Global Metals Weekly

Peak capex and peak China

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Commodities
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Mining capex remains below previous highs

While the focus on ESG has taken a backseat, decarbonising economies through spending on green technologies remains a focus. Indeed, we expect elevated metals demand growth, as the global economy keeps marching towards Net Zero. Miners need to spend a minimum of $127BN, but potentially up to $181BN to prevent raw material constraints. Yet capex was $104BN last year, including both sustaining and development. In short, miners are still not sinking enough money into the ground. Iron ore has lost share in capex, while copper has gained, but the red metal remains under-invested.

Headline growth not a good guide for metals demand

China's Two Sessions congress has just concluded with the government setting a 2024 growth target of "around 5%", while putting a bigger focus on policy coordination to avoid an outright pro-cyclical policy. A healthy economy is important, but the emphasis on headline growth is not a good guide for metals demand, as the government continues to support strategic industries, including renewables and EVs. Ongoing support here means metals consumption will likely also expand this year.

China capacity utilisation rates sit 5ppt below vs US

Micro matters more than macro these days. Indeed, a narrower growth focus is also driven by an overhang from previous stimulus cycles. China's industry capacity utilisation rate is running around 5ppt below that of the US. This is remarkable when keeping in mind that China's economic growth has been almost twice as high as the US's of late. One implication: China has a real problem reflating its economy.

Possible stranded capacity for China as West pushes back

Overcapacity has popped up in different sectors: for instance, for solar PV manufacturing capacity almost twice as high as annual domestic installations. The West is increasingly pushing back on that, reflected in Europe's EV anti-dumping investigation. Meanwhile, the Biden administration is looking at increasing a 27.5% import tariff on China's EVs, and is also discussing national security concerns on these vehicles. Ultimately, this raises the risk that China may end up with "stranded" capacity.

Metals demand may return if West rebuilds supply chains

What does "stranded" capacity mean for metals demand? US copper consumption peaked in 2000, i.e., the year before China entered the WTO, as demand was exported to the PRC during globalisation. If Western countries rebuild their domestic supply chains, some of that demand may come back. As a result, Chinese demand may be weaker, but offtake ex-China stronger – a zero-sum game in the end, but a volatile path for metals as supply chains shift.

Miners are underinvesting

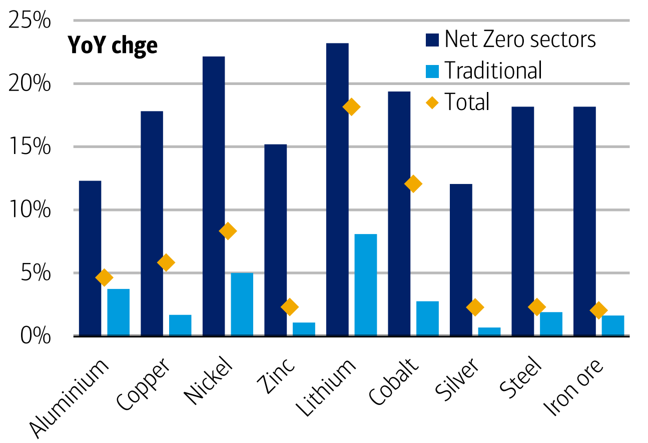
Capex has increased but remains below previous highs

Miners have increased capex

While the focus on ESG has taken a backseat, decarbonising economies through spending on green technologies remains a focus. Exhibit 1 shows that metals demand is set to expand until the end of the decade as the global economy keeps marching towards Net Zero. Given the constructive outlook, it is perhaps not surprising that miners have boosted capex (Exhibit 2), as our colleagues in equity research note. While encouraging, investment still runs well below the highs seen in the previous decade.

Exhibit 1: Average metals demand growth until 2030 under a Net Zero 2050 scenario

Decarbonisation is a key driver of metals demand



Source: IEA, BofA Global Research

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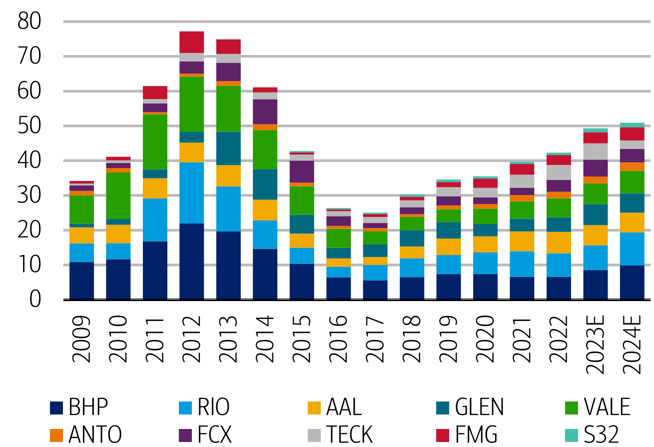
Exhibit 2: Big miners capex, US$ BN

Capex has risen, but remains below previous peaks



Source: company reports, BofA Global Research

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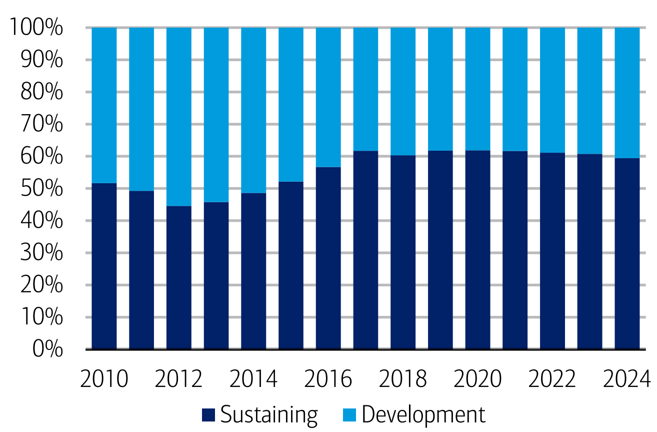
Industry capex should be between $127BN and $181BN annually

Miners need to spend on development and sustaining capex

Taking a closer look into capex dynamics, Exhibit 3 shows that the miners need to spend on developing new projects. At the same time, sustaining capex at existing sites is also important and has accounted for 60% of total spend.

Exhibit 3: Metals and mining industry capex

Sustaining capex makes up more than half of total investment spend



Source: S&P

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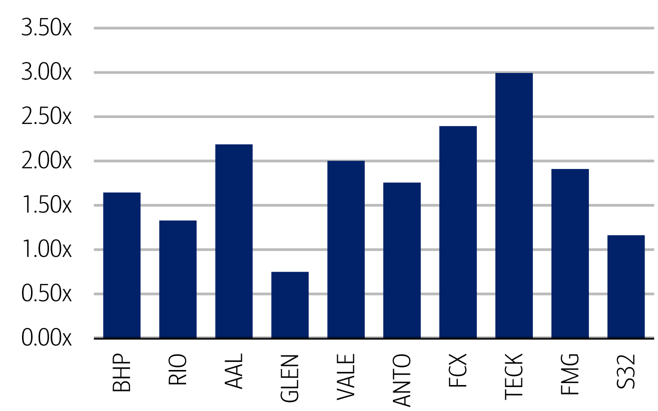
Exhibit 4: Big miners capex/ depreciation ratio

Sustaining capex affects cash flows; depreciation is about accounting, but it still is an important metric



Source: company reports, BofA Global Research

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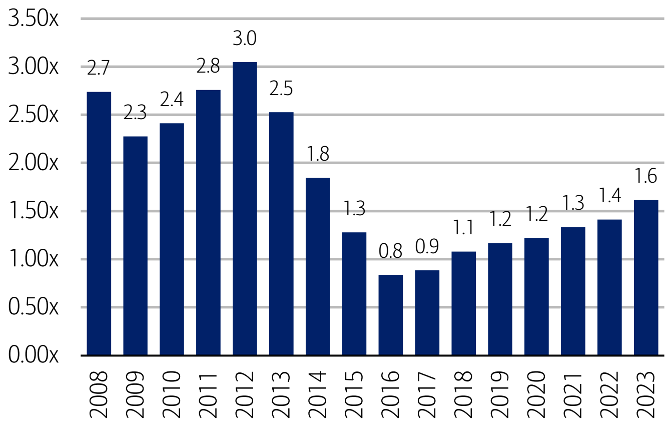
Exhibit 7 looks at this from a different angle, showing different capex/depreciation ratios for the miners. The data highlights that depreciation accounted for around 66% of capex in 2023 (Exhibit 5).

Exhibit 5: Big miners, average capex/depreciation ratio
The capex/depreciation ratio Is creeping up again



Source: company reports, BofA Global Research

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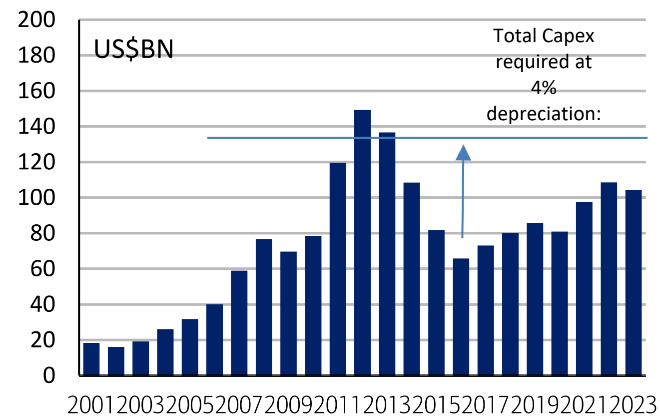
Exhibit 6: Actual capex and capex requirement to achieve Net Zero
Miners are underspending



Source: S&P, IEA, BofA Global Research

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Pulling all of this together, estimating expansion capex is relatively straightforward because we know:1) how strong demand growth will likely be as the world looks to achieve Net Zero by 2050, and 2) how high capex intensities are, i.e., the investment requirement per tonne of metal production capacity.

In Exhibit 6, we assume an average mine life of 25 years, equivalent to a 4% annual depreciation rate. Under this scenario, miners would need to spend around $127BN on capex annually. Meanwhile, using an average capex/depreciation ratio of 1.2, total capex would amount to $181BN (Exhibit 7). Either way. with industry capex running at just $104BN in 2023, miners are not sinking enough money into the ground.

Exhibit 7: Metals and mining capex
Miners would need to spend up to $181BN in capex on the march to Net Zero

	Capex Intensity	Production required	Expansion Capex	Deprecation	Total	Per year 2024-2030
Aluminium	6,000	23,265	139.59	107.38	247.0	41.2
Copper	20,000	11,451	229.02	176.17	405.2	67.5
Nickel	50,000	2,137	106.84	82.18	189.0	31.5
Zinc	3,900	2,078	8.10	6.23	14.3	2.4
Lithium	31,000	1,692,081	52.45	40.35	92.8	15.5
Cobalt	4,000	220,917	0.88	0.68	1.6	0.3
Platinum	1,200	2,933,926	3.52	2.71	6.2	1.0
Silver	25	5,264	4.23	3.25	7.5	1.2
Iron ore	200	349	69.87	53.75	123.6	20.6
Total			614.51	472.70	1,087.2	181.2

Source: S&P, IEA, BofA Global Research

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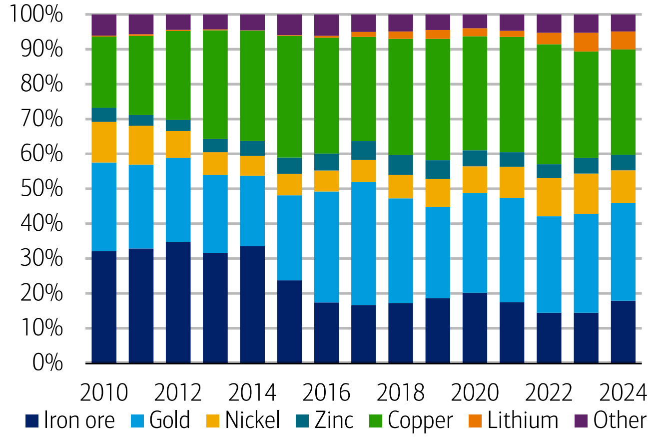
Miners are underspending on copper

Digging deeper into the headline capex figures, Exhibit 8 breaks down how miners have been spending their money. Broadly, iron ore has lost market share, while copper has gained. Exhibit 9 digs into individual commodities, confirming that the miners keep underspending on a range of commodities, including copper.

Exhibit 8: Breakdown of industry capex by commodity
Iron ore has lost out, copper has gained



Source: S&P, IEA, BofA Global Research

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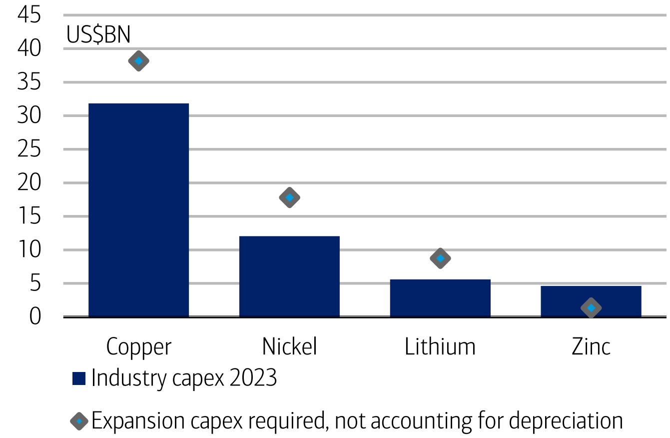
Exhibit 9: Industry capex by commodity
The miners are under-investing in copper



Source: S&P, IEA, BofA Global Research

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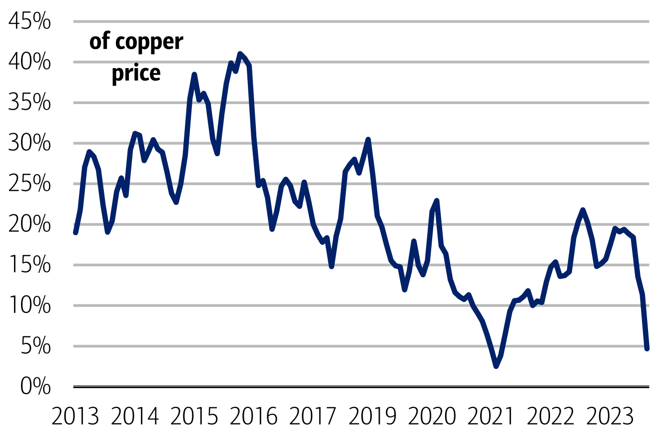
Shortfalls are not a future issue

Of course, these capex shortfalls are a key reason we are structurally bullish raw materials including copper. It is worth keeping in mind that the risk of sustained deficits is already coming through now. Indeed, Exhibit 10 and Exhibit 11 highlight that copper and zinc treatment charges[1] have been under pressure of late, raising the risk that refiners will be forced to cut production in the coming months.

Exhibit 10: Copper treatment and refining charges
TC/RCs have dropped sharply



Source: Woodmac, BofA Global Research

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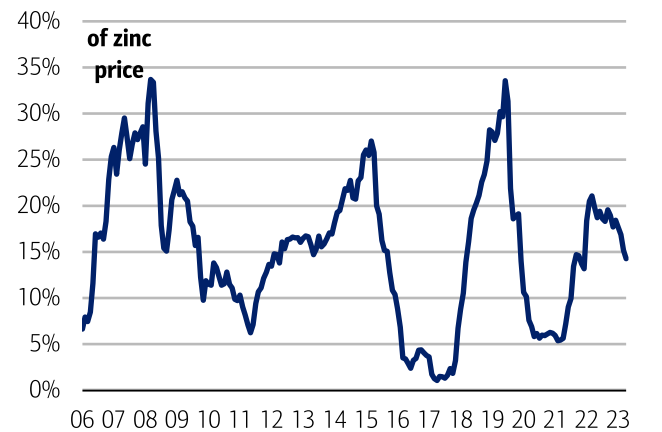
Exhibit 11: Zinc treatment charges
The much-anticipated zinc glut has not materialised



Source: Woodmac, BofA Global Research

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[1] Copper is produced through two production processes: the smelting/ refining route accounts for 80% of all copper output, while the SX-EW route accounts for 20%. Smelters receive concentrates from mines and produce anodes. The anodes are then sent to refineries, which process them into cathodes. Smelters/ refiners receive a treatment and refining charge (TC/RC) from the miners for their services, while miners retain the copper price less the treatment and refining charge. TC/RCs are an important indicator for constraints: when they fall, concentrates availability is insufficient. There are (at least) two copper market balances: one for concentrates, the other for refined metal
Mines send zinc concentrates to smelters. Smelters receive a treatment charge (TC) from the miners for their services, while miners retain the zinc price less the treatment charge. TCs are an important indicator for constraints: when they fall, concentrates availability is insufficient. Hence, there are two zinc market balances: one for concentrates, the other for refined metal.

China has an issue with overcapacities

China has been the key driver of metal markets in the past two decades, but its influence has waned somewhat as growth has slowed. Acknowledging the latter, the government is now looking to reconfigure the economy, by co-incidence focusing on sectors that are metals-intensive (see: Global Metals Weekly: Copper markets tighten, despite China's battle with the 3Ds 13 February 2024). Yet, given these issues, how confident are we that the miners really need to potentially spend $181BN in capex to prevent metal shortfalls?

In short, we are confident. We acknowledge that the government does not have the appetite for an all-out stimulus package (more on this below). That said, Premier Li Qiang delivered his first government work report (GWR) at the Two Sessions forum, outlining key economic policy priorities and targets (see China Watch: 2024 NPC: More fiscal stimulus to support the "around 5%" growth target 05 March 2024). Overall, the GWR struck a supportive policy tone, suggesting that the government wants to stabilise economic activity:

1. The **2024 growth target of "around 5%"** is in line with our and market expectations, signalling continued policy support to prop up growth.

2. At the same time, the government seems to be placing a bigger focus on policy coordination and will likely avoid introducing a pro-cyclical policy this year.

Exhibit 12 shows the economic targets the CCP has set itself.

Exhibit 12: Key economic indicators: 2024 target vs. 2023 actual
Key economic targets set in 2024 NPC are largely in line with the prior year

	GDP target	CPI	Budget deficit	LGSB quota	New employment	Unemployment rate
	(%)	(%)	(% of GDP)	(RMB tn)	(mn)	(%)
2024 target	~5.0	~3.0	3.0	3.9	>12	~5.5
2023 actual	5.2	0.2	3.8	3.96	12.44	5.2

Source: Government Work Reports, NBS

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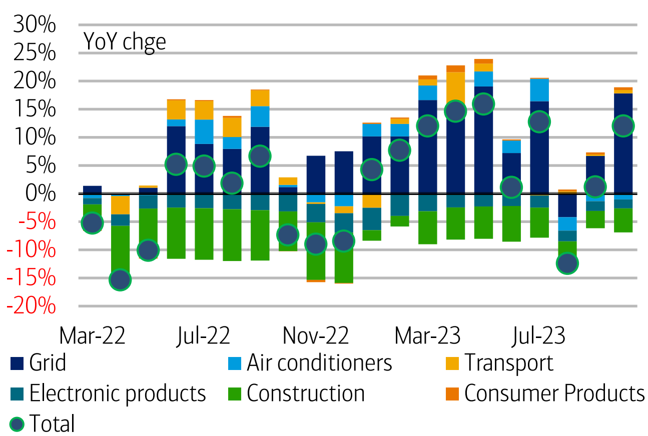
While headline growth targets are important, they are somewhat of a red herring for the mined commodities. Indeed, the government's stance on sectors in which it wants to lead, such as renewables and EVs, matters much more (Exhibit 13). While we expect a slowdown in copper demand growth this year, China's consumption is still set to expand (Exhibit 14).

Exhibit 13: China copper demand, breakdown by sector
Grid investment and EV production drove China's copper demand



Source: Bloomberg, BofA Global Research

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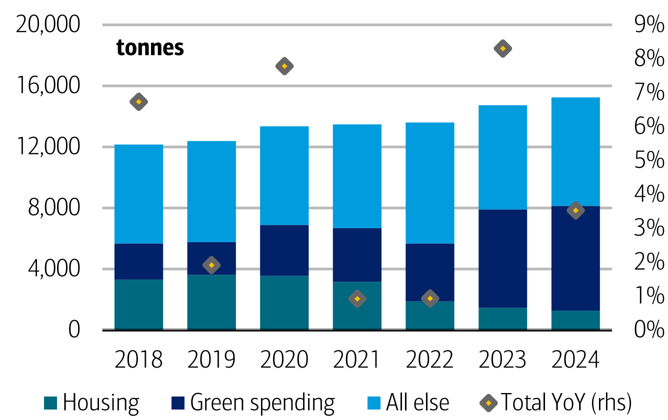
Exhibit 14: China copper demand
Green spending has offset the weakness housing market



Source: Bloomberg, BofA Global Research

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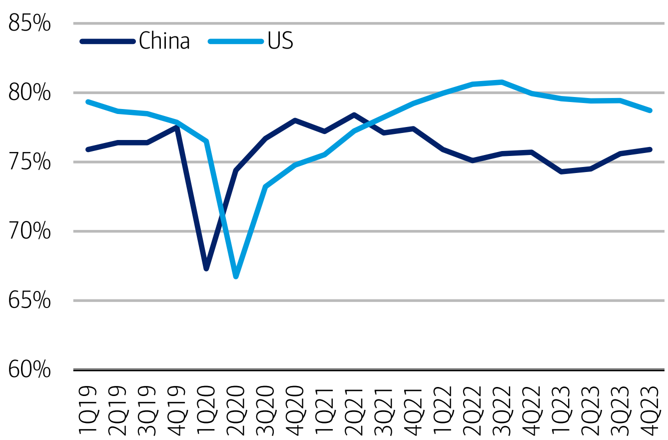
Indeed, the GWR outlined that "striving to modernise the industrial system and developing new quality productive forces" is one of the top tasks this year, while also calling for an increase of TFP (total factor productivity) growth. Specifically, the utilisation and upgrade of the industrial supply chain has been highlighted. The cultivation of emerging and future-oriented industries was another focus, including hydrogen power, new materials, biomanufacturing, commercial spaceflight, quantum technology and life sciences.

China faces a multitude of structural issues

In our view, China will likely remain focused on strategic sectors because it faces a multitude of structural issues. Indeed, we believe overcapacities are a key overhang, likely holding back the "traditional" economy. It could also become an increasing issue for China as the US and Europe push back on strategic sectors like renewables and EVs.

The issue with overcapacity is revealed in Exhibit 15. It shows that the capacity utilisation rate in China's industry is running around 5ppt below that in the US. This is remarkable when keeping in mind that the US economy expanded by an average of 2.2% in 2022/23, enough to push up capacity utilisation rates. Meanwhile, China's economy has expanded by an average of 4% in the past couple of years and capacity utilisation has kept falling. Exhibit 16 shows one of the implications: China has a real problem reflating its economy.

Exhibit 15: Capacity utilisation at industry
While China is growing faster than the US, capacity utilisation is lower



Source: NBS, Bloomberg

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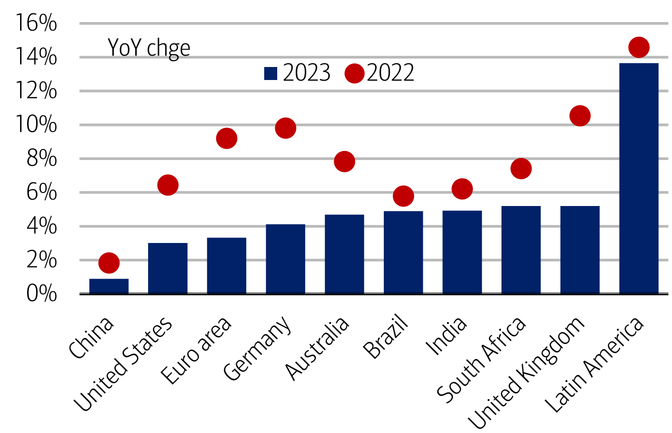
Exhibit 16: Headline consumer price index
China has an issue reflating its economy



Source: IMF, BofA Global Research

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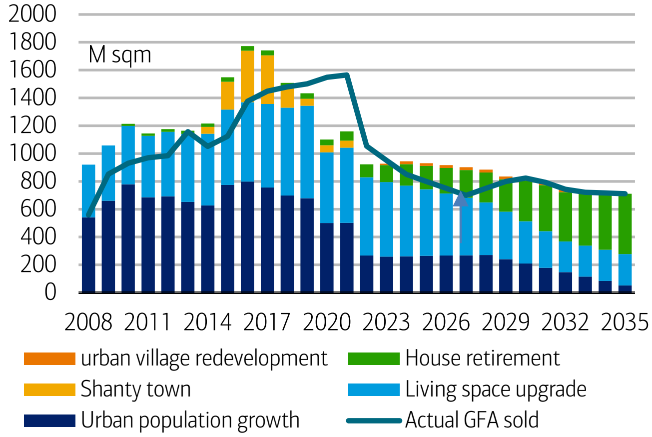
Overcapacities show up in various sectors

Overcapacities have appeared in a range of sectors that are important for the metals. China's housing market historically accounted for around one-third of domestic copper demand. However, we argue that the sector is now in structural decline (Exhibit 17), with housing demand set to fall gradually in the coming years. Exhibit 18 shows that housing starts are running well below housing demand.

Our China property team also estimates that vacant secondary stocks represent 5-6 years of new home demand, so mathematically, new home demand can for now be satisfied entirely by vacant secondary stocks. Housing starts could fall to zero for a while and there would still be no shortages!

Exhibit 17: China, housing demand
The demand in China for housing will likely keep trending lower



Source: BofA Global Research

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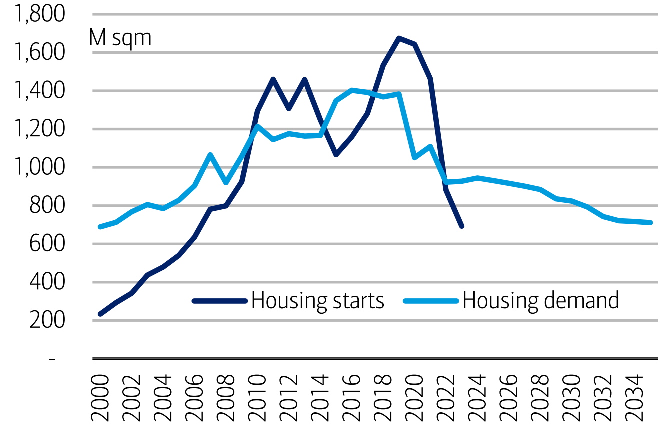
Exhibit 18: China, housing demand and housing starts
Housing starts are running well below demand



Source: BofA Global Research

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For housing starts to stabilise, secondary stock owners need to stop putting up for sale their vacant units (possible if they feel more confident, or if prices keep falling to below cost level), or new starts will have to run low for a few years to allow destocking to take place. Either way, while the property sector has been stabilising at a low level, it is unlikely to make a meaningful contribution to copper demand again.

Exhibit 19: China, housing markets
Activity is set to be contracting

	2023	2024E (new)
National sales volume	-8.20%	5% to 10% drop
National sales value (commodity housing only)	-6.00%	9% to 16% drop
Residential new starts	-21.00%	9% to 15% drop
Residential Completion	17.20%	5%-10% drop

Source: BofA Global Research

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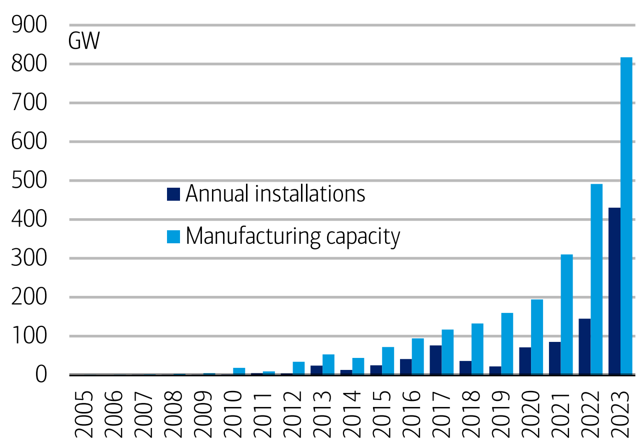
As China is looking to upgrade its industry, there are question marks on how exactly the CCP is looking to facilitate it. Indeed, Exhibit 20 and Exhibit 21 show that China has raced ahead with building solar PV manufacturing capacity, but once again, the country has overcapacities and relies on export markets.

Exhibit 20: China, solar PV capacity and installations
China has solar PV overcapacity



Source: BNEF, BofA Global Research

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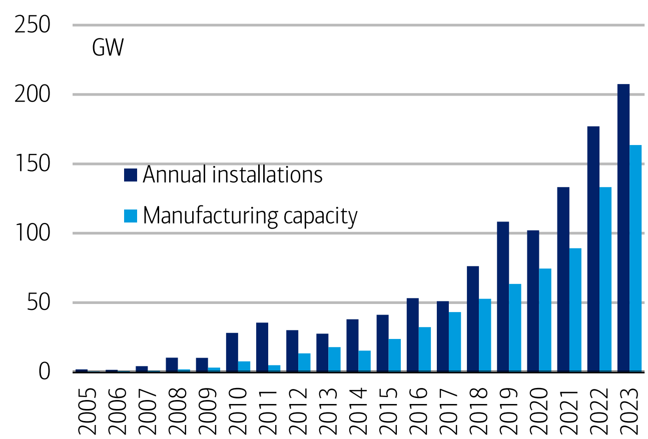
Exhibit 21: World ex-China, solar PV capacity and installations
World ex-China does not have enough solar PV capacity



Source: BNEF, BofA Global Research

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Ex-China is now pushing back

While the excess stocks in China's housing market are more of a domestic issue, overcapacities in "green" industries are an entirely different kettle of fish that could come back to haunt the Asian country as Western governments increasingly push back.

In electric vehicles, for instance, the EU Commission said earlier this week that it found evidence of massive imports of Chinese cars in a relatively short period of time, including a "substantial increase" of 14% since an anti-dumping investigation kicked off in October 2023. Following normal timelines, provisional tariffs could be introduced by July, with definitive duties hitting by November. In recent probes of other sectors such as e-bikes and fibre-optic cables, the EU discovered subsidy margins ranging from 4% to 17%, as our colleague Horst Schneider, who covers European car manufacturers, notes.

Meanwhile, in the US, in 2018 the Trump administration imposed a 27.5% tariff on Chinese-built electric vehicles, made up of a 2.5% tariff that generally applies to imported cars plus an additional 25% on Chinese-made cars. The Biden administration is now debating whether tariffs on Chinese electric vehicles should be raised further. It is also worth keeping in mind that the Inflation Reduction Act limits the eligibility of cars built with batteries made by Chinese companies for a for a $7,500 consumer tax credit.

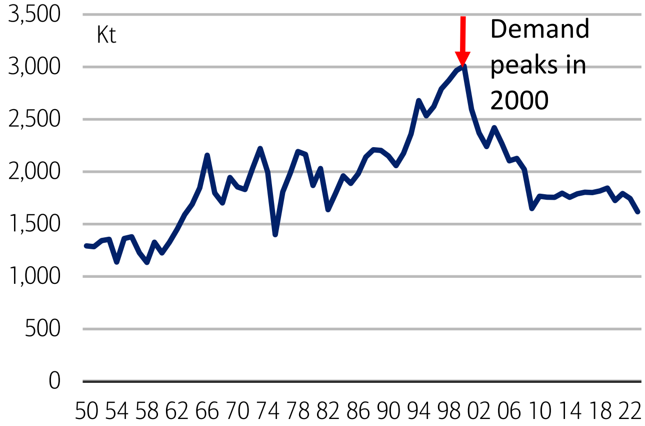
President Biden also noted that China's automakers are seeking to flood the autos market in the United States and globally, posing new threats to national security. Digging deeper, the White House added that "Autos increasingly leverage advanced technologies to enable navigational tools, provide driver assist features, and reduce operating costs and carbon emissions through fast and efficient charging. These autos are constantly connecting with personal devices, other cars, U.S. infrastructure, and their original manufacturer. New vulnerabilities and threats could arise with connected autos if a foreign government gained access to these vehicles' systems or data. Connected vehicles collect large amounts of sensitive data on their drivers and passengers; regularly use their cameras and sensors to record detailed information on U.S. infrastructure; interact directly with critical infrastructure; and can be piloted or disabled remotely. Connected autos that rely on technology and data systems from countries of concern, including the People's Republic of China, could be exploited in ways that threaten national security".

The short of it: it is unlikely to get easier for China to increase exports

Ultimately this means that China's goal of becoming the leading global manufacturing power in 10 strategic sectors is facing obstacles, as Western countries increasingly push back. This will ultimately dampen China's metals demand. Yet, that consumption is not lost, if Western countries manage to rebuild supply chains.

In the end, we could see the partial reversal of a trend in place since 2001, i.e. when China entered the WTO. Exhibit 22 and Exhibit 23 show that Western metals demand remains well below recent highs. The decline in metal purchases has been particularly pronounced in the US, which exported its metals demand to China during peak globalisation. Onshoring manufacturing capacity may well bring back some of that. Linked to that, if the pushback on China's products intensifies, there is also a case to be made for China to put more efforts into boosting domestic consumption, with all the implications this has including a reform of social security and a lower savings rate.

Exhibit 22: US copper demand
Copper demand peaked in 2000



Source: ICSG, Woodmac, CRU, BofA Global Research

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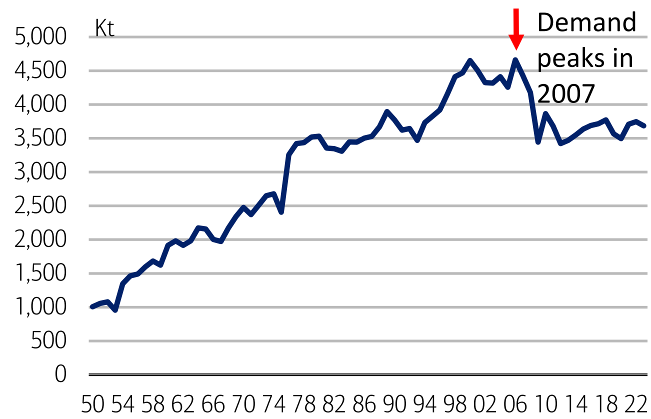
Exhibit 23: Europe, copper demand
European copper demand has also stagnated



Source: ICSG, Woodmac, CRU, BofA Global Research

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Appendix

Table 1: Commodity prices, exchange rates, equity indices, yields and inventories

Metal prices have stabilized

Base metals	Cash, $/t	3-month, $/t	Cash, WoW change	3-month, WoW change
Aluminium	2,219	2,265	1.5%	1.6%
Copper	8,561	8,657	1.9%	1.9%
Lead	2,138	2,144	5.0%	4.8%
Nickel	18,325	18,551	4.6%	4.5%
Tin	27,418	27,520	2.8%	2.6%
Zinc	2,524	2,561	4.5%	4.3%
LMEX	3,777		2.3%	
	Cash, c/lb	**3-month, c/lb**		
Aluminium	101	103		
Copper	388	393		
Lead	97	97		
Nickel	831	842		
Tin	1,244	1,248		
Zinc	114	116		
Other commodities, freight, exchange rates, equities and yields	**Spot**	**WoW change**		
Gold, $/oz	2,158	1.4%		
Silver, $/oz	24	2.0%		
Platinum, $/oz	925	4.7%		
Palladium, $/oz	1,041	9.5%		
Iron ore, China fines cfr $/dmt	112	-3.2%		
Brent, $/bbl	82	-0.1%		
Baltic Dry Index	2,315	1.0%		
EUR/USD	1.093	0.6%		
Dow Jones Industrial Average	39,005	1.1%		
10-year US Treasury yield	4.153	0.0%		
ICE BofA Commodity index, ER	420	0.8%		
ICE BofA Commodity index Industrial Metals, ER	179	2.3%		
ICE BofA Commodity index Precious Metals, ER	230	1.2%		
ICE BofA Commodity index Energy, ER	506	-0.0%		
Exchange stocks and cancelled warrants	**Stocks, tonnes**	**WoW change**	**Canc. warrants, tonnes**	**Canc. warr., of stocks**
Aluminium				
LME	572,925	-1.8%	218,225	38.1%
Shanghai	184,264	-3.5%		
Total aluminium	757,189	-2.3%		
Copper				
LME	108,925	-4.5%	15,625	14.3%
Comex	28,221	7.6%		
Shanghai	239,245	11.5%		
Total copper	376,391	6.1%		
Lead				
LME	191,875	2.2%	8,750	4.6%
Shanghai	62,810	18.8%		
Total lead	254,685	5.8%		
Nickel				
LME	74,544	0.8%	4,980	6.7%
Shanghai	19,016	2.5%		
Total nickel	93,560	1.1%		
Tin	5,255	-5.7%	1,405	26.7%
Zinc				
LME	267,750	-2.7%	69,200	25.8%
Shanghai	108,671	11.3%		
Total zinc	376,421	1.0%		

Source: BofA Global Research

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Exhibit 24: Price forecasts, fundamental drivers and risks
We are bullish a range of cyclical commodities

Metal	2024E	2025E	Fundamental drivers	Risks (D = downside; U = upside)
Aluminium	$2,563/t 116c/lb	$3,000/t 136c/lb	• China is almost operating at its 45mt capacity cap and smelters ex-China have closed capacity • China's smelters remain under pressure on hydro power shortages. At the same time, demand has been strong, so exports will likely remain capped • We expect rising deficits going forward	• D: No production discipline in China/World ex-China • D: China exports more • U: Smelter restraint and/or production disruptions reduce output • U: Stronger-than-anticipated demand growth
Copper	$8,625/t 391c/lb	$10,500/t 476c/lb	• Demand in China has been patchy, but grid spending has completely offset weakness in housing. Demand may be more balanced in 2024, and should hold up. Copper to rally, if the government pushes leads to broader recovery • Inventories are low, which is supportive, but could also increase volatility • We expect a small surplus for 2024	• D: China re-exports metal • D: Global demand slows sharply into next year • U: Strong restocking through the supply chain on improved confidence • U: Continued production disruptions in coming quarters
Lead	$2,000/t 91c/lb	$1,750/t 79c/lb	• There are no immediate scrap or concentrates shortages, suggesting the market could flip back into surplus • China's demand has slowed structurally, as the ebike market has matured	• D: Destocking in China or higher lead exports from the country. • U: Strong seasonal demand for replacement batteries after cold/hot winter/summer months
Nickel	$18,750/t 851c/lb	$20,000/t 907c/lb	• Nickel demand from electric vehicle producers should rise in the coming years, yet more NPI is being converted to nickel sulphate • China has built conversion capacity, which should take about 100Kt of Indonesian units into the refined market • Indonesian supply may prevent shortages near-term, but further out, more material is required • We expect a surplus for 2024, with prices increasingly supported by costs	• D: NPI producers don't close shop; ore inventories last for longer and more ores are imported form the Philippines. • D: Faster ramp-up of Indonesian NPI production • D: Stainless steel demand remains subdued
Zinc	$2,375/t 108c/lb	$2,250/t 102c/lb	• The zinc market has been better supplied, as demand from galvanisers has subsided • Zinc may remain an underperformer, but immediate downside more limited, also because costs have shifted higher on inflation • The surpluses could disappear, if more mine close	• D: Unreported inventories exist on the zinc market. More metal could become available • D: The zinc market is fragmented. There is evidence that miners, especially in China, could consider further output increases
Gold	$1,975/oz	$2,150/oz	• Gold has been a trade on US rates. The rally past $2,000/oz subsided as the Fed signalled a resumption of rate hikes. Until the end of the hiking cycle is reached, gold prices will remain capped. • If rate cuts come before 2Q24, gold could end next year at $2,400/oz • Central bank buying has been strong, but not sufficient; a Fed pivot may bring more investors into the market • Gold to rally in 2H24	• D: Deterioration of investor sentiment • D: Real rates become more positive; sustained USD rally • D: High gold prices deter buyers of physical gold; increased scrap supply
Silver	$23.26/oz	$24.75/oz	• The silver market has rebalanced on production discipline and demand from new applications including solar panels • As more spending on solar panels come through, silver should rally • Bottoming out of the global economy in 2024 should also help industrial demand	• U: Investors returning to the market • U: China's imports to rise • D: ETF liquidation • D: More supply
Platinum Palladium	$1,050/oz $750/oz	$1,250/oz $500/oz	• Palladium is slowly moving into surplus, keeping pressure on prices. • More production discipline is necessary. • Any supply cuts may reduce the palladium surpluses, but will likely push platinum into a deficit, so prices might diverge. • PGMs are in a difficult spot.	• D: Jewellery demand suffers due to rising prices • D: In palladium, the risk of deliveries from Russian stockpiles has not gone away • D: Demand from key buyers like Europe not increasing • U: Production disruptions reduce availability of PT and PD
Iron Ore	$125/t CIF	$90/t CIF	• Iron ore inventories at China's mills are extremely low. • Production cuts at mills, along with higher steel demand should support steel prices, likely pulling iron ore higher as well near-term	• D: China's steel production slowing sharply • U: Mine closures/slowdown in production increases
HCC Thermal coal	$270/t $150t	$215/t $125/t	• Thermal coal prices to come under pressure as supply is increasing and the energy emergency normalises • Normalisation of supply should also contribute to lower met coal prices	• D: Lack of supply discipline • U: Chinese steel production stronger (HCC) U: mine closures

Colours indicate our stance on each commodity: Green = bullish, Yellow = neutral, Red = cautious. **Source:** BofA Global Research estimates

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Exhibit 25: Commodity price forecasts

Copper and aluminium are stabilizing, we are still bearish lithium

		Current	1Q24E	2Q24E	3Q24E	4Q24E	1Q25E	2Q25E	2023E	2024E	2025E	2026E	2027E	2028E	LT price
Base metals															
Aluminium	US$/t	2,219	2,250	2,500	2,750	2,750	3,000	3,000	2,268	2,563	3,000	3,250	3,015	2,781	2,546
	USc/lb	101	102	113	125	125	136	136	103	116	136	147	137	126	115
Copper	US$/t	8,561	8,000	8,500	8,750	9,250	10,000	10,000	8,442	8,625	10,500	9,500	9,539	9,578	9,617
	USc/lb	388	363	386	397	420	454	454	383	391	476	431	433	434	436
Lead	US$/t	2,138	2,000	2,000	2,000	2,000	1,750	1,750	2,156	2,000	1,750	2,024	2,217	2,409	2,602
	USc/lb	97	91	91	91	91	79	79	98	91	79	92	101	109	118
Nickel	US$/t	18,325	18,500	18,500	19,000	19,000	20,000	20,000	21,786	18,750	20,000	20,000	19,141	18,283	17,424
	USc/lb	831	839	839	862	862	907	907	988	851	907	907	868	829	790
NPI, 8-12%	CNY/t		1,032	1,032	1,032	1,032	1,062	1,062	1,129	1,032	1,062	1,102	1,138	1,174	1,210
Zinc	US$/t	2,524	2,500	2,500	2,250	2,250	2,250	2,250	2,648	2,375	2,250	2,424	2,596	2,769	2,942
	USc/lb	114	113	113	102	102	102	102	120	108	102	110	118	126	133
Precious metals															
Gold, nominal	US$/oz	2,164	1,950	1,950	2,000	2,000	2,100	2,100	1,924	1,975	2,150	2,096	2,095	2,094	2,093
Gold, real	US$/oz		1,950	1,950	2,000	2,000	2,049	2,049	1,924	1,975	2,098	1,995	1,946	1,898	1,850
Silver, nominal	US$/oz	24.37	22.50	23.00	23.53	24.00	24.50	24.50	23.20	23.26	24.75	26.07	27.18	28.30	29.42
Silver, real	US$/oz		22.50	23.00	23.53	24.00	23.90	23.90	23.20	23.26	24.15	24.81	25.21	25.60	26.00
Platinum	US$/oz	930	1,000	1,000	1,100	1,100	1,250	1,250	976	1,050	1,250	1,322	1,372	1,421	1,471
Palladium	US$/oz	1,064	900	800	700	600	500	500	1,379	750	500	500	824	1,147	1,471
		Current	**1Q24E**	**2Q24E**	**3Q24E**	**4Q24E**	**1Q25E**	**2Q25E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**LT price**
Bulk Commodities															
Hard coking coal	US$/t fob	294	360	280	210	230	240	190	290	270	215	205	212	219	226
Semi-soft	US$/t fob	149	238	185	139	152	158	125	220	178	142	135	134	133	132
Thermal Coal	US$/t fob	131	148	148	151	153	125	125	176	150	125	112	112	113	113
Iron ore fines	US$/t CIF	110	150	130	120	100	90	90	115	125	90	90	94	98	102
		Current	**1Q24E**	**2Q24E**	**3Q24E**	**4Q24E**	**1Q25E**	**2Q25E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**LT price**
Other materials															
Lithium spodumene	US$/t	900	850	500	500	750	1,000	1,500	3,821	650	1,438	1,750	1,650	1,550	1,450
Lithium carbonate	US$/t	14,000	13,500	10,000	8,250	10,250	12,000	16,000	40,469	10,500	15,500	18,000	18,667	19,333	20,000
Lithium hydroxide	US$/t	13,800	14,000	11,000	9,700	11,750	13,500	17,500	44,500	11,613	17,000	19,500	20,167	20,833	21,500
Alumina	$/t	369	340	340	340	340	348	348	343	340	348	357	375	394	412
Uranium	$/lb		75.00	77.50	80.00	80.00	75.00	75.00	58.91	78.13	75.00	70.00	65.00	60.00	55.00
Molybdenum	$/lb	20.2	18.10	18.10	18.10	18.10	18.10	18.10	23.99	18.10	18.10	18.10	16.32	14.54	12.76
Cobalt	$/lb	16.4	18.00	18.00	18.00	18.00	18.00	18.00	17.57	18.00	18.00	18.44	19.84	21.23	22.63
Manganese ore	$/dmtu	4.20	4.35	4.35	4.35	4.35	4.35	4.35	4.79	4.35	4.35	4.93	5.52	6.11	6.70
Steel, HRC															
HRC, Europe	US$/t	670	719	701	639	674	721	702	767	683	714				
HRC, US	US$/t	882	1,130	1,020	882	805	799	799	975	959	799				
HRC, China	US$/t	527	568	585	602	623	592	597	565	595	602				
		Current	**1Q24E**	**2Q24E**	**3Q24E**	**4Q24E**	**1Q25E**	**2Q25E**	**2023E**	**2024E**	**2025E**	**2026E**	**2027E**	**2028E**	**LT price**
WTI	US$/bbl	79	73	75	77	75	57	57	79	75	57	57	57	57	57
Brent	US$/bbl	83	78	80	82	80	60	60	83	80	60	60	60	60	60
Henry Hub	US$/MMBtu	1.7	2.9	2.5	3.0	3.6	2.6	2.6	2.7	3.0	2.6	2.6	2.6	2.6	2.6

Note: quarterly energy forecasts are period-end, rest are period averages; **Source:** BofA Global Research

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Supply and demand balances

Table 2: Aluminium supply and demand balance
Deficits set to increase

'000 tonnes	2022	2023	2024E	2025E	2026E
Global production	68,342	69,881	72,280	73,902	75,238
YoY change	1.4%	2.3%	3.4%	2.2%	1.8%
Global consumption	69,061	70,415	73,447	76,385	79,440
YoY change	0.7%	2.0%	4.3%	4.0%	4.0%
Balance	**-719**	**-534**	**-1,167**	**-2,483**	**-4,203**
Market inventories	8,576	9,120	7,953	5,470	
Weeks of world demand	6.5	6.7	5.6	3.7	
LME Cash ($/t)	**2,706**	**2,268**	**2,563**	**3,000**	**3,250**
LME Cash (c/lb)	**123**	**103**	**116**	**136**	**147**

Source: SNL, Woodmac, CRU, Bloomberg, company reports, IAI, BofA Global Research

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Table 3: Copper supply and demand balance
Balanced market in 2023E

'000 tonnes	2022	2023	2024E	2025E	2026E
Global production	24,717	26,418	26,526	27,655	28,318
YoY change	1.5%	6.9%	0.4%	4.3%	2.4%
Global consumption	25,164	26,061	26,868	27,943	29,061
YoY change	0.9%	3.6%	3.1%	4.0%	4.0%
Balance	**-447**	**357**	**-342**	**-288**	**-743**
Market inventories	1,030	1,016	674	386	
Weeks of world demand	2.1	2.0	1.3	0.7	
LME Cash ($/t)	**8,822**	**8,442**	**8,625**	**10,500**	**9,500**
LME Cash (c/lb)	**400**	**383**	**391**	**476**	**431**

Source: SNL, Woodmac, CRU, Bloomberg, company reports, ICSG, BofA Global Research

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Table 4: Nickel supply and demand balance
Nickel to be well supplied

'000 tonnes	2022	2023	2024E	2025E	2026E
Global production	3,135	3,396	3,542	3,860	4,111
YoY change	16.3%	10.2%	8.8%	9.9%	10.7%
Global consumption	3,087	3,287	3,468	3,833	4,127
YoY change	0.1%	6.5%	5.5%	8.9%	6.0%
Balance	**48**	**109**	**75**	**27**	**-15**
Weeks of world demand	2.8	3.0	3.9	3.9	3.5
LME price ($/t)	25707.4	21785.7	18750.0	20000.0	20000.0
LME price (c/lb)	**1,166**	**988**	**851**	**907**	**907**

Source: SNL, Woodmac, CRU, Bloomberg, company reports, INSG, BofA Global Research

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Table 5: Zinc supply and demand balance
Project pipeline not a significant risk

	2022	2023	2024E	2025E	2026E
Global production	13,919	14,000	15,150	15,900	16,150
YoY change	-2.8%	0.6%	8.2%	5.0%	1.6%
Global consumption	13,607	13,513	14,104	14,400	14,703
YoY change	-3.2%	-0.7%	4.4%	2.1%	2.1%
Balance	**312**	**487**	**1,046**	**1,500**	**1,447**
Market inventories	3,482	2,648	2,375	2,250	2,424
Weeks of world demand	13.3	10.2	8.8	8.1	8.6
LME Cash ($/t)	**3,482**	**2,648**	**2,375**	**2,250**	**2,424**
LME Cash (c/lb)	**158**	**120**	**108**	**102**	**110**

Source: SNL, Woodmac, CRU, Bloomberg, company reports, ILZSG, BofA Global Research

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Exhibit 26: Iron ore supply and demand balance
Flipping back into surplus

Wet Mt	2022	2023E	2024E	2025E	2026E
Global production	2,363	2,375	2,422	2,504	2,544
YoY change	2.2%	0.5%	2.0%	3.4%	1.6%
Global consumption	2,301	2,348	2,372	2,374	2,386
YoY change	-5.0%	2.1%	1.0%	0.1%	0.5%
Balance	**63**	**27**	**50**	**130**	**157**
Iron ore price (US$/t)	**120**	**115**	**125**	**90**	**90**

Source: Woodmac, CRU, Bloomberg, company reports, BofA Global Research estimates

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Exhibit 27: Metallurgical coal supply and demand balance
Deficit to persist

Mt	2022	2023E	2024E	2025E	2025E
Global production	904	950	977	1,001	1,010
YoY change	-0.6%	5.1%	3.3%	2.4%	0.9%
Global consumption	925	971	993	991	1,003
YoY change	-1.4%	4.9%	2.3%	-0.2%	1.2%
Balance	**-21**	**-21**	**-15**	**10**	**7**
Met coal price (US$/t)	365	290	270	215	205

Source: Woodmac, McCloskey, company reports, BofA Global Research estimates

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Exhibit 28: Platinum supply and demand balance
Supply cuts could flip the market into a deeper deficit

'000 ounces	2022	2023	2024E	2025E	2026E
Global production	6,561	6,711	7,157	7,607	7,706
YoY change	-13.5%	2.3%	6.6%	6.3%	1.3%
Global consumption	6,057	7,231	7,255	7,250	7,255
YoY change	-22.8%	19.4%	0.3%	-0.1%	0.1%
Balance	**504**	**-519**	**-99**	**357**	**451**
Spot ($/oz)	964	976	1,050	1,250	1,322

Source: Matthey, company reports, BofA Global Research estimates

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Exhibit 29: Palladium supply and demand balance
Rising surpluses ahead

'000 ounces	2022	2023	2024E	2025E	2026E
Global production	9,314	9,320	9,970	10,572	10,819
YoY change	-5.1%	0.1%	7.0%	6.0%	2.3%
Global consumption	9,829	9,710	8,771	8,434	8,024
YoY change	-3.2%	-1.2%	-9.7%	-3.8%	-4.9%
Balance	**-515**	**-390**	**1,199**	**2,138**	**2,795**
Spot ($/oz)	2,110	1,379	750	500	500

Source: Matthey, company reports, BofA Global Research estimates

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Table 6: Lithium supply and demand balance
The lithium market is increasingly oversupplied

tonnes	2022	2023	2024E	2025E	2026E
Global production	657,337	897,532	1,245,682	1,704,066	1,986,158
YoY change	-2.5%	36.5%	38.8%	36.8%	16.6%
Global consumption	688,335	869,496	1,120,566	1,410,128	1,778,390
YoY change	48.5%	26.3%	28.9%	25.8%	26.1%
Balance	**-30,998**	**28,036**	**125,115**	**293,938**	**207,768**
Spot ($/t)	71,531	45,980	10,500	15,500	18,000

Source: Company reports, Woodmac, Bloomberg, BofA Global Research estimates
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Table 7: Cobalt supply and demand balance
The cobalt market needs some supply cuts

tonnes	2022	2023	2024E	2025E	2026E
Global production	198,235	231,241	274,225	301,692	309,256
YoY change	25.4%	16.6%	18.6%	10.0%	2.5%
Global consumption	186,279	210,900	250,033	291,266	335,607
YoY change	17.0%	13.2%	18.6%	16.5%	15.2%
Balance	**11,956**	**20,341**	**24,192**	**10,425**	**-26,351**
Spot ($/t)	68,428	38,733	39,681	39,681	40,652

Source: Company reports, CRU, Bloomberg, BofA Global Research estimates
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