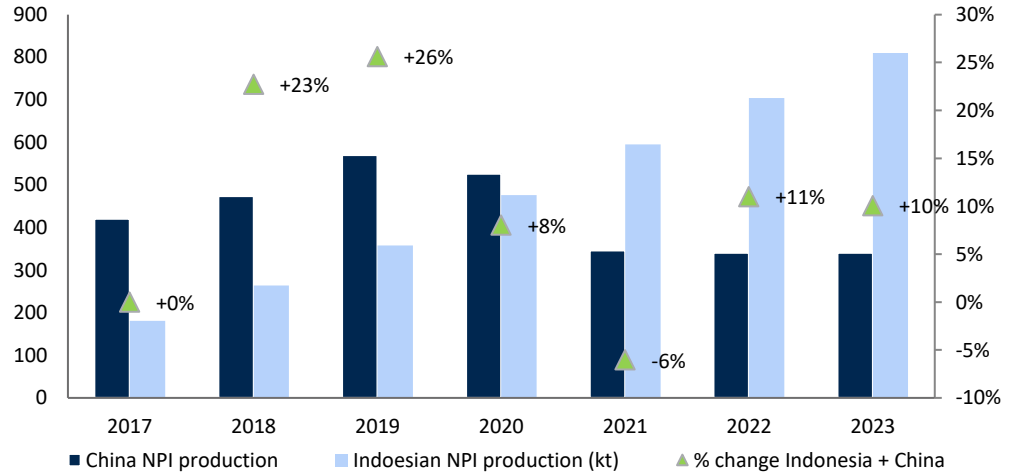
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total Refined Production	2,025	2,119	2,237	2,394	2,423	2,392	2,662	2,714	2,848	2,850
Y/Y Change	0.5%	4.6%	5.6%	7.0%	1.2%	(1.3%)	11.3%	2.0%	4.9%	0.1%
Total Consumption	2,059	2,211	2,280	2,409	2,492	2,552	2,612	2,671	2,735	2,829
Y/Y Change	10.3%	7.4%	3.1%	5.7%	3.5%	2.4%	2.3%	2.3%	2.4%	3.4%
Surplus (Deficit)	(34)	(92)	(43)	(15)	(69)	(161)	50	43	113	21
Global Stocks	554	490	447	432	362	202	252	295	407	429
Weeks of Consumption	14.0	11.5	10.2	9.3	7.6	4.1	5.0	5.7	7.7	7.9
Real LME Cash Price	\$4.35	\$4.73	\$5.95	\$6.36	\$7.00	\$7.00	\$8.00	\$8.00	\$8.00	\$8.00
Old Estimate				\$6.00	\$6.00	\$6.50	\$7.00	\$8.00	\$8.00	\$8.00
Long term price 2026 and beyond										\$8.00



Source: Wood Mackenzie, RBC Capital Markets estimates, Bloomberg, ILZSG

The Indonesian ore ban is expected to ban shipments of raw ore from Indonesia to China starting in January 2020, impacting Chinese NPI production. With the rush to increase exports before year end and available stockpiles, this may not have a significant impact in 2020; however, in 2021 we could see a decline in overall NPI production. As Indonesian NPI processing capacity is built this situation could normalize and rebalance the market in 2022 and beyond (Exhibit 27).

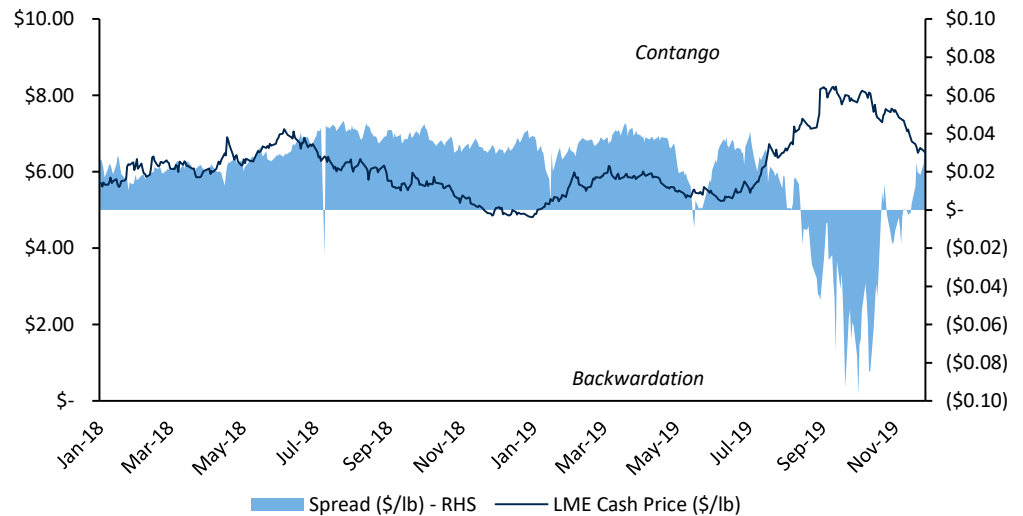
Exhibit 27: Indonesian ban could result in lower NPI production in 2021



Source: Wood Mackenzie, RBC Capital Markets estimates

Nickel has returned to contango as inventory levels have stabilized and the price has fallen, indicating the market isn't as tight as it was a few months ago following the Indonesian announcement.

Exhibit 28: Nickel swings back into contango as prices fall and inventories stabilize

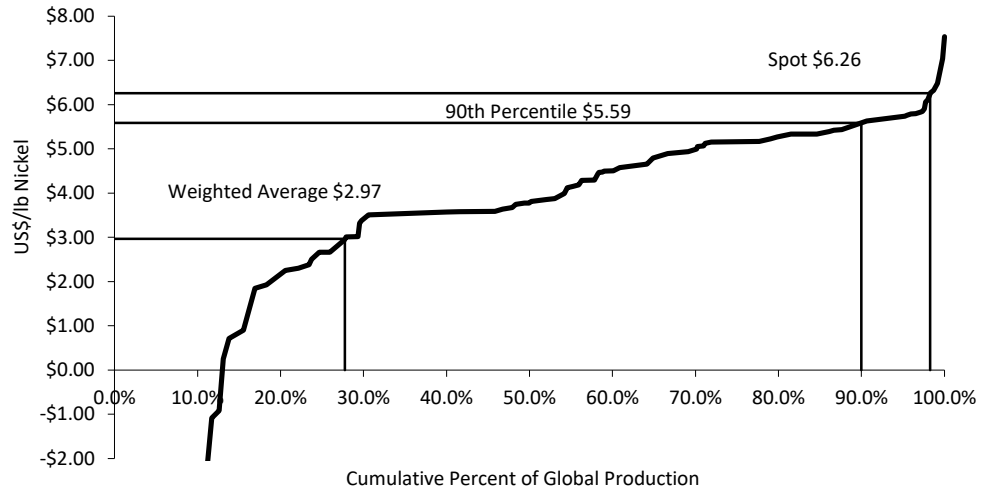


Source: Bloomberg



Spot nickel of \$6.26/lb is above cash costs at the 90<sup>th</sup> percentile of \$5.59/lb.

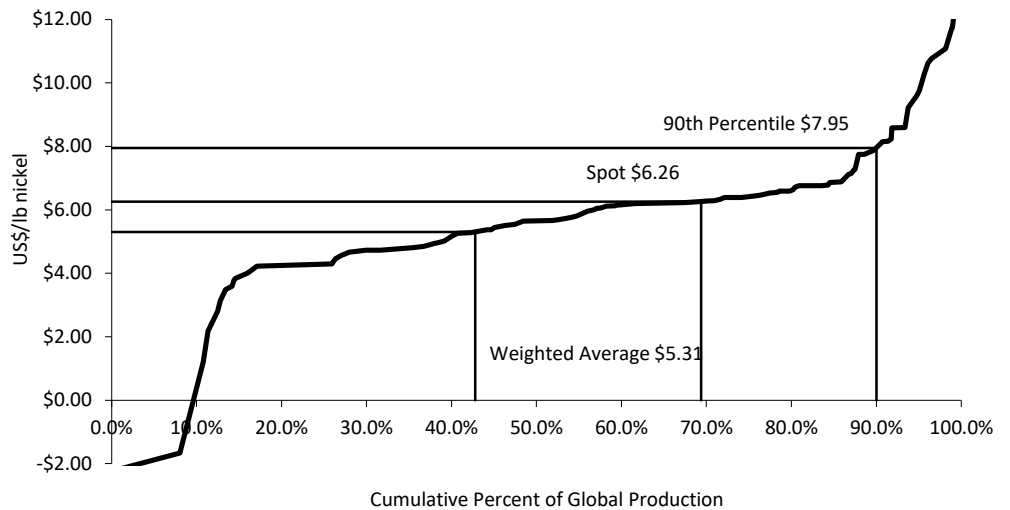
Exhibit 29: Nickel remains above cash costs at the 90<sup>th</sup> percentile of \$5.59/lb  
Nickel C1 cash costs for 2020



Source: Wood Mackenzie, Bloomberg

Our long term price assumption is based on our cash cost estimates including sustaining capex in 2026 at the 90<sup>th</sup> percentile of \$7.95/lb.

Exhibit 30: Cash costs + sustaining capex in the long term support our \$8.00/lb price  
Nickel C3 cash costs for 2026

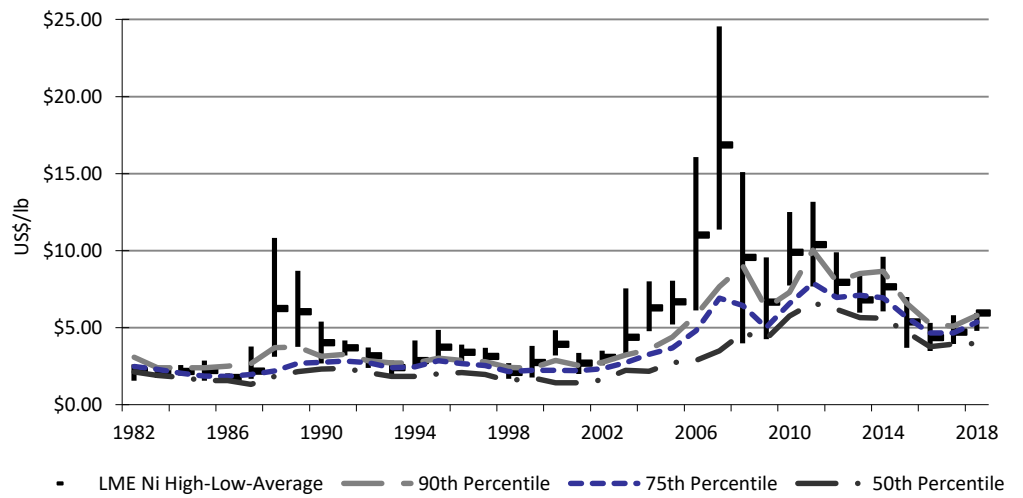


Source: Wood Mackenzie, Bloomberg



As with copper and zinc, the cost curve has historically provided support for prices; however, innovations such as NPI have resulted in dramatic changes to the cost curve over time. We believe this could continue as Indonesia works to develop HPAL capacity at lower costs than prior operations.

Exhibit 31: Historical Nickel Cost Curve



Source: Wood Mackenzie, Bloomberg

## Appendix I: Global Metals & Mining Summary Valuation & Recommendations

### Exhibit 32: Global Metals & Mining Summary Valuation & Recommendation

Symbol & Exchange	Analyst	11/26/19 Current Share Price	Current Price % of 52-week Hi/Lo Range	Rating	12-month Target Price	Dividend Yield	Total Implied Return	Performance		Market Cap (US\$MM)	Net Debt/ Total Cap.	Net Debt/ 2019 EBITDA	EBITDA Interest Coverage (trailing)	Net Asset Value	Premium (Discount) to NAV	P/E		P/CFPS		EV/EBITDA		
								QTD	YTD							2019E	2020E	2019E	2020E	2019E	2020E	
<b>COPPER</b>																						
Antofagasta	ANTO L	TB	£9.06	60%	SP	£9.00	4.3%	4%	0.7%	15.6%	\$11,538	13.7%	0.7x	28.3x	£6.98	29.8%	19.2x	14.6x	6.5x	6.2x	6.0x	5.3x
Capstone Mining	CS T	SC	C\$0.56	47%	SP**	C\$1.00	0.0%	79%	-5.1%	-8.2%	\$165	16.0%	1.8x	7.5x	C\$1.31	-57.4%	6.2x	3.0x	2.1x	1.5x	4.6x	2.9x
Central Asia Metals	CAML L	JB	£2.13	38%	OP	£2.85	4.4%	38%	1.2%	-3.2%	\$485	22.5%	1.0x	7.9x	£3.14	-32.1%	9.0x	7.3x	4.4x	4.1x	5.4x	5.0x
First Quantum	FM T	SC	C\$12.41	52%	OP	C\$18.00	0.1%	45%	11.1%	12.0%	\$6,441	35.6%	3.9x	n/a	C\$16.83	-26.2%	28.0x	7.1x	17.5x	3.0x	8.5x	4.7x
Freeport McMoRan	FCX N	SC	US\$11.71	53%	SP	US\$14.00	1.7%	21%	21.3%	12.6%	\$17,003	27.8%	3.1x	3.0x	US\$11.48	2.0%	n/a	16.3x	11.3x	5.0x	13.3x	7.5x
HudBay Minerals	HBM T	SC	C\$4.39	6%	SP	C\$6.00	0.3%	37%	-7.9%	-31.9%	\$864	18.8%	1.3x	3.6x	C\$9.09	-51.7%	n/a	46.4x	n/a	3.4x	3.5x	3.2x
Imperial Metals	III T	SC	C\$1.73	28%	SP**	C\$3.00	0.0%	73%	-18.1%	12.1%	\$155	66.9%	-64.7x	0.1x	C\$6.03	-71.3%	0.7x	12.3x	n/a	4.4x	n/a	15.1x
Ivanhoe Mines	IVN T	SC	C\$3.47	57%	OP**	C\$7.00	0.0%	102%	0.0%	45.1%	\$2,047	-32.8%	n/a	-24.6x	C\$6.99	-50.4%	n/a	n/a	n/a	n/a	n/a	n/a
KAZ Minerals	KAZ L	JB	£4.97	33%	SP	£6.00	1.9%	23%	15.6%	-5.9%	\$2,876	41.9%	1.6x	-7.5x	£9.62	-48.3%	6.0x	5.4x	2.9x	2.6x	4.0x	3.7x
Lundin Mining	LUN T	SC	C\$7.33	78%	OP	C\$9.00	3.8%	27%	17.8%	30.1%	\$4,011	19.9%	1.4x	41.7x	C\$9.13	-19.7%	22.5x	9.1x	7.3x	4.7x	7.8x	4.7x
Nevada Copper	NCU T	SC	C\$0.26	20%	OP**	C\$1.00	0.0%	292%	8.7%	-35.1%	\$154	23.9%	-17.4x	n/a	C\$1.21	-78.9%	n/a	n/a	n/a	n/a	n/a	17.0x
OZ Minerals	OZL A	PH	A\$10.41	78%	SP	A\$10.50	2.2%	3%	9.6%	19.7%	\$2,279	-6.4%	-0.4x	-704.7x	A\$9.50	9.6%	19.4x	9.1x	7.7x	5.1x	7.1x	4.2x
Sandfire Resources NL	SFR A	PH	A\$5.71	7%	SP	A\$7.00	4.0%	27%	-13.9%	-15.4%	\$617	-40.8%	-0.8x	52.7x	A\$6.52	-12.5%	8.0x	4.5x	3.5x	2.5x	2.0x	1.4x
Turquoise Hill	TRQ N	SC	US\$0.47	4%	SP	US\$1.50	0.0%	220%	-2.3%	-71.9%	\$944	10.3%	3.9x	8.4x	US\$1.97	-76.1%	3.8x	5.1x	2.3x	3.1x	3.0x	2.6x
<b>Weighted Average</b>											<b>\$3,541</b>	<b>20.3%</b>		<b>-25.2x</b>		<b>-5.3%</b>	<b>19.2x</b>	<b>13.0x</b>	<b>9.5x</b>	<b>4.7x</b>	<b>8.9x</b>	<b>5.7x</b>
<b>Weighted Average - Large Cap</b>																<b>-0.7%</b>	<b>12.3x</b>	<b>13.4x</b>	<b>9.7x</b>	<b>4.8x</b>	<b>9.2x</b>	<b>5.8x</b>
<b>NICKEL</b>																						
Independence Group	IGO A	PH	A\$5.94	77%	OP	A\$6.75	1.7%	15%	-7.8%	55.5%	\$2,378	-13.6%	-0.5x	-54.0x	A\$4.43	34.0%	18.7x	16.9x	8.0x	6.7x	6.5x	6.1x
Western Areas	WSA A	PH	A\$2.90	65%	SP	A\$2.80	0.7%	-3%	-5.5%	46.5%	\$536	-22.3%	-0.9x	27.3x	A\$2.94	-1.4%	14.2x	10.1x	5.9x	5.4x	4.9x	3.6x
<b>Weighted Average</b>											<b>\$1,457</b>	<b>-15.2%</b>		<b>-39.0x</b>		<b>27.5%</b>	<b>17.9x</b>	<b>15.6x</b>	<b>7.6x</b>	<b>6.5x</b>	<b>6.2x</b>	<b>5.6x</b>

#### Investment Ratings

TP - Top Pick  
 OP - Outperform  
 SP - Sector Perform  
 U - Underperform

#### Risk Qualifiers

\*\*Speculative Risk

Note: Large Cap - ANTO, FM, FCX, HBM, LUN, OZL.  
 Priced as of market close November 26, 2019  
 Source: Bloomberg, RBC Capital Markets estimates



Exhibit 33: Global Metals & Mining Summary Valuation & Recommendation

Symbol & Exchange	Analyst	11/26/19 Current Share Price	Current Price % of 52-week Hi/Lo Range	Rating	12-month Target Price	Dividend Yield	Total Implied Return	Performance		Market Cap (US\$MM)	Net Debt/ Total Cap.	Net Debt/ 2019 EBITDA	EBITDA Interest Coverage (trailing)	Net Asset Value	Premium (Discount) to NAV	P/E		P/CFPS		EV/EBITDA		
								QTD	YTD							2019E	2020E	2019E	2020E	2019E	2020E	
<b>ZINC</b>																						
Nexa Resources	NEXA N	SC	US\$8.11	19%	SP	US\$10.00	7.1%	30%	-13.1%	-31.3%	\$1,081	12.6%	2.0x	3.2x	C\$10.08	-19.5%	n/a	15.1x	7.2x	2.6x	5.5x	4.0x
Trevali Mining	TV T	SC	C\$0.16	1%	SP	C\$0.40	0.0%	158%	-26.1%	-59.0%	\$95	4.7%	0.4x	0.0x	C\$0.33	-52.8%	n/a	n/a	1.1x	1.7x	1.2x	2.2x
New Century Resources	NCZ A	PH	A\$0.28	7%	OP	A\$0.80	0.0%	186%	7.5%	-65.7%	\$121	83.5%	-2.0x	0.0x	A\$0.55	-49.3%	n/a	3.2x	n/a	1.8x	n/a	1.9x
<b>Weighted Average</b>											<b>\$1,297</b>	<b>18.6%</b>		<b>2.7x</b>		<b>-24.7%</b>	<b>n/a</b>	<b>13.9x</b>	<b>6.7x</b>	<b>2.4x</b>	<b>5.1x</b>	<b>3.7x</b>
<b>DIVERSIFIED</b>																						
Anglo American	AAL L	TB	£20.67	70%	TP	£26.50	4.9%	33%	9.8%	17.5%	\$33,860	6.2%	0.2x	15.8x	£28.22	-26.8%	8.2x	8.1x	4.0x	4.0x	3.8x	4.0x
BHP Group	BHP L	TB/PH	£17.34	48%	OP	£20.00	9.8%	25%	-0.3%	9.7%	\$113,230	12.2%	0.4x	14.4x	£14.59	18.8%	9.8x	10.5x	5.8x	6.3x	4.9x	5.3x
Glencore plc	GLEN L	TB	£2.50	34%	OP	£2.90	6.3%	23%	1.1%	-10.0%	\$45,926	12.1%	0.9x	10.0x	£3.63	-31.2%	19.0x	11.2x	6.3x	4.4x	5.0x	3.9x
Rio Tinto	RIO L	TB/PH	£42.57	57%	SP	£39.00	5.6%	-3%	0.7%	20.1%	\$94,504	4.9%	0.2x	32.9x	£28.05	51.8%	10.8x	12.1x	6.5x	7.8x	5.1x	6.2x
South32	S32 A	PH	A\$2.64	17%	SP	A\$2.90	5.4%	15%	1.9%	-19.8%	\$8,959	-4.6%	n/a	-18.6x	A\$2.73	-3.5%	17.3x	12.2x	6.3x	5.6x	4.4x	4.0x
Teck Resources	TECK.B T	SC	C\$21.00	11%	OP	C\$31.00	1.4%	49%	-2.3%	-28.6%	\$9,023	9.6%	0.6x	17.3x	C\$30.58	-31.3%	7.3x	7.8x	2.9x	3.3x	3.5x	3.7x
Vale	VALE N	TB	US\$12.03	35%	SP	US\$14.00	5.6%	22%	3.0%	-10.2%	\$62,525	27.0%	1.4x	5.1x	US\$16.21	-25.8%	22.4x	7.8x	9.2x	6.1x	6.4x	5.1x
<b>Weighted Average</b>											<b>\$52,575</b>	<b>11.8%</b>		<b>16.4x</b>		<b>7.5%</b>	<b>13.3x</b>	<b>10.3x</b>	<b>6.4x</b>	<b>6.1x</b>	<b>5.1x</b>	<b>5.1x</b>
<b>COAL</b>																						
Warrior Met Coal	HCC N	SC	US\$20.05	20%	SP	US\$29.00	23.0%	68%	4.1%	-2.6%	\$1,032	12.0%	0.3x	19.0x	US\$31.43	-36.2%	3.8x	8.8x	2.2x	3.8x	2.4x	3.9x
<b>Weighted Average</b>											<b>\$1,032</b>	<b>12.0%</b>		<b>19.0x</b>		<b>-36.2%</b>	<b>3.8x</b>	<b>n/a</b>	<b>2.2x</b>	<b>3.8x</b>	<b>2.4x</b>	<b>3.9x</b>
<b>IRON ORE</b>																						
Fortescue Metals	FMG A	PH	A\$9.81	99%	SP	A\$8.75	8.3%	-3%	11.3%	154.9%	\$20,556	14.3%	0.2x	24.8x	A\$7.03	39.6%	4.1x	8.1x	3.0x	5.2x	2.6x	4.5x
Labrador Iron Ore	LIF T	SC	C\$25.29	32%	SP	C\$27.00	14.0%	21%	1.9%	11.9%	\$1,219	-11.2%	n/a	n/a	C\$26.23	-3.6%	6.1x	9.8x	5.5x	10.0x	4.8x	7.6x
<b>Weighted Average</b>											<b>\$21,774</b>	<b>12.9%</b>		<b>24.8x</b>		<b>33.9%</b>	<b>4.2x</b>	<b>8.2x</b>	<b>3.1x</b>	<b>5.4x</b>	<b>2.7x</b>	<b>4.7x</b>

**Investment Ratings**

TP - Top Pick  
 OP - Outperform  
 SP - Sector Perform  
 U - Underperform

**Risk Qualifiers**

\*\*Speculative Risk

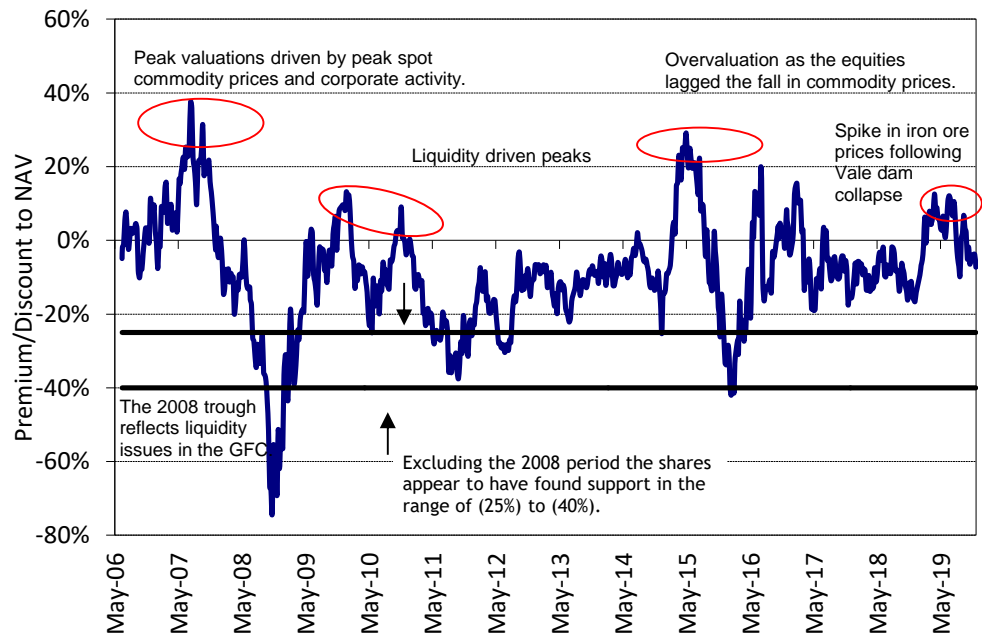
Priced as of market close November 26, 2019  
 Source: Bloomberg, RBC Capital Markets estimates



### Base metals names remain undervalued

The global industrial metal mining shares are trading at a 7.1% premium to NAV at our forecast prices and a 2.9% discount to NAV at forward curve prices. However, this is largely driven by the iron ore focused names, while base metals names remain undervalued.

Exhibit 34: Industrial Metal Mining Equities – P/NAV @ Forward Curve



Source: Bloomberg, RBC Capital Markets estimates

Exhibit 35: Industrial Metal Mining Equities – P/NAV @ RBCCM Forecast Prices

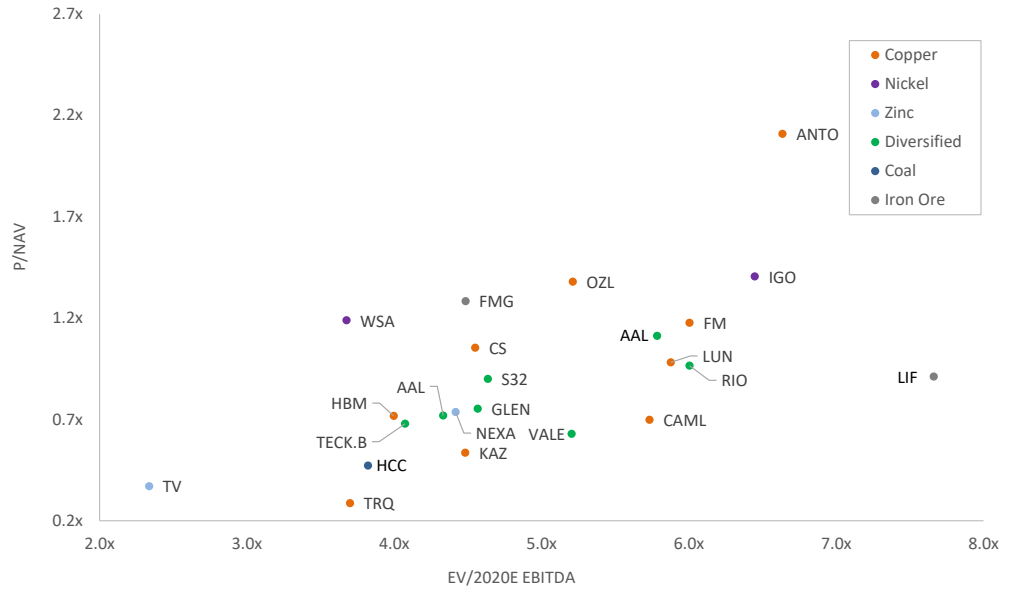


Source: Bloomberg, RBC Capital Market estimates



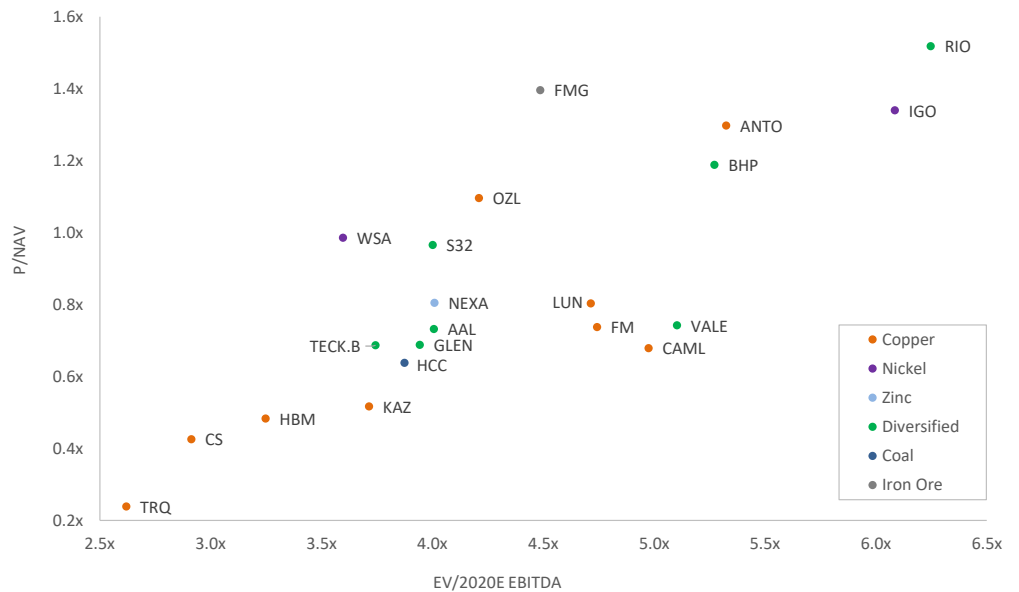
Several names remain at significant discounts to our estimates

Exhibit 36: Industrial Metals Valuations @ Forward Curve



Priced as of market close November 26, 2019  
 Source: Bloomberg, RBC Capital Market estimates

Exhibit 37: Industrial Metals Equities – P/NAV @ RBCCM Forecast Prices



Priced as of market close November 26, 2019.  
 Source: Bloomberg, RBC Capital Market estimates



## Appendix II: Details of Commodity Price Changes

### Exhibit 38: Base Metals Price Changes – USD

(US\$/lb)		Current Spot Price	Average YTD 2019	Q4/19	2019E	2020E	2021E	2022E	2023E	2019 US\$ Long Term
Aluminum	to	\$0.79	\$0.81	\$0.80	\$0.81	\$0.80	\$0.83	\$0.90	\$0.90	\$0.90
	from			\$0.80	\$0.81	\$0.80	\$0.83	\$0.90	\$0.90	\$0.90
Copper	to	\$2.64	\$2.72	\$2.65	\$2.72	\$3.00	\$2.75	\$2.75	\$2.75	\$3.00
	from			\$2.75	\$2.74	\$3.00	\$3.00	\$3.00	\$3.25	\$3.00
Lead	to	\$0.89	\$0.91	\$0.95	\$0.91	\$1.00	\$1.00	\$1.00	\$1.00	\$0.85
	from			\$0.90	\$0.90	\$1.00	\$1.00	\$1.00	\$1.00	\$0.85
Nickel	to	\$6.53	\$6.30	\$7.20	\$6.36	\$7.00	\$7.00	\$8.00	\$8.00	\$8.00
	from			\$5.75	\$6.00	\$6.00	\$6.50	\$7.00	\$8.00	\$8.00
Zinc	to	\$1.06	\$1.17	\$1.10	\$1.16	\$1.05	\$1.00	\$1.00	\$1.00	\$1.00
	from			\$1.25	\$1.20	\$1.25	\$1.15	\$1.10	\$1.10	\$1.00
Uranium	to	\$25.30	\$26.00	\$27.50	\$26.48	\$30.00	\$35.00	\$40.00	\$40.00	\$65.00
	from			\$27.50	\$26.48	\$30.00	\$35.00	\$40.00	\$40.00	\$65.00
Cobalt	to	\$17.50	\$16.48	\$15.00	\$16.34	\$17.50	\$20.00	\$22.50	\$25.00	\$25.00
	from			\$15.00	\$16.34	\$17.50	\$20.00	\$22.50	\$25.00	\$25.00
Molybdenum	to	\$9.60	\$11.54	\$10.00	\$11.40	\$9.50	\$9.50	\$9.50	\$9.50	\$8.50
	from			\$10.00	\$11.40	\$9.50	\$9.50	\$9.50	\$9.50	\$8.50

Priced as of November 26<sup>th</sup> 2019 \* Copper LT estimate is at 2025 in LT 2019\$.  
Source: LME, Bloomberg, RBC Capital Markets estimates, Platts

### Exhibit 39: Precious Metals Price Changes – USD

Precious Metals		Current Spot Price	Average YTD 2019	Q4/19	2019E	2020E	2021E	2022E	2023E	Long Term
Gold (US\$/oz)	to	\$1,469	\$1,383	\$1,500	\$1,396	\$1,500	\$1,450	\$1,450	\$1,400	\$1,400
	from			\$1,500	\$1,396	\$1,500	\$1,450	\$1,450	\$1,400	\$1,400
Silver (US\$/oz)	to	\$17.09	\$16.09	\$17.50	\$16.23	\$17.50	\$17.50	\$17.50	\$17.50	\$17.50
	from			\$17.50	\$16.23	\$17.50	\$17.50	\$17.50	\$17.50	\$17.50
Platinum (US\$/oz)	to	\$912	\$857	\$900	\$861	\$950	\$1,000	\$1,075	\$1,075	\$1,050
	from			\$850	\$849	\$900	\$950	\$1,025	\$1,025	\$1,050
Palladium (US\$/oz)	to	\$1,764	\$1,497	\$1,750	\$1,526	\$1,575	\$1,500	\$1,350	\$1,150	\$1,000
	from			\$1,550	\$1,476	\$1,500	\$1,313	\$1,000	\$1,000	\$1,000
Rhodium (US\$/oz)	to			\$2,750	\$3,163	\$2,750	\$2,563	\$2,000	\$2,000	\$2,000
	from			\$2,750	\$3,163	\$2,750	\$2,563	\$2,000	\$2,000	\$2,000

Priced as of November 26<sup>th</sup> 2019  
Source: Bloomberg, RBC Capital Markets estimates



Exhibit 40: Bulk Commodities (Calendar Year) Price Changes – USD

Bulk Commodities (US\$/tonne)		Q4/19	2019E	2020E	2021E	2022E	2023E	2019 US\$
								Long Term
Alumina - Spot	to	\$282.00	\$332.58	\$325.00	\$325.00	\$325.00	\$325.00	\$325.00
	from	\$325.00	\$343.33	\$325.00	\$325.00	\$325.00	\$325.00	\$325.00
Coal (Coking)	to	\$140.00	\$177.62	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
	from	\$140.00	\$177.71	\$150.00	\$150.00	\$150.00	\$150.00	\$150.00
Coal (LV PCI Coal)	to	\$135.00	\$127.68	\$110.00	\$110.00	\$100.00	\$100.00	\$100.00
	from	\$135.00	\$130.23	\$110.00	\$110.00	\$100.00	\$100.00	\$100.00
Coal (Semi Soft Coking)	to	\$125.00	\$108.19	\$100.00	\$100.00	\$90.00	\$90.00	\$90.00
	from	\$125.00	\$115.59	\$100.00	\$100.00	\$90.00	\$90.00	\$90.00
Coal (Steaming)	to	\$67.00	\$75.50	\$75.00	\$85.00	\$90.00	\$90.00	\$90.00
	from	\$70.00	\$76.25	\$75.00	\$85.00	\$90.00	\$90.00	\$90.00
Iron Ore Fines Spot (US\$/dmt, 62% Fe, CFR China)	to	\$95.00	\$94.97	\$77.50	\$60.00	\$60.00	\$65.00	\$65.00
	from	\$75.00	\$86.64	\$65.00	\$60.00	\$60.00	\$65.00	\$65.00
Iron Ore Atlantic Pellet Premium (US\$/dmt)	to	\$45.00	\$58.96	\$35.00	\$40.00	\$40.00	\$40.00	\$55.00
	from	\$70.00	\$68.71	\$70.00	\$70.00	\$60.00	\$60.00	\$55.00
Iron Ore Fines (US\$/dmt, 62% Fe, FOB Aus)	to	\$86.57	\$86.94	\$67.44	\$49.13	\$49.13	\$54.13	\$54.13
	from	\$66.57	\$81.97	\$55.76	\$49.13	\$49.13	\$54.13	\$54.13
Iron Ore Grade premium 65%-62%	to	\$13.00	\$12.03	\$17.50	\$15.00	\$15.00	\$15.00	\$15.00
	from	\$10.00	\$11.28	\$12.50	\$15.00	\$15.00	\$15.00	\$15.00
Iron Ore Grade discount 62%-58%	to	\$11.50	\$15.23	\$15.00	\$25.00	\$25.00	\$25.00	\$25.00
	from	\$17.50	\$16.73	\$17.50	\$25.00	\$25.00	\$25.00	\$25.00
Freight (Australia - China) Spot Avg (US\$/wmt)	to	\$7.75	\$7.38	\$9.25	\$10.00	\$10.00	\$10.00	\$10.00
	from	\$7.75	\$7.38	\$8.50	\$10.00	\$10.00	\$10.00	\$10.00
Freight (Brazil - China) Spot Avg (US\$/wmt)	to	\$20.00	\$18.34	\$18.50	\$18.50	\$18.50	\$18.00	\$16.00
	from	\$16.00	\$17.35	\$17.00	\$18.50	\$18.50	\$18.00	\$16.00

Source: Bloomberg, Platts, RBC Capital Markets estimates, Platts



Exhibit 41: TC/RC Forecasts

TC/RC's		Q4/19	2019E	2020E	2021E	2022E	2023E	2019 US\$ Long Term
<b>Copper</b>								
Benchmark TC US\$/t Concentrate	to	\$83.00	\$83.00	\$75.00	\$80.00	\$80.00	\$80.00	\$80.00
	from	\$83.00	\$83.00	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00
Benchmark RC US\$/lb	to	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080
	from	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080	\$0.080
<b>Zinc</b>								
T.C. US\$/tonne Concentrate	to	\$250.00	\$250.00	\$275.00	\$250.00	\$200.00	\$200.00	\$200.00
	from	\$250.00	\$250.00	\$250.00	\$250.00	\$200.00	\$200.00	\$200.00
Base Price US\$/tonne	to	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$1,750
	from	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$2,500	\$1,750

Source: Wood Mackenzie, RBC Capital Markets estimates

Exhibit 42: Currency Forecasts

Currency Revisions		Current	Average		2020E	2021E	2022E	2023E	Long Term
		Spot Price	YTD 2019	Q4/19					
US\$/C\$	to	\$0.750	\$0.753	\$0.769	\$0.757	\$0.760	\$0.770	\$0.780	\$0.800
	from			\$0.741	\$0.749	\$0.735	\$0.730	\$0.750	\$0.800
US\$/AUD\$	to	\$0.680	\$0.696	\$0.680	\$0.695	\$0.665	\$0.686	\$0.708	\$0.750
	from			\$0.741	\$0.749	\$0.735	\$0.730	\$0.750	\$0.800
US\$/Euro	to	\$1.107	\$1.121	\$1.080	\$1.113	\$1.100	\$1.113	\$1.125	\$1.150
	from			\$1.076	\$1.112	\$1.075	\$1.076	\$1.071	\$1.150
ZAR/US\$	to	R14.720	R14.457	R15.000	R14.520	R15.500	R15.000	R14.500	R13.500
	from			R14.750	R14.457	R14.750	R14.000	R13.500	R13.500
US\$/GBP	to	\$1.296	\$1.273	\$1.260	\$1.270	\$1.280	\$1.285	\$1.290	\$1.300
	from			\$1.250	\$1.268	\$1.250	\$1.250	\$1.297	\$1.300
BRL/US\$	to	R\$ 4.201	R\$ 3.928	R\$ 4.099	R\$ 3.940	R\$ 3.999	R\$ 3.899	R\$ 3.800	R\$ 3.600
	from			R\$ 4.000	R\$ 3.915	R\$ 4.000	R\$ 3.500	R\$ 3.500	R\$ 3.600
US\$/MXN	to	\$0.051	\$0.052	\$0.0518	\$0.0519	\$0.0522	\$0.0527	\$0.0531	\$0.0541
	from			\$0.0524	\$0.0521	\$0.0524	\$0.0524	\$0.0524	\$0.0541

Priced as of November 26<sup>th</sup> 2019

Source: Bloomberg, RBC Capital Markets estimates



## Appendix III: Estimate Revisions

Price target revisions down for copper, nickel and diversified companies under coverage and increased for nickel producers.

Exhibit 43: Rating, NAV, and Price Target Revisions

Company	Ticker	Analyst	Rating		Current Price	Target (12 month)			Implied Rt. to Target	NAV/shr		
			Prev.	New		Prev.	New	% Chg		Prev.	New	% Chg
<b>COPPER</b>												
Antofagasta	ANTO L	TB	SP	SP	£9.06	£9.40	£9.00	-4%	-1%	£7.67	£6.98	-9%
Capstone Mining	CS T	SC	SP**	SP**	C\$0.56	C\$1.25	C\$1.00	-20%	79%	C\$1.68	C\$1.31	-22%
Central Asia Metals	CAML L	JB	OP	OP	£2.13	£3.05	£2.85	-7%	34%	£2.96	£3.14	6%
First Quantum	FM T	SC	OP	OP	C\$12.41	C\$18.00	C\$18.00	0%	45%	C\$18.06	C\$16.83	-7%
Freeport McMoRan	FCX N	SC	SP	SP	\$11.71	\$14.00	\$14.00	0%	20%	\$12.15	\$11.48	-6%
HudBay Minerals	HBM T	SC	SP	SP	C\$4.39	C\$8.00	C\$6.00	-25%	37%	C\$10.44	C\$9.09	-13%
Imperial Metals	III T	SC	SP**	SP**	C\$1.73	C\$4.00	C\$3.00	-25%	73%	C\$6.60	C\$6.03	-9%
Ivanhoe Mines	IVN T	SC	OP**	OP**	C\$3.47	C\$7.00	C\$7.00	0%	102%	C\$7.07	C\$6.99	-1%
KAZ Minerals	KAZ L	JB	SP	SP	£4.97	£6.00	£6.00	0%	21%	£9.22	£9.62	4%
Lundin Mining	LUN T	SC	OP	OP	C\$7.33	C\$9.00	C\$9.00	0%	23%	C\$9.71	C\$9.13	-6%
Nevada Copper	NCU T	SC	OP**	OP**	C\$0.26	C\$1.00	C\$1.00	0%	292%	C\$1.45	C\$1.21	-17%
OZ Minerals	OZL A	PH	SP	SP	A\$10.41	A\$11.00	A\$10.50	-5%	1%	A\$10.21	A\$9.50	-7%
Sandfire Resources NL	SFR A	PH	SP	SP	A\$5.71	A\$7.50	A\$7.00	-7%	23%	A\$7.32	A\$6.52	-11%
Turquoise Hill Resources	TRQ N	SC	SP	SP	\$0.47	\$2.00	\$1.50	-25%	220%	\$2.02	\$1.97	-3%
<b>Average</b>								<b>-8%</b>	<b>69%</b>			<b>-6%</b>
<b>Average Large Cap</b>								<b>-5%</b>	<b>22%</b>			<b>-5%</b>
<b>NICKEL</b>												
Independence Group	IGO A	PH	OP	OP	A\$5.94	A\$6.00	A\$6.75	13%	14%	A\$4.30	A\$4.43	3%
Western Areas	WSA A	PH	SP	SP	A\$2.90	A\$2.50	A\$2.80	12%	-3%	A\$2.75	A\$2.94	7%
<b>Average</b>								<b>12%</b>	<b>5%</b>			<b>5%</b>
<b>ZINC</b>												
Trevali Mining	TV T	SC	SP	SP	C\$0.16	C\$0.60	C\$0.40	-33%	158%	C\$0.53	C\$0.33	-38%
Nexa Resources	NEXA N	SC	SP	SP	\$8.11	\$12.00	\$10.00	-17%	23%	\$12.20	\$10.08	-17%
New Century Resources	NCZ A	PH	OP	OP	A\$0.28	A\$1.20	A\$0.80	-33%	186%	A\$0.85	A\$0.55	-35%
<b>Average</b>								<b>-28%</b>	<b>122%</b>			<b>-30%</b>
<b>DIVERSIFIED</b>												
Anglo American	AAL L	TB	TP	TP	£20.67	£24.50	£26.50	8%	28%	£27.65	£28.22	2%
BHP Billiton plc	BHP L	TB/PH	OP	OP	£17.34	£19.00	£20.00	5%	15%	£14.68	£14.59	-1%
Glencore plc	GLEN L	TB	SP	OP	£2.50	£3.10	£2.90	-6%	16%	£3.96	£3.63	-8%
Rio Tinto plc	RIO L	TB/PH	U	SP	£42.57	£37.00	£39.00	5%	-8%	£30.84	£28.05	-9%
South32 Limited	S32 A	PH	SP	SP	A\$2.64	A\$2.90	A\$2.90	0%	10%	A\$2.82	A\$2.73	-3%
Teck Resources	TECK.B T	SC	OP	OP	C\$21.00	C\$35.00	C\$31.00	-11%	48%	C\$32.93	C\$30.58	-7%
Vale	VALE N	TB	SP	SP	\$12.03	\$12.00	\$14.00	17%	16%	\$15.08	\$16.21	7%
<b>Average</b>								<b>3%</b>	<b>18%</b>			<b>-3%</b>
<b>COAL &amp; IRON ORE</b>												
Warrior Met Coal	HCC N	SC	SP	SP	\$20.05	\$29.00	\$29.00	0%	45%	\$31.43	\$31.43	0%
Labrador Iron Ore	LIF T	SC	SP	SP	C\$25.29	C\$27.00	C\$27.00	0%	14%	C\$31.67	C\$26.23	-34%
Fortescue Metals Group	FMG A	PH	SP	SP	A\$9.81	A\$7.75	A\$8.75	13%	-11%	A\$6.22	A\$7.03	13%
<b>Average</b>								<b>6%</b>	<b>16%</b>			<b>6%</b>

\*\*Speculative Risk

Note: Priced as of market close November 26, 2019. BHP Ltd price target increases to A\$41/share (previously A\$39/share)

Legend: U – Underperform R – Restricted  
 SP – Sector Perform \*\* – Speculative Risk  
 OP – Outperform  
 TP – Top Pick

Source: Bloomberg, RBC Capital Markets estimates



Exhibit 44: EPS and EBITDA Annual Estimates

Company	Ticker		EPS Estimates (fiscal year)			EBITDA Estimates (fiscal year)		
			2019	2020	2021	2019	2020	2021
<b>COPPER</b>								
Antofagasta	ANTO L	New	\$0.61	\$0.80	\$0.56	\$2482	\$2814	\$2422
		Old	\$0.62	\$0.76	\$0.74	\$2511	\$2728	\$2825
Capstone Mining	CS T	New	\$0.07	\$0.14	\$0.11	\$97	\$153	\$132
		Old	\$0.08	\$0.14	\$0.18	\$101	\$154	\$178
Central Asia Metals	CAML L	New	\$0.31	\$0.38	\$0.35	\$109	\$119	\$111
		Old	\$0.32	\$0.43	\$0.40	\$112	\$128	\$120
First Quantum	FM T	New	\$0.33	\$1.31	\$1.09	\$1671	\$2981	\$2709
		Old	\$0.37	\$1.27	\$1.40	\$1714	\$2941	\$3085
Freeport McMoRan	FCX N	New	\$0.02	\$0.72	\$1.08	\$2462	\$4399	\$5585
		Old	\$0.04	\$0.71	\$1.47	\$2557	\$4383	\$6650
HudBay Minerals	HBM T	New	(C\$0.16)	C\$0.07	(C\$0.10)	C\$391	C\$427	C\$404
		Old	C\$0.02	C\$0.31	C\$0.29	C\$443	C\$489	C\$524
Imperial Metals	III T	New	C\$2.32	C\$0.14	C\$0.29	(C\$13)	C\$70	C\$120
		Old	(C\$0.17)	C\$0.17	C\$0.50	(C\$17)	C\$76	C\$158
Ivanhoe Mines	IVN T	New	(C\$0.03)	(C\$0.05)	(C\$0.08)	(C\$39)	(C\$39)	(C\$39)
		Old	(C\$0.03)	(C\$0.05)	(C\$0.08)	(C\$39)	(C\$39)	(C\$39)
KAZ Minerals	KAZ L	New	\$1.06	\$1.20	\$1.06	\$1247	\$1327	\$1258
		Old	\$1.08	\$1.27	\$1.43	\$1264	\$1404	\$1527
Lundin Mining	LUN T	New	\$0.25	\$0.60	\$0.59	\$709	\$1169	\$1168
		Old	\$0.25	\$0.68	\$0.73	\$718	\$1253	\$1332
Nevada Copper	NCU T	New	(\$0.03)	(\$0.05)	(\$0.06)	(\$6)	\$18	\$37
		Old	(\$0.03)	(\$0.03)	(\$0.06)	(\$10)	(\$6)	\$18
OZ Minerals	OZL A	New	A\$0.54	A\$1.14	A\$1.37	A\$446	A\$754	A\$764
		Old	A\$0.56	A\$1.17	A\$1.60	A\$457	A\$766	A\$867
Sandfire Resources NL	SFR A	New	A\$0.66 A	A\$1.02	A\$1.00	A\$294 A	A\$401	A\$386
		Old	A\$0.67 A	A\$1.06	A\$1.21	A\$296 A	A\$411	A\$439
Turquoise Hill Resources	TRQ N	New	\$0.12	\$0.09	\$0.06	\$317	\$368	\$298
		Old	\$0.12	\$0.09	\$0.07	\$325	\$366	\$379
<b>NICKEL</b>								
Independence Group	IGO A	New	A\$0.14 A	A\$0.36	A\$0.35	A\$356 A	A\$542	A\$522
		Old	A\$0.14 A	A\$0.30	A\$0.30	A\$356 A	A\$487	A\$484
Western Areas	WSA A	New	A\$0.04 A	A\$0.27	A\$0.32	A\$73 A	A\$178	A\$186
		Old	A\$0.04 A	A\$0.17	A\$0.25	A\$73 A	A\$141	A\$161

Note: EBITDA in millions of respective reporting currency  
Source: RBC Capital Markets estimates





Exhibit 45: EPS and EBITDA Annual Estimates

Company	Ticker		EPS Estimates (fiscal year)			EBITDA Estimates (fiscal year)		
			2019	2020	2021	2019	2020	2021
<b>ZINC</b>								
Trevalli Mining	TV T	New	(C\$0.02)	(C\$0.01)	(C\$0.01)	C\$118	C\$61	C\$61
		Old	(C\$0.01)	C\$0.05	C\$0.03	C\$103	C\$134	C\$109
Nexa Resources	NEXA N	New	(\$0.75)	\$0.54	\$1.28	\$312	\$428	\$532
		Old	(\$0.40)	\$1.26	\$2.16	\$379	\$565	\$698
New Century Resources	NCZ A	New	(\$0.04)A	(\$0.01)	\$0.14	(\$12)A	(\$6)	\$157
		Old	(\$0.04)A	(\$0.01)	\$0.26	(\$12)A	(\$6)	\$265
<b>DIVERSIFIED</b>								
Anglo American	AAL L	New	\$3.27	\$3.30	\$2.83	\$11094	\$10607	\$9466
		Old	\$3.13	\$2.67	\$2.68	\$10738	\$9180	\$9265
BHP Billiton plc	BLT L	New	\$1.74	\$2.47	\$1.68	\$23158	\$26842	\$20429
		Old	\$1.74	\$2.08	\$1.62	\$23158	\$23916	\$20235
Glencore plc	GLEN L	New	\$0.17	\$0.29	\$0.28	\$11285	\$14206	\$14388
		Old	\$0.18	\$0.29	\$0.36	\$11464	\$14267	\$15821
Rio Tinto plc	RIO L	New	\$5.07	\$4.53	\$2.58	\$20444	\$16613	\$11574
		Old	\$4.80	\$3.51	\$3.13	\$19812	\$14226	\$12982
South32 Limited	S32 A	New	\$0.20 A	\$0.10	\$0.15	\$2193 A	\$1054	\$1468
		Old	\$0.20 A	\$0.10	\$0.14	\$2197 A	\$1056	\$1448
Teck Resources	TECK.B T	New	C\$2.86	C\$2.68	C\$2.38	C\$4456	C\$4153	C\$3981
		Old	C\$3.03	C\$3.28	C\$3.20	C\$4613	C\$4687	C\$4724
Vale	VALE N	New	\$0.54	\$1.53	\$1.01	\$12741	\$16070	\$12317
		Old	\$0.96	\$0.96	\$0.80	\$11183	\$11708	\$11197
<b>COAL &amp; IRON ORE</b>								
Warrior Met Coal	HCC N	New	\$5.31	\$2.28	\$2.12	\$476	\$300	\$301
		Old	\$5.31	\$2.28	\$2.12	\$476	\$300	\$301
Labrador Iron Ore	LIF T	New	C\$4.12	C\$2.57	C\$1.93	C\$321	C\$205	C\$159
		Old	C\$4.37	C\$2.09	C\$2.71	C\$338	C\$170	C\$216
Fortescue Metals Group	FMG A	New	\$1.04 A	\$1.36	\$0.39	\$6047 A	\$7445	\$3169

Note: EBITDA in millions of respective reporting currency  
Source: RBC Capital Markets estimates

Exhibit 46: Industrial metals multiple change rationale

Company	Ticker	Analyst	Rating	Current Price	Price Target	Implied Return	NAV Multiple		EV/EBITDA Multiple		Price Target Multiple Change Rationale
							Prev.	New	Prev.	New	
<b>COPPER</b>											
Antofagasta	ANTO L	TB	SP	£9.06	£9.00	(0.7%)	1.10x	1.10x	6.0x	6.0x	Unchanged
Capstone Mining	CS T	SC	SP**	C\$0.56	C\$1.00	78.6%	0.85x	0.80x	5.0x	4.0x	Lowered multiples to reflect historical range for smaller producers
Central Asia Metals	CAML L	JB	OP	£2.13	£2.85	33.8%	1.04x	1.04x	6.0x	5.5x	We adjust our EV/EBITDA target multiple from 6.0x to 5.5x to align it with the multiples at which global base metal
First Quantum	FM T	SC	OP	C\$12.41	C\$18.00	45.0%	0.80x	1.00x	6.0x	6.0x	Adjusted NAV multiple as Cobre Panama comes into production
Freeport McMoRan	FCX N	SC	SP	\$11.71	\$14.00	19.6%	1.00x	1.00x	5.0x	6.0x	Adjusted EV/EBITDA multiple to reflect premium for FCX shares as Graberg transition rolls off in the next 12-
HudBay Minerals	HBM T	SC	SP	C\$4.39	C\$6.00	36.7%	0.80x	0.80x	4.0x	4.0x	Unchanged
Imperial Metals	III T	SC	SP**	C\$1.73	C\$3.00	73.4%	0.85x	0.85x	5.0x	5.0x	Unchanged
Ivanhoe Mines	IVN T	SC	OP**	C\$3.47	C\$7.00	101.7%	1.00x	1.00x	n/a	n/a	Unchanged
KAZ Minerals	KAZ L	JB	SP	£4.97	£6.00	20.7%	0.84x	0.84x	4.0x	4.0x	Unchanged
Lundin Mining	LUN T	SC	OP	C\$7.33	C\$9.00	22.8%	1.00x	1.00x	4.0x	4.0x	Unchanged
Nevada Copper	NCU T	SC	OP**	C\$0.26	C\$1.00	292.2%	0.80x	0.80x	n/a	n/a	Unchanged
OZ Minerals	OZL A	PH	SP	A\$10.41	A\$10.50	0.9%	1.00x	1.00x	n/a	n/a	Unchanged. Note - 50/50 weighting of 1.0x NAV and 10x debt adjusted cash flow
Sandfire Resources NL	SFR A	PH	SP	A\$5.71	A\$7.00	22.6%	1.00x	1.00x	n/a	n/a	Unchanged. Note - 50/50 weighting of 1.0x NAV and 4x debt adjusted cash flow
Turquoise Hill Resources	TRQ N	SC	SP	\$0.47	\$1.50	219.8%	0.85x	0.85x	n/a	n/a	Unchanged
<b>Average</b>							<b>0.92x</b>	<b>0.93x</b>	<b>5.0x</b>	<b>4.9x</b>	
<b>NICKEL</b>											
Independence Group	IGO A	PH	OP	A\$5.94	A\$6.75	13.6%	1.00x	1.00x	n/a	n/a	Unchanged. Note - 50/50 weighting of 1.0x NAV and 10x debt adjusted cash flow
Western Areas	WSA A	PH	SP	A\$2.90	A\$2.80	(3.4%)	1.00x	1.00x	n/a	n/a	Unchanged. Note - 50/50 weighting of 1.0x NAV and 5x debt adjusted cash flow
<b>Average</b>							<b>1.00x</b>	<b>1.00x</b>	<b>n/a</b>	<b>n/a</b>	
<b>ZINC</b>											
Trevali Mining	TV T	SC	SP	C\$0.16	C\$0.40	158.1%	1.00x	1.00x	3.0x	3.0x	Unchanged
Nexa Resources	NEXA N	SC	SP	\$8.11	\$10.00	23.3%	1.00x	1.00x	4.0x	4.0x	Unchanged
New Century Resources	NCZ A	PH	OP	A\$0.28	A\$0.80	185.7%	1.00x	1.00x	n/a	n/a	Unchanged. Note - 50/50 weighting of 1.0x NAV and 5x debt adjusted cash flow
<b>Average</b>							<b>1.00x</b>	<b>1.00x</b>	<b>3.0x</b>	<b>3.0x</b>	
<b>DIVERSIFIEDS</b>											
Anglo American	AAL L	TB	TP	£20.67	£26.50	28.2%	0.90x	0.90x	5.5x	5.5x	Unchanged
BHP Billiton plc	BHP L	TB/PH	OP	£17.34	£20.00	15.3%	1.10x	1.10x	6.5x	6.5x	Unchanged
Glencore plc	GLEN L	TB	OP	£2.50	£2.90	16.2%	0.80x	0.80x	4.5x	4.5x	Unchanged
Rio Tinto plc	RIO L	TB/PH	SP	£42.57	£39.00	(8.4%)	1.10x	1.10x	6.5x	7.0x	We adjust our EV/EBITDA target multiple from 6.5x to 7.0x as we believe that RIO's superior ESG strategy justifies
South32 Limited	S32 A	PH	SP	A\$2.64	A\$2.90	9.8%	1.00x	1.00x	5.5x	5.5x	Unchanged
Teck Resources	TECK.B T	SC	OP	C\$21.00	C\$31.00	47.6%	1.00x	1.00x	5.0x	5.0x	Unchanged
Vale	VALE N	TB	SP	\$12.03	\$14.00	16.4%	0.80x	0.80x	5.0x	5.0x	Unchanged
<b>Average</b>							<b>0.96x</b>	<b>0.96x</b>	<b>5.5x</b>	<b>5.6x</b>	
<b>COAL &amp; IRON ORE</b>											
Warrior Met Coal	HCC N	SC	SP	\$20.05	\$29.00	44.6%	1.00x	1.00x	5.0x	5.0x	Unchanged
Fortescue Metals Group	FMG A	PH	SP	A\$9.81	A\$8.75	(10.8%)	1.00x	1.00x	4.5x	4.5x	Unchanged
<b>Average</b>							<b>1.00x</b>	<b>1.00x</b>	<b>4.8x</b>	<b>4.8x</b>	

Note: Priced as of market close November 26, 2019.  
Source: RBC Capital Markets estimates, Bloomberg



## Appendix IV: Valuation

### Anglo American plc

Our base case price target of 2,650p is based on a blend of 0.9x NAV (2020E) and 5.5x 2019E-2020E EV/EBITDA. Our EV/EBITDA and P/NAV multiples are at a slight discount vs peers, which reflect a stable operating base of assets but in a higher geopolitical risk environment. Our valuation methodology is in line with global diversified peers and our price target supports our Top Pick rating.

### Antofagasta plc

We value Antofagasta on both (50:50) a longer-term NAV basis (1.1x) as well as a shorter-term EV/EBITDA valuation (6.0x). Our multiples are at a slight premium compared to global peers and reflect ANTO's defensive balance sheet, established production footprint and lower risk copper exposure. Our valuation methodology is in line with global peers and our price target of 900p/share supports our Sector Perform rating.

### BHP Group plc

We value BHP on a blend of 50% on 1.1x NAV and 50% on 6.5x 2-year average forward EV/EBITDA, deriving our 12-month price target of 2,000p/share, which supports our Outperform rating. This is broadly in line with our methodology for global peers.

### Capstone Mining Corp.

We value Capstone by applying a 50% weight to 0.8x our NAV and 50% weight to 4.0x our 2020E EV/EBITDA. The 0.8x NAV and 4.0x EV/EBITDA multiples are based on historical trading averages and in line with the industry peer group. The \$1.00 target price supports our Sector Perform, Speculative Risk rating. We assign a Speculative Risk qualifier due to the higher cost nature of Pinto Valley which exposes Capstone to negative moves in the copper price.

### First Quantum Minerals Ltd.

We value First Quantum using a 50/50 weighting of 1.0x our NAV and a 6.0x multiple of our average EBITDA over the 2020–21 period. The NAVPS multiple is below peers at 1.0x due to higher execution and geopolitical risk while EBITDA is higher than peers at 5.0x, reflecting higher growth potential. Our C\$18 price target and implied relative return support our Outperform rating.

### Fortescue Metals Group Ltd.

We value FMG using an equal blend of near-term earnings/cash flow (4.5x EV/EBITDA) and longer-term NAV (1.0x). This is generally in line with other large-cap Australian producers, with a small discount to account for its pure-play status and lower-grade products. We believe this methodology provides an appropriate method to assist in navigating the increased volatility that we are seeing in both commodity and resource-related equity share prices. Our A\$8.75 price target supports a Sector Perform rating.

### HudBay Minerals Inc.

We value HudBay using a combination of our NAV and a multiple of forecast earnings. We apply a 50% weight to 0.8x our NAV and a 50% weight to 4.0x our EV/EBITDA multiple, which is in line with peers. The relative return to our C\$6 price target supports our Sector Perform rating.

### Imperial Metals Corporation

We value III by applying a 50% weight to 0.85x our operating NAV and 50% weight to 5.0x our EV/EBITDA. These multiples and discount rates are in line with peers and give value for



the long-term value and near-term earnings potential. Our C\$3 price target supports our Sector Perform rating. We assign a Speculative risk qualifier to Imperial Metals due to risk around the company's projects.

#### **Independence Group NL**

Our 12-month price target of A\$6.75 is based on a blend (50/50) of debt-adjusted cash flow and NAV, applying multiples of 10.0x and 1.0x, respectively, in line with the peer group. Our price target supports our Outperform rating.

#### **Nexa Resources SA**

Our \$10 target price is based on the average of 1.0x NAVPS and 4.0x 2020E EBITDA and these multiples are in line with peers' historical average. Our 2020E EBITDA estimate is based on a \$1.05/lb zinc price and our NAVPS uses an 8% discount rate and \$1.00/lb long term zinc price. Our price target supports our Sector Perform rating.

#### **OZL Minerals Ltd.**

Our 12-month price target for OZL is A\$10.50, which is derived from a weighted blend of debt-adjusted cash flow (50%) and NAV (50%) with applied multiples of 10.0x and 1.0x, respectively. Our price target supports our Sector Perform rating.

#### **Sandfire Resources NL**

Our 12-month price target of A\$7.00 is based on a 50:50 split of debt-adjusted cash flows (on a 4x multiple) and NAV (1.0x), which we believe appropriately reflects the company's remaining mine life (3-4 years), without ascribing material additional value to speculative exploration potential. Our price target supports our Sector Perform rating.

#### **Teck Resources Limited**

We value Teck by applying a 50% weight to 1.0x our NAV and 50% weight to 5.0x our 2020E average EBITDA. The 1.0x NAV and 5.0x EV/EBITDA multiples are based on historical trading averages and in line with peers. Our C\$31.00 price target supports our Outperform rating.

#### **Trevali Mining Corporation**

Our target price of C\$0.40 supports our Sector Perform rating and is based on 1.0x NAVPS and 3.0x 2019E EBITDA. The P/NAV multiple is inline with peers while 3.0x is a discount to peers at 4.0x due to some execution challenges and uncertainty around the management of the company.

#### **Turquoise Hill Resources Ltd.**

We value TRQ based on NAV. We apply a 0.85x multiple to our NAV given the longer dated nature of TRQ's production growth and the current stage in the commodity cycle at our long-term copper price of \$3.00/lb and gold price of \$1,450/oz. This yields a target of \$1.50, which supports our Sector Perform recommendation.

#### **Vale SA**

We value Vale using a 50%-50% combination of our risked NAV estimate and risked EV/EBITDA target multiples. To account for Brazil and iron ore concentration risk, we use discounted target multiples vs. global peers of 0.80x P/NAV and 5.0x EV/EBITDA. Our \$14.00 price target and implied relative return support our Sector Perform rating.

#### **Western Areas Ltd.**

We derive our A\$2.80 price target from a blend (50/50) of cash flow and NAV with applied multiples of 5.0x and 1.0x, respectively, in line with the peer group. Our price target supports our Sector Perform rating.



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