

Data, Insight, Strategy & Communities

## CRU Aluminium Seminar Tokyo, 25 November 2024



Data, Insight, Strategy & Communities

# Alumina prices skyrocket to all-time highs — what's next?

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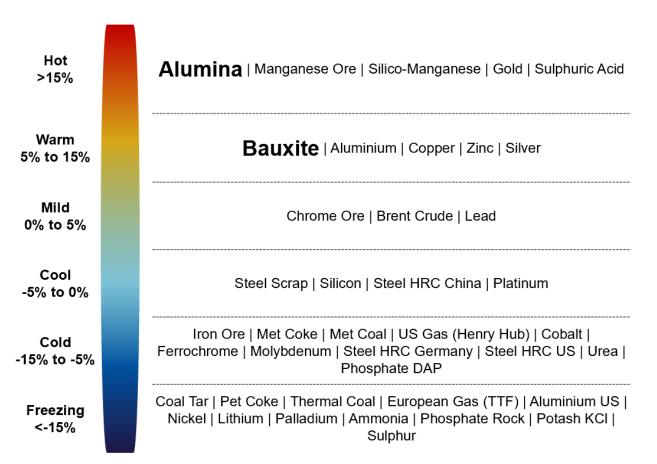
### Presentation Overview

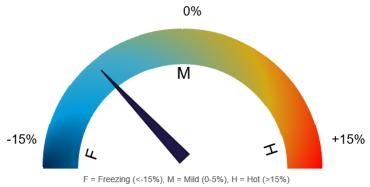
- 1. Recent developments Alumina Price Index.
- 2. Alumina market balance and costs.
- 3. Bauxite and the risks in Guinea.
- 4. Conclusions.



### Alumina: the hottest commodity in 2024

CRU basket of 38 mining, metals and fertiliser price forecasts | 2024 over 2023



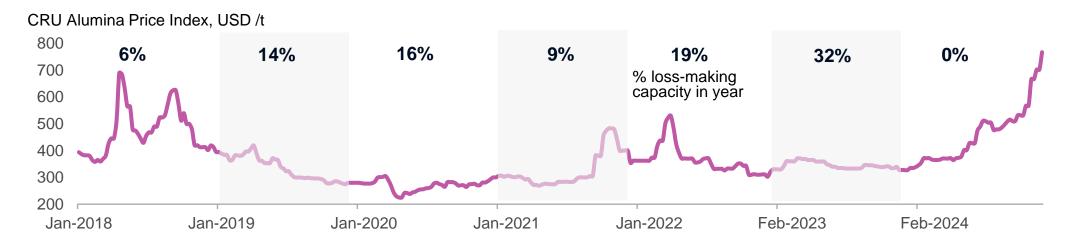




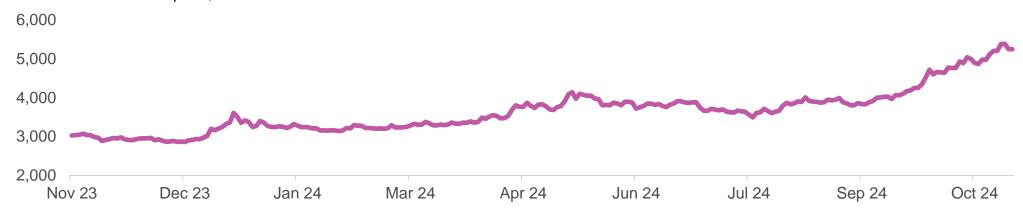
**DATA: CRU Market Outlooks** 



### Prices at record highs following several year plight



#### SHFE 3-month alumina price, RMB /t

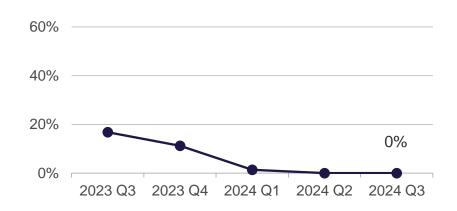


DATA: CRU Bauxite and Alumina Monitor

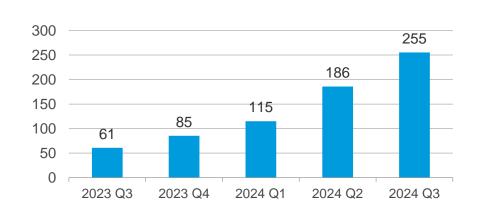


### Alumina industry shifts to being highly profitable in 2024

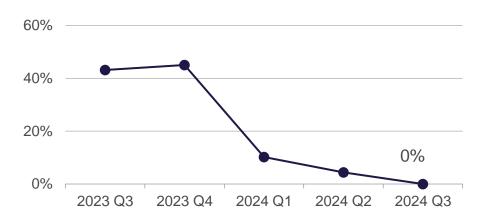
#### Share of loss-making production in world ex. China



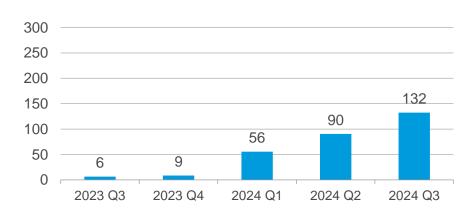
#### Average profit in world ex. China (\$/t)



#### Share of loss-making production in China



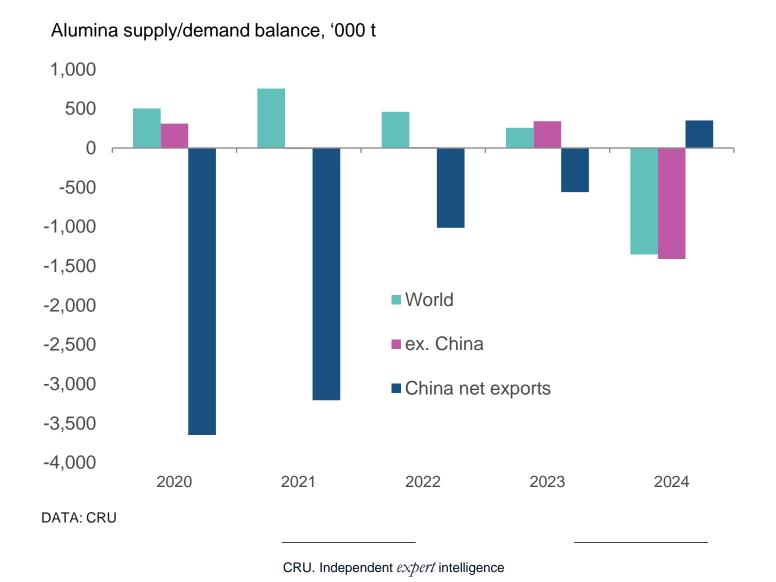
#### Average profit in China (\$/t)



DATA: CRU



### Unprecedented alumina market deficit in 2024





#### Alcoa announces curtailment of Kwinana Alumina Refinery ...

9 Jan 2024 — Alcoa Corporation (NYSE: AA) today announced it plans to **fully curtail production in 2024** at its **Kwinana** Alumina Refinery in Western Australia.



Rio Tinto declares force majeure on Queensland alumina ...

21 May 2024 — **Rio Tinto** has declared **force majeure** on third-party contracts for **alumina** exports from its refineries in Queensland, Australia, ...



#### Jamalco back to full production after Beryl, port out of ...

16 Aug 2024 — **Jamalco** has resumed full production despite its declaration of force majeure due to damage caused by Hurricane Beryl at its Rocky Point port ...

BNN Bloomberg

### Aluminum Jumps as EGA Says Bauxite Exports Suspended in Guinea

Aluminum prices jumped more than 2% in London after a key supplier of the mined ore needed to make the metal said exports from its operations in Guinea had...

1 month ago

Mining.com

### Alcoa suspends bauxite shipments from Brazil's Juruti mine due to port issue

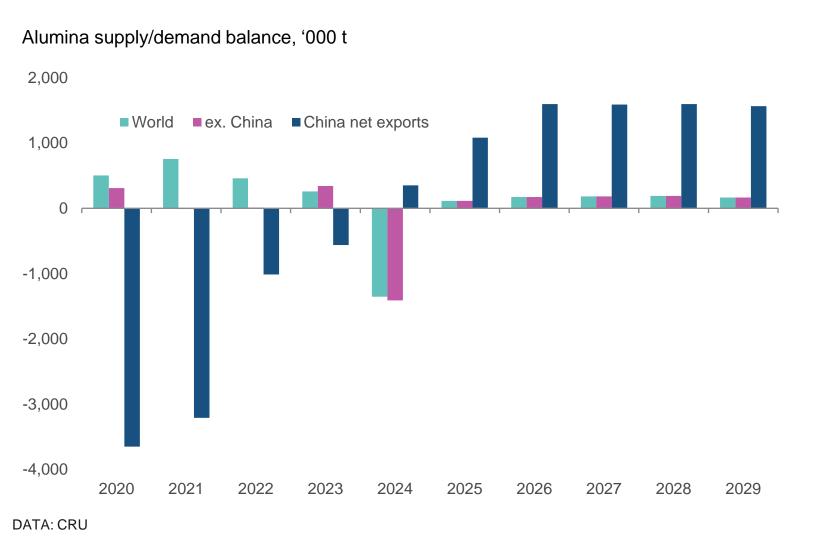
US aluminum maker Alcoa said on Thursday it had halted bauxite shipments from Brazil's Juruti port due to a stranded vessel in the waterway.

1 week ago

Alumina prices skyrocket to all-time highs - what's next?



### Additional alumina capacity arriving over next five years



2025: Launch of two greenfield refinery projects in Indonesia (Mempawah and PT BAP).

2025 - 2027: Significant expansion in alumina capacity in China (Hebei and Guangxi). China shifts to alumina net-exporter.

2025 - 2027: Vedanta pressing ahead with expanding Lanjigarh. Reducing dependency on imports.

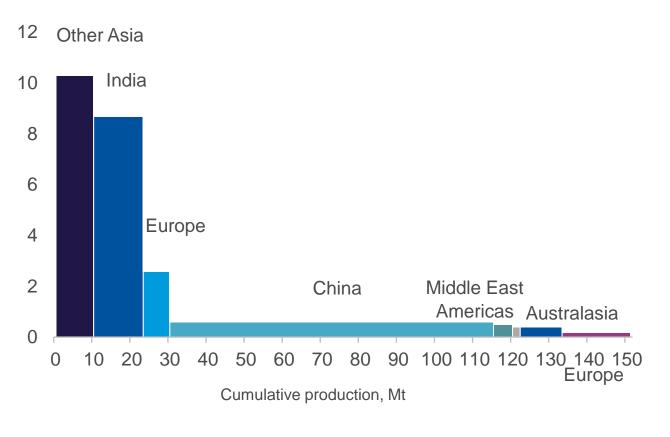
2029: Investment in Guinean refinery projects expected to be a slow burner.

Alumina prices skyrocket to all-time highs – what's next?



### Alumina production growth driven by Asia

2024 to 2029 alumina production growth %,



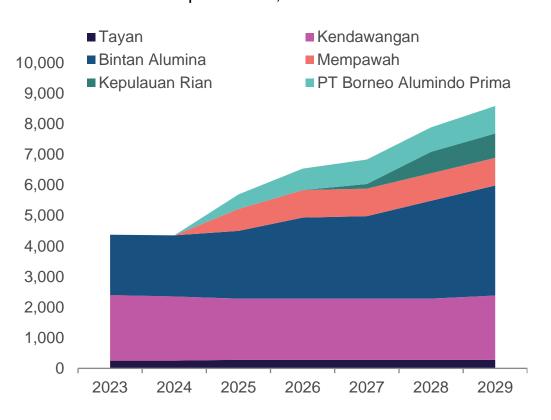
Refinery	Country	Owner	Start date	Capacity, '000t
Dapilon	Guinea	SMB	2030	1000
Lanjigarh	India	Vedanta	2024	3000
Kashipur	India	Adani	2029	4000
Damanjodi	India	Nalco	2026	1000
Aditya	India	Hindalco	2029	2000
Kepulauan Rian	Indonesia	Tianshan Aluminium	2027	1000
Mempawah	Indonesia	PT Antam	2025	1000
PT BAP	Indonesia	Jinjiang Group	2025	1000
Bintan Alumina	Indonesia	Nanshan Group	2025	2000
China (various)	China	Various	2025- 2029	10000

DATA: CRU

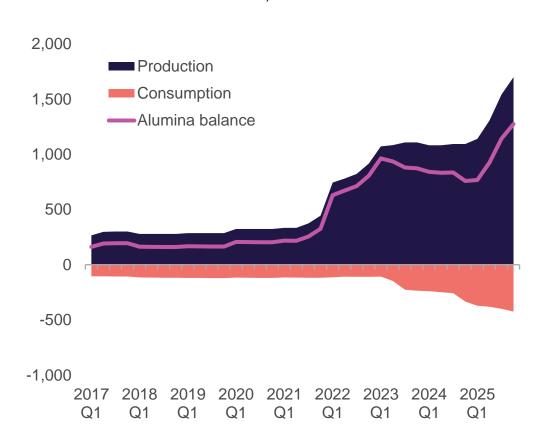


## New Indonesian refinery is first greenfield plant opened outside China since 2021

#### Indonesia alumina production, '000 t



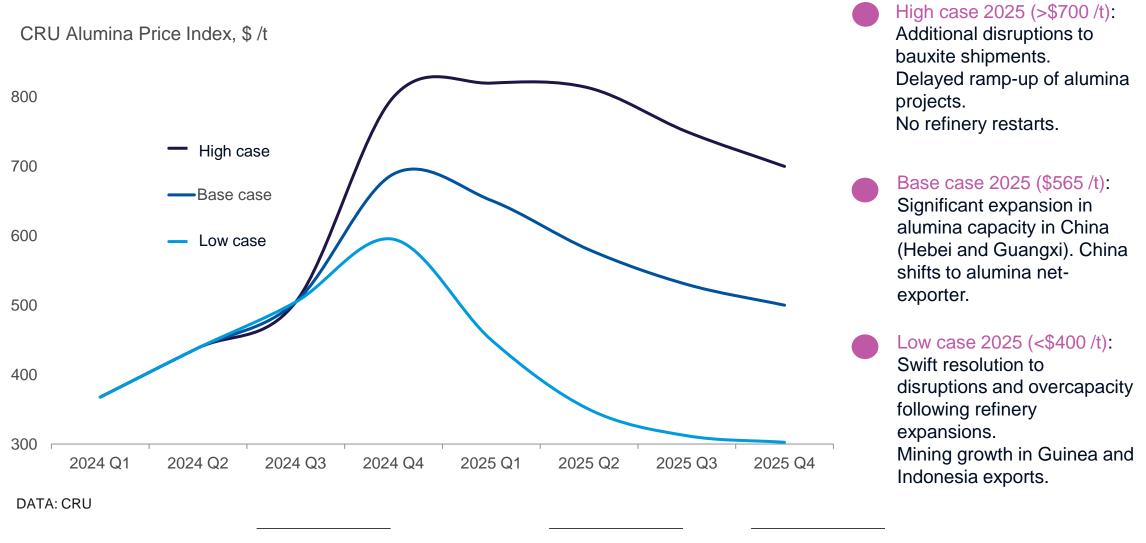
#### Indonesia alumina balance, '000 t



DATA: CRU



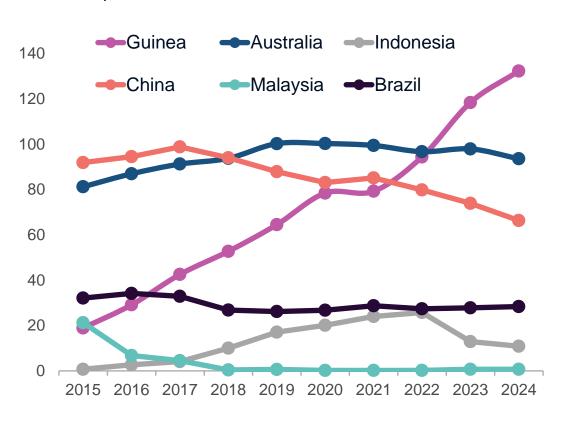
## Alumina price forecast hinges on timing of expansions and bauxite availability



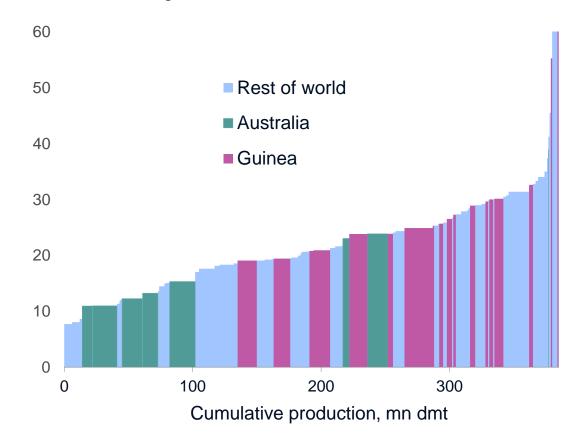


## Guinea established as world's largest bauxite producer

#### Bauxite production estimates, Mt



#### Bauxite mining site cost curve, 2024, \$ /dmt

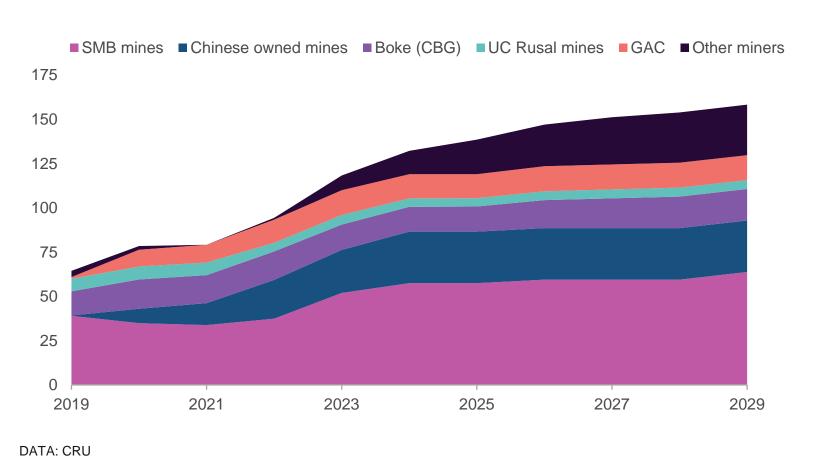


DATA: CRU



## Spotlight on Guinea after GAC disruption, but mining activity is still accelerating

#### Guinean bauxite production, Mt



#### Opportunities and threats:

High bauxite ore quality.

Competitive cost position.

Bauxite reserves and investment requirements.

Risk around resource nationalism.

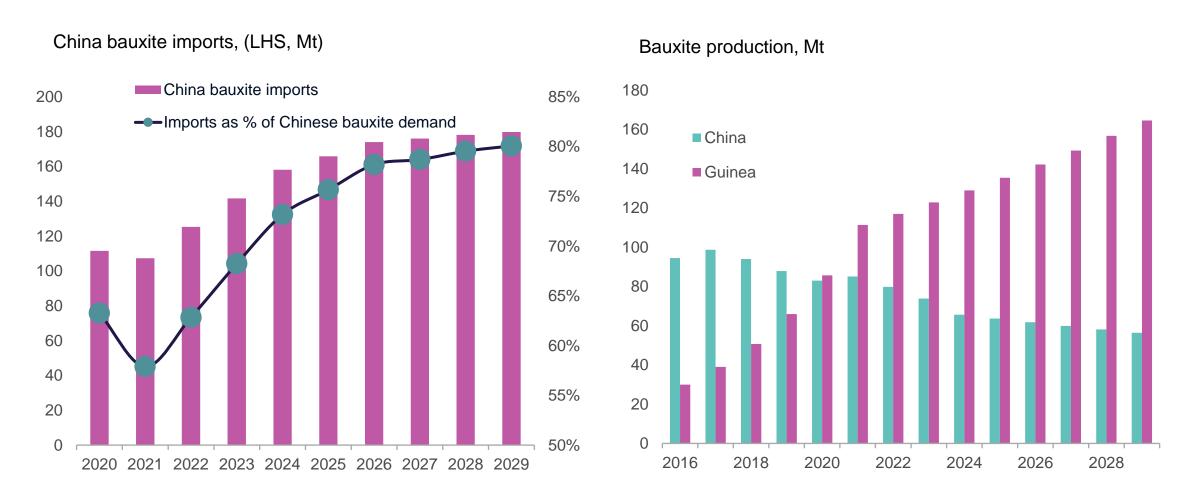
ESG.

Ocean freight volatility.

Reputation and government relationships.



### Caution grows in Guinea over the medium-term



DATA: CRU, China customs



### Conclusions

- 1. Alumina prices skyrocket to all-time highs in 2024 following plethora of supply-side disruptions.
- 2. Alumina price expectations in 2025 hinge on timing of expansions and bauxite availability.
- 3. Guinea is principal risk over the medium-term amid unpredictable geopolitical risks.

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## Thank you.

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## Aluminium Market Outlook

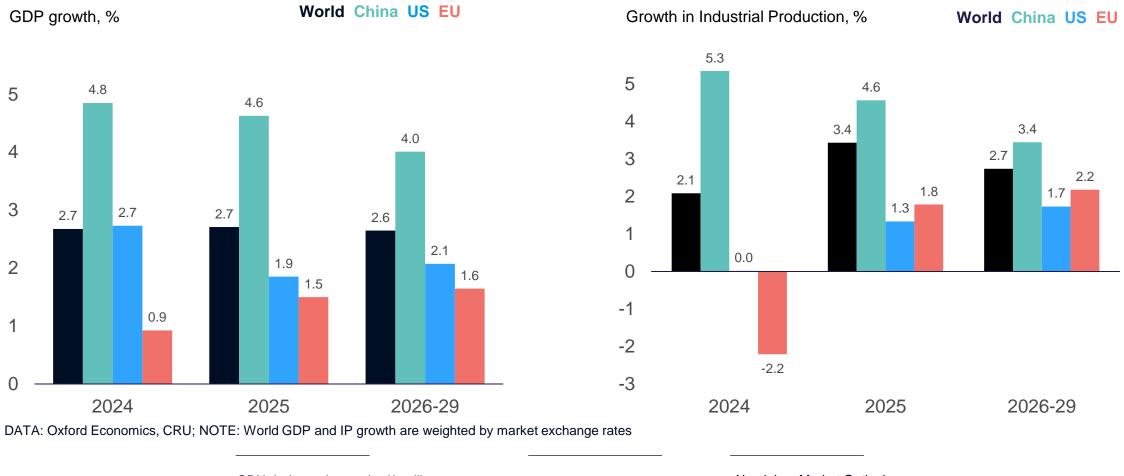
Paul Williams
Head of Aluminium
paul.williams@crugroup.com



## Chinese stimulus and US data have supported the outlook for 2025

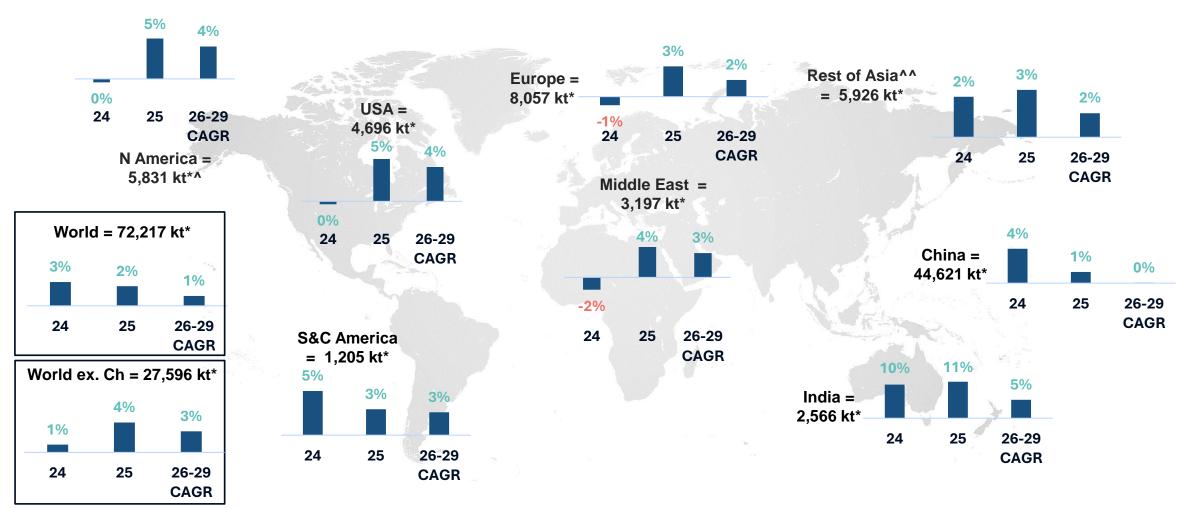
We expect growth to hold steady in 2025...

...with a greater contribution from IP





## World ex. China primary aluminium demand to grow by over 4% in 2025



DATA: CRU. NOTE:\*aluminium consumption in 2024e; ^North America = Canada, Mexico and USA; ^Nest of Asia = Asia ex. India, China, the Middle East

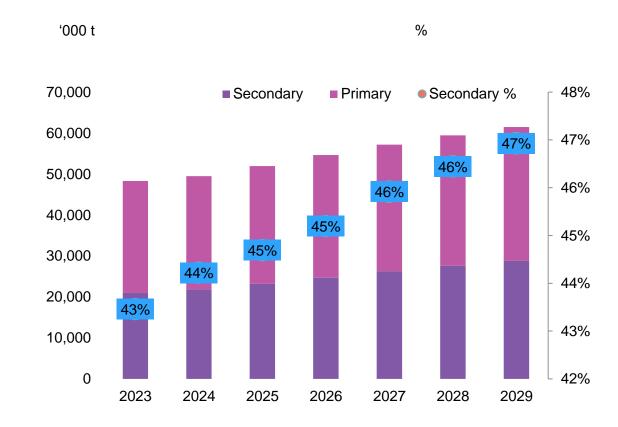


## Semis demand growth will gain from interest rates cuts in ex. China

World ex. China semis: 4.4% CAGR from 2024-29

#### '000t Construction ■ Transport ■ Foil stock Packaging Electrical Consumer durables 70,000 ■ Machinery & Equipment Other 60,000 50,000 40,000 30,000 20,000 10.000 0 2023 2024 2025 2026 2027 2028 2029

Primary consumption share to decrease gradually

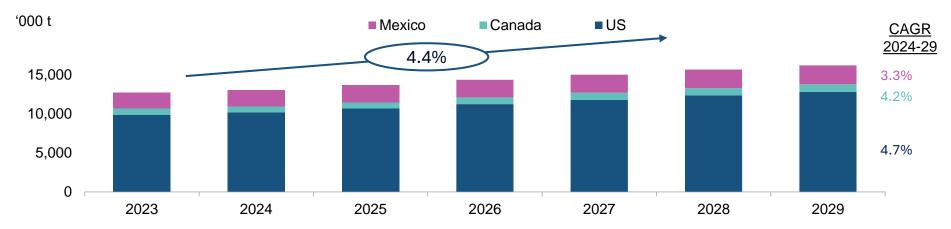


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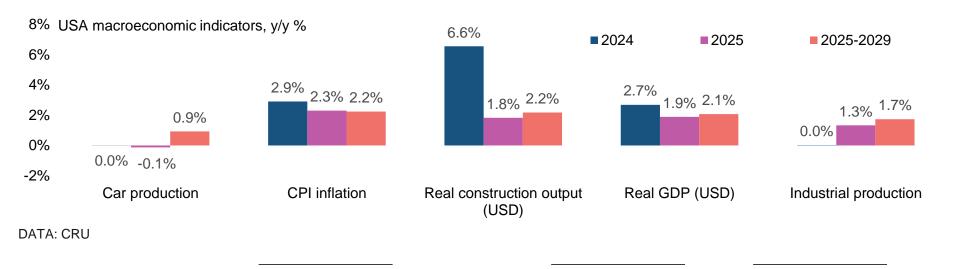


## North American demand to accelerate with onshoring push

North America semis demand is expected to maintain healthy in medium term



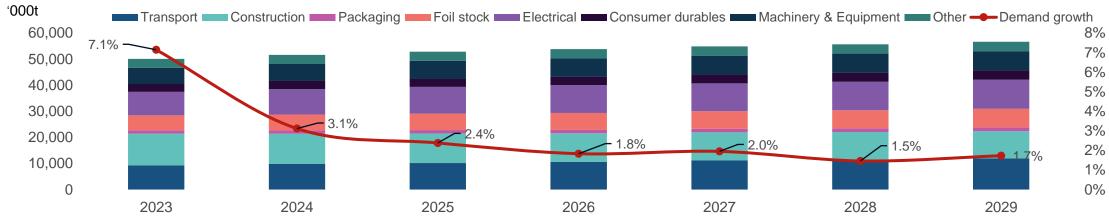
US macro indicators suggesting acceleration in semis consumption after 2025



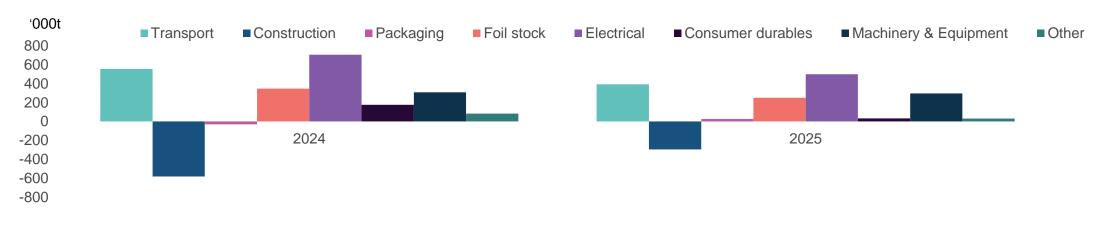


## Stimulus package to help semis demand maintain growth in China

#### Chinese semis demand forecast



#### China's semis demand growth by sectors

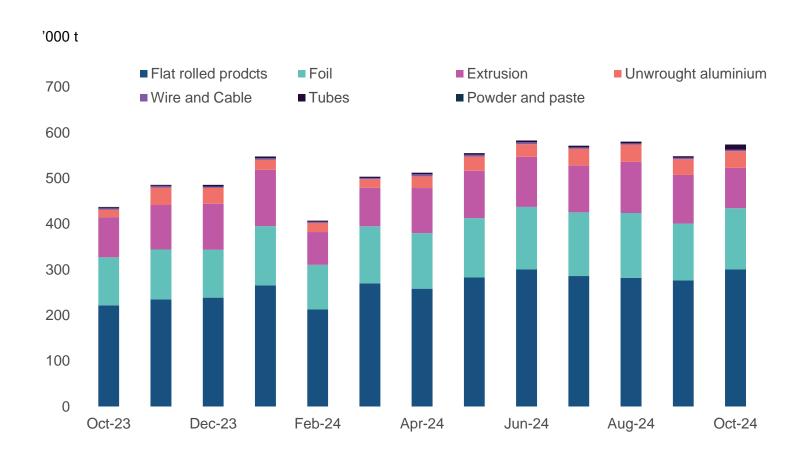


DATA: CRU



## China's aluminium exports stay high, but VAT changes and tariffs impact negatively

China exports of unwrought aluminium and products



#### DATA: CRU, China Customs

## Tariffs will impact exports

China's aluminium exports increased by 17% YTD to end October.

However, in the US a 25% tariff on aluminium took effect on 27 September. President-elect Trump threatens more tariffs.

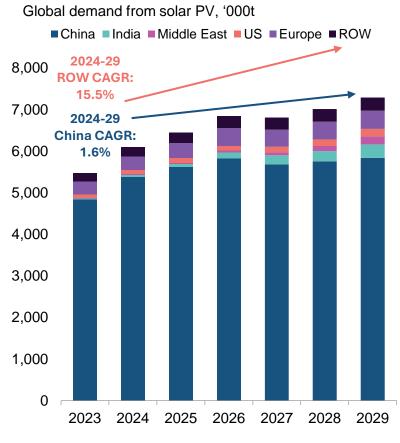
Canadian Department of Finance announced a 25% import surtax on Chinese products, which covers 19 tariff numbers for aluminum. This surtax went into effect on October 22, 2024.

China has recently announced the cancellation on VAT rebates on aluminium semis.



### Sun setting on solar growth in China





Rapid module capacity build-out ex. China...



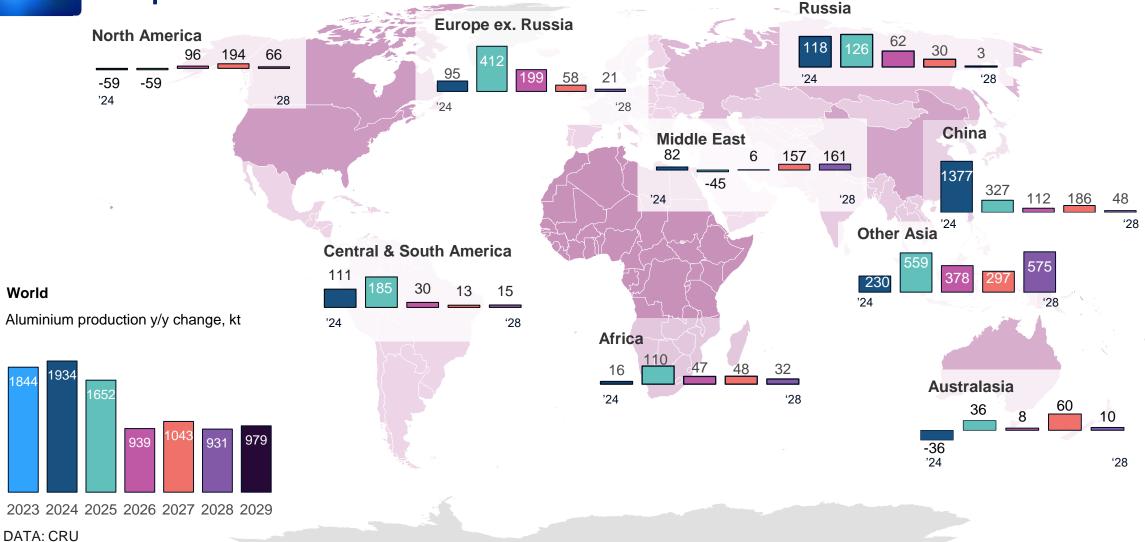
#### China remains dominant player

- China leads demand growth in solar
- The second half of this decade, however, is set to look very different as Chinese demand slows significantly. While demand ex. China will pick up markedly, China will still account for the lion share.
- Alongside thrifting and increasing module efficiency, downside effects to Chinese demand growth are being driven by plateauing module production.
- Outside of China, module capacity build out, together with onshoring away from China, is expected to drive demand growth.
- India is building significant module capacity, and we expect extrusions demand growth from the Middle East to satisfy this.

DATA: CRU



Production growth in world ex. China faces delays but will outpace China from 2025





## Indonesian expansions: ongoing but slower than originally expected

Projects included in our base case add 1.2Mt.by 2028



Huaging Morowali Aluminium has ramped up



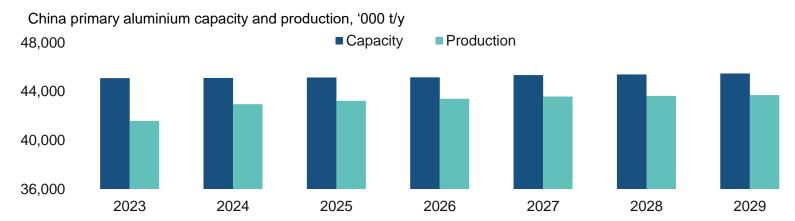
## Indonesian projects are progressing but slower than expected

- Indonesia, remains the largest potential growth region over the next decade.
- Huaqing Aluminium Morowali smelter started operating in March 2023, and produced ~140 kt of alumnium last year
- expansions at Huaqing Aluminium Morowali have not been started. Levelling work for the Kaltara smelter started in 2023. CRU forecasts the smelter to start ramping up an initial 500kt/y from 2025.
- Bintan has also not started construction at this time.

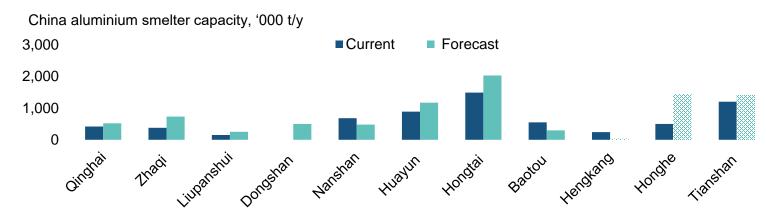


## China primary aluminium production to grow slowly

China smelting capacity to reach the ceiling



Very few new projects to be added in China



DATA: CRU. Note: Projects in dashed color means the projects have not started construction yet.

### China production hit record high in September but will grow slowly

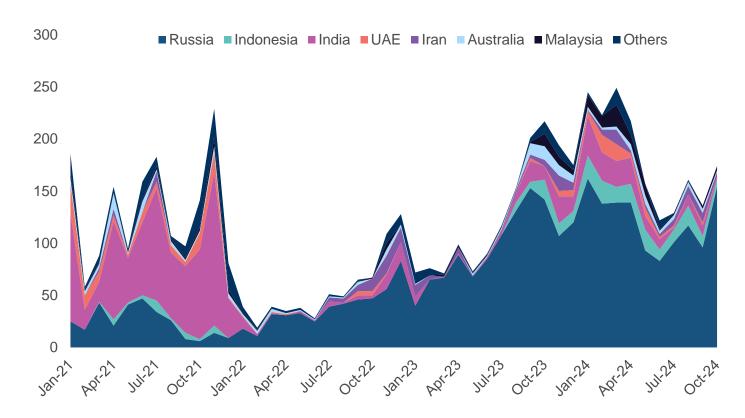
- China primary aluminium production hit a record high of 3.58 Mt in September 2024, implying the operating capacity in China at 43.64 Mt/y. China is expected to reach the aluminium smelting capacity ceiling of 45.4 M t/y set by the government in 2027.
- However, China primary aluminium production is expected to grow at a very limited rate of 0.3% CAGR 2024-2029.
- On the new projects, the production increase will be only from Chalco Qinghai, Zhaqi phase two project during the forecast period. Potentially, Xinjiang Tianshan may have a net increase capacity of 200,000 t/y over the long term, which has already reached capacity. All the capacity increase in other smelters on the bottom left chart won't bring any capacity increase since the relevant smelters have to close the equivalent capacity based the capacity swap policy for aluminium smelters elsewhere in China.



### China primary aluminium imports trending lower

Primary aluminium imports from Russia stabilises in Q3 2024

China primary aluminium imports (HS code 760110, '000t



DATA: GTT, CRU

## Negative arbitrage impacts imports

China primary aluminium imports (HS code 760110) totaled 430 kt in Q3 2024, down by 13.7% q/q. Most of the decline come from the countries including Indonesia and Malaysia, primarily driven by the negative import arbitrage in the past quarters.

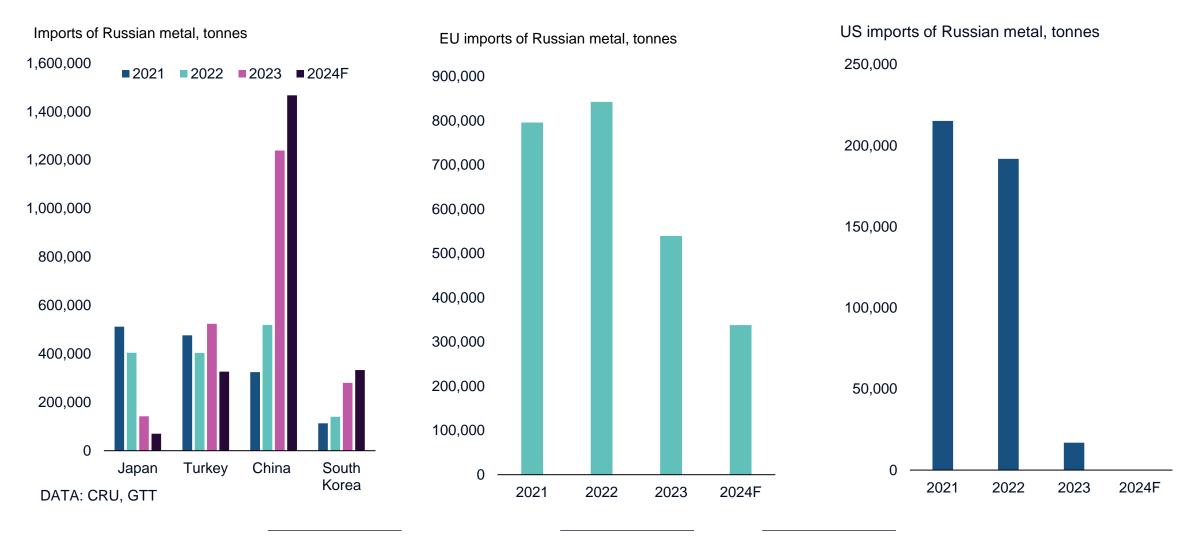
The imports from Russia remains stable at 314 kt in Q3 2024, relatively unchanged from 315 kt in Q2 2024.

However, despite negative arbitrage imports rose again In October.

Rusal started to do alumina tolling trade with China Hebei Wenfeng alumina refinery, in which Rusal holds 30% of shares of Hebei Wenfeng. The tolling trade means that Rusal buys alumina from China and exports primary aluminium into China on tolling trade base. China has imported 263 kt of primary aluminium from Rusal in the first three quarters this year, accounting for 33% of the total imports from Russia this year.



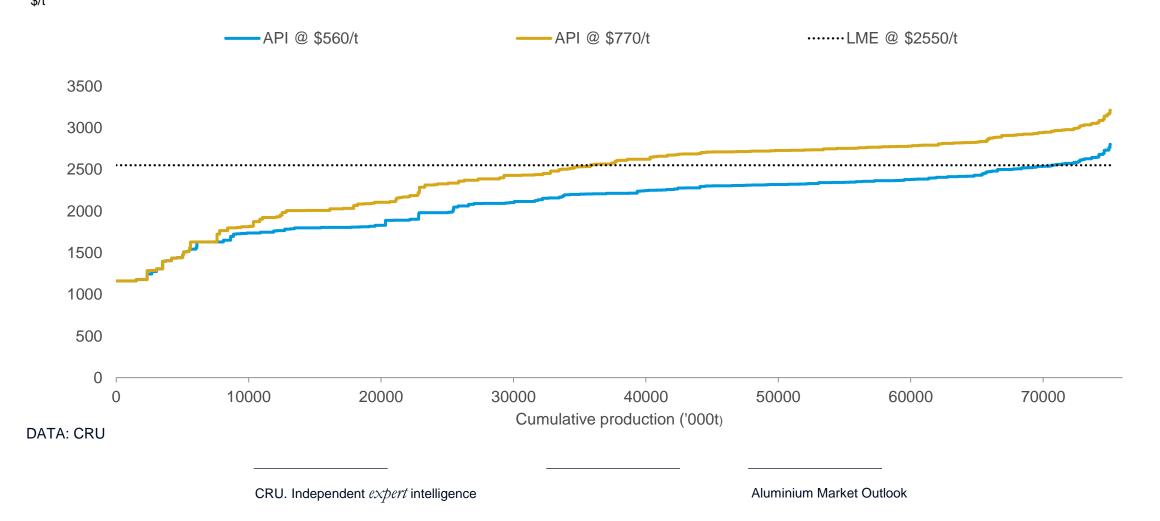
## Russia's primary exports only rising to South Korea and China this year





### Alumina is placing pressure on smelter margins

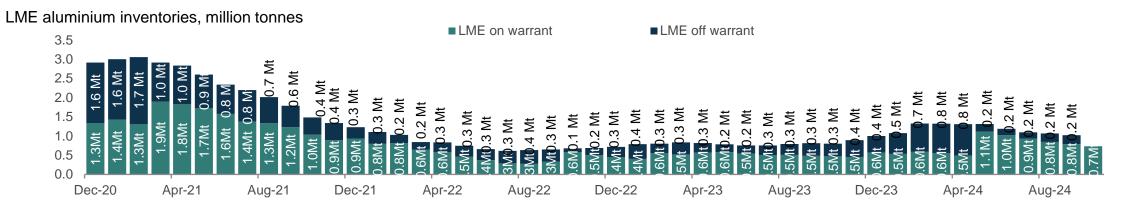
2025 Business costs at current alumina prices would shift >50% of production into the red \$/t\$



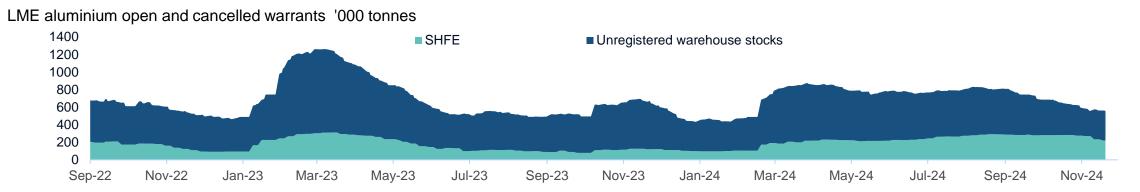


### Exchange inventories trend lower

LME on warrant and off warrant inventories \*Off warrant data for October not yet available



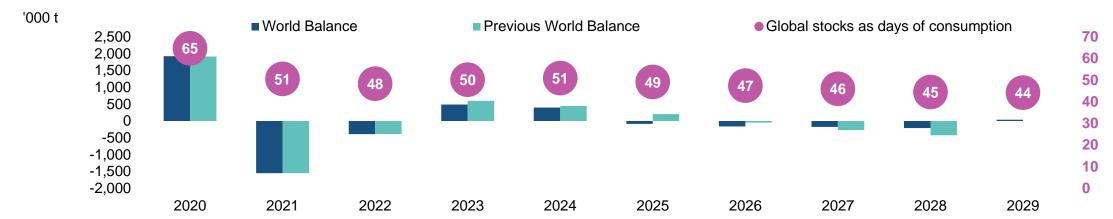
#### SHFE and unregistered China inventories



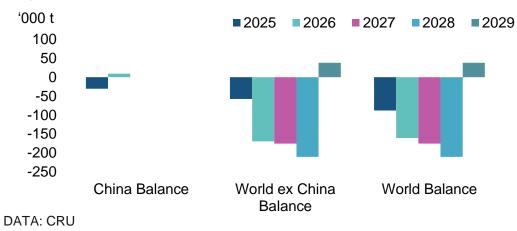


## Primary market to tighten sooner than previously expected

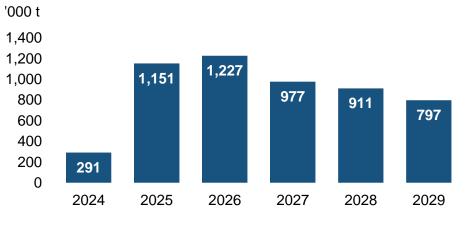
#### Global balance & Days stocks



#### Projected world balances 2025-2029



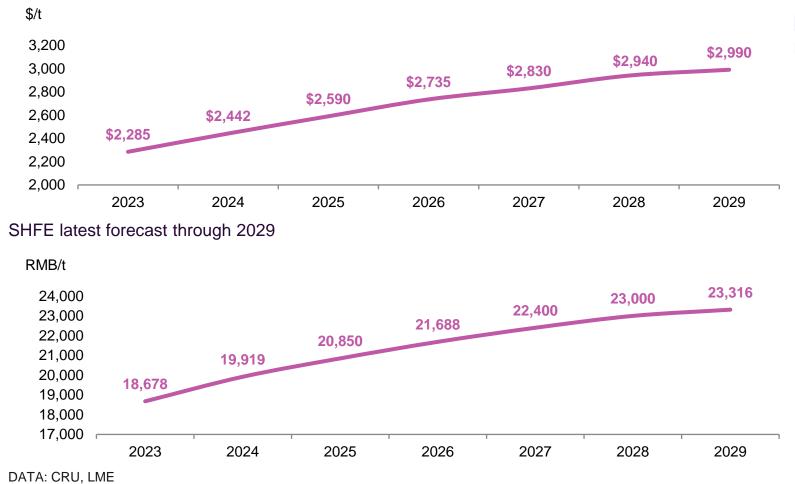
World ex China primary consumption y/y change





### IRU LME 3-month outlook positive on tighter balance

LME 3-month outlook steady entering the second half of the year



### Bullish outlook continues as demand recovery set to pick up pace

- While recent moves on the LME are still believed to be ahead of the fundamentals, there is no doubt that sentiment has started to shift. The outlook through much of the forecast has been lifted on adjusted market balances.
- 2025 will still get off to a slow start but the market is now expected to shift into deficit by year end. This will then continue through to 2029 and gives support for a higher LME 3-month price.
- Other factors will also come into play.
   Costs will continue to increase through much of the forecast period. World ex China consumption will continue to grow, and the US dollar outlook is bearish through the middle years of the forecast.

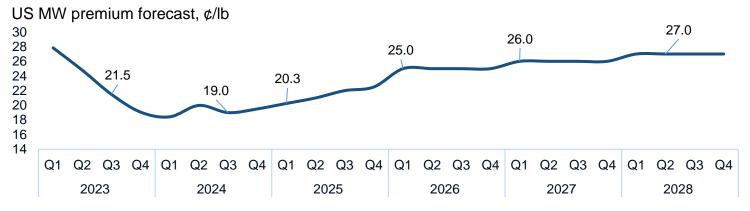


### Upside risks have increased for premiums

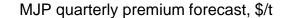
European ingot premiums expected to increase ahead of demand improving

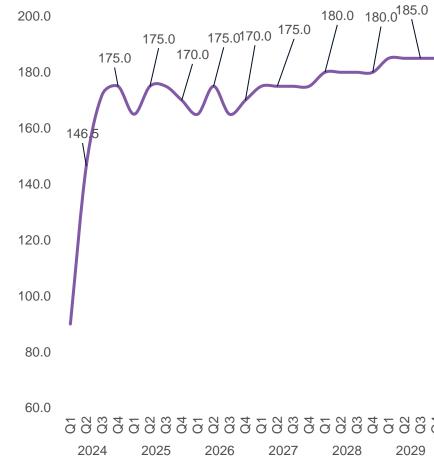


US Midwest premium forecast throughout the forecast period



DATA: CRU, Drewry Market Research







### **Takeaways**



Demand has disappointed, particularly in Europe, recovery expected in 2025, but with downside risks. EV transition facing risks, especially in US



Restarts in primary production will be vital to meet demand in the long term. China still has a capacity cap. VAT rebate changes may shift more exports down the value chain



Prices have risen on Chinese stimulus and VAT cancellations. Alumina could place more upward pressure on prices in 2025.



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## Thank you.

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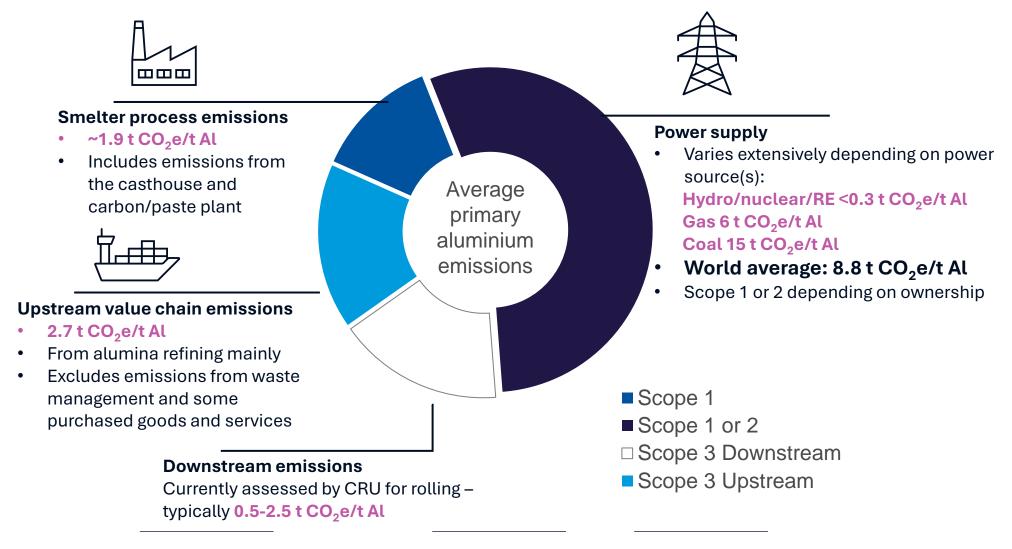


Data, Insight, Strategy & Communities

# Aluminium industry decarbonisation: Can the industry meet net zero targets? Paul Williams & Wan Ling



### Emissions in aluminium smelting

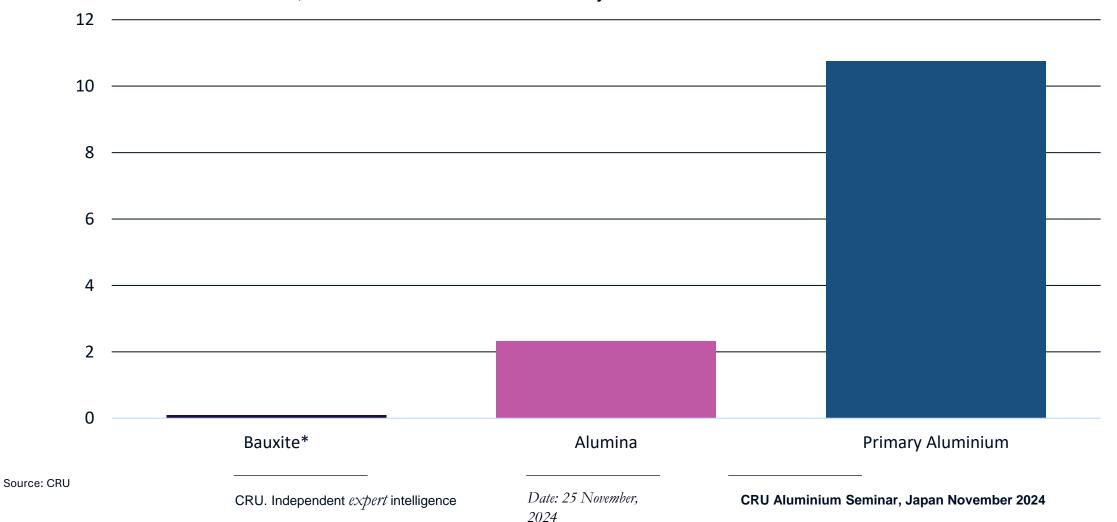


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### The smelting industry is the key to decarbonisation

Weighted average scope 1 and 2 emissions per tonne of primary aluminum t CO2e/t, 2023: DATA CRU's Emissions Analysis Tool

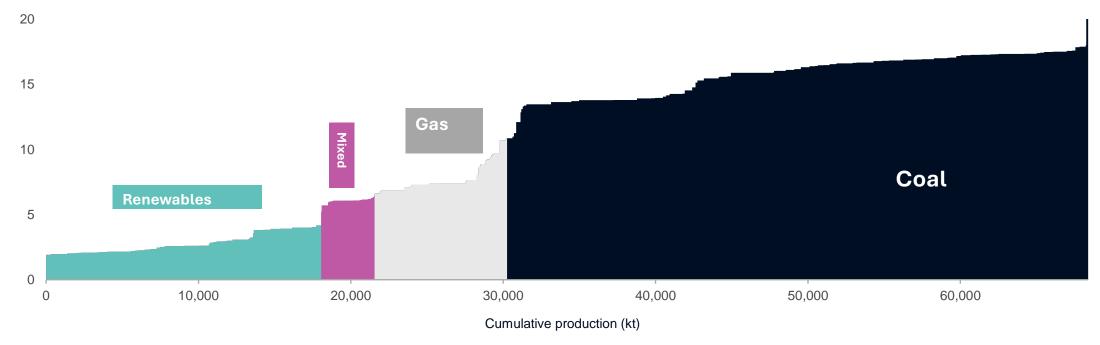




# Primary aluminium emissions curve by power source – a long way from carbon free primary

### World scope 1, 2 and third-party anode purchases emissions in 2023

Aluminium emissions curve (scope 1, 2 and third party anode purchases), 2022, t CO2e/t Al

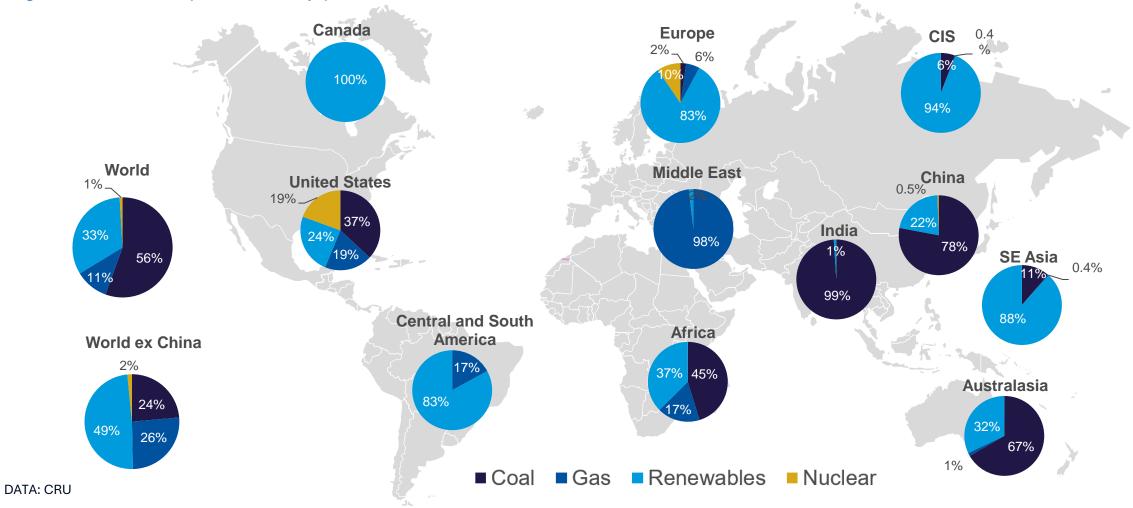


DATA: CRU Emissions Analysis Tool



### Primary aluminium smelting by power source

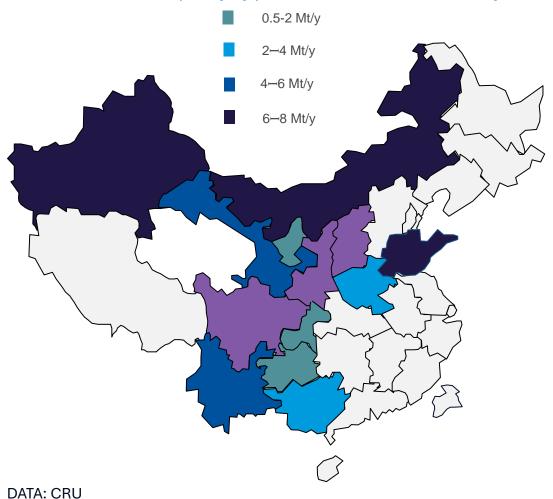
Regional aluminium production by power sources, 2023



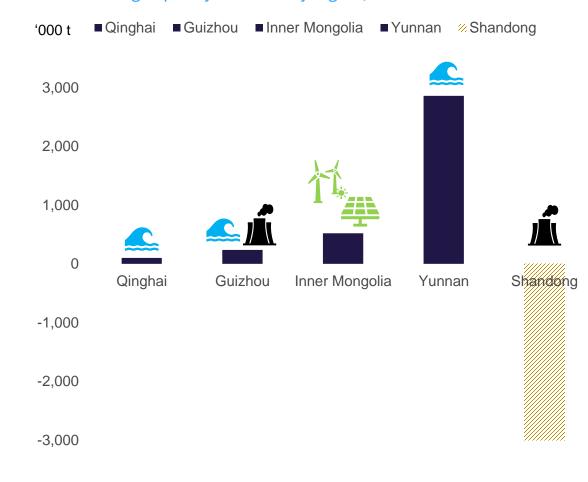


# China smelters moving towards renewables and relocation to reduce emissions





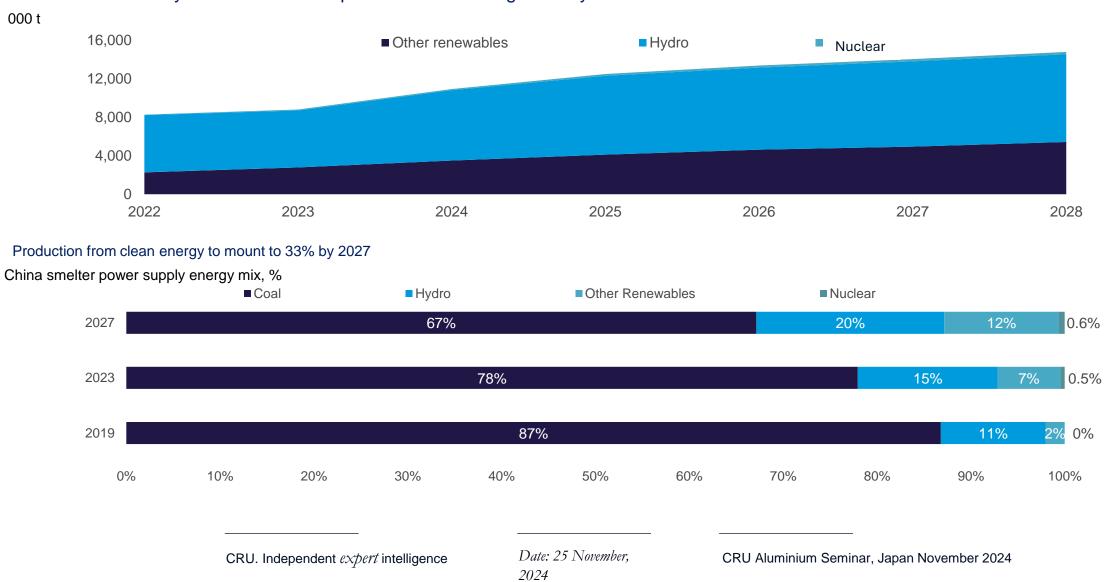
#### China smelting capacity increase by region, 2023-2033





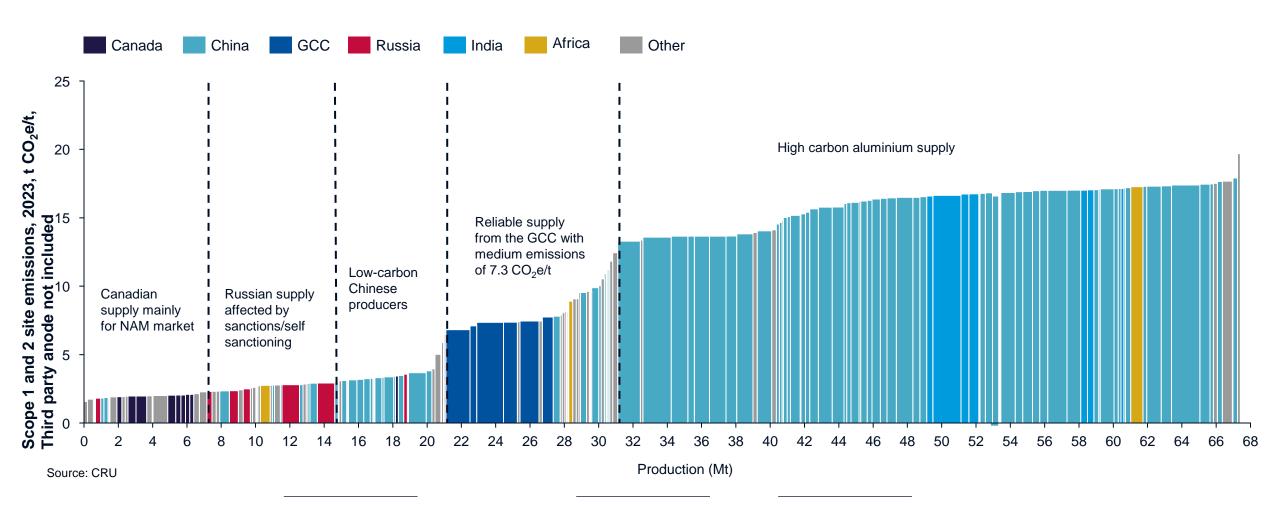
### Primary production from clean energy to increase in China

Production from both hydro and wind/solar power to increase significantly





### CRU's Primary emissions curve by geography

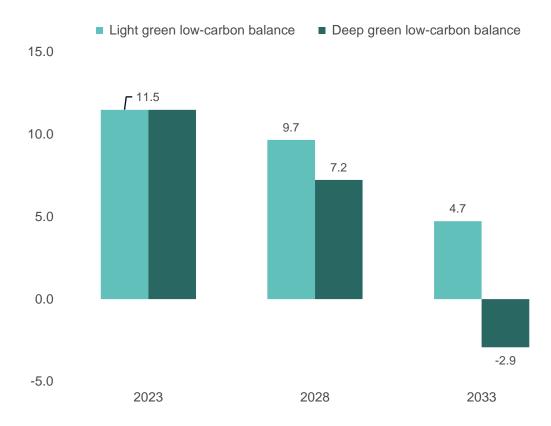




### Low carbon demand is rising but supply plentiful for now

Surplus to shrink but likely to be around the end of the decade before tightness arrives

World ex. China, low-carbon market balance, million tonnes



DATA: CRU. Note: this assumes low carbon to represent primary aluminium being produced with smelter emissions of less than 4 tonnes of CO<sub>2</sub> per tonne of aluminium

# Unwillingness to buy Russian metal could accelerate tightness

Low carbon aluminium demand is rising, particularly in Europe, and in the automotive and packaging sectors. However, growth is arguably a little slower than expected at present due to the weakness of overall demand.

To be clear, we estimate low carbon primary consumption to be that which is paying a low carbon premium. Meanwhile, we estimate that the low carbon supply in the calculations for our balances, shown in the accompanying chart, is smelters with emissions below 4 t of  $\mathrm{CO}_2$  per tonne of aluminium.

There is a large portion of aluminium smelter output that has been around for a long time which is below this threshold e.g. hydro powered smelters in Canada and Russia. Given the market imbalance, a low carbon premium is struggling to rise, and we assess it at modest levels, and currently only established in Europe and in the world ex. China.

In the long-term, we expect demand to grow strongly, and this will erode the surplus. This process will effectively be accelerated if these consumers are unwilling (or unable) to buy Russian material.

Aluminium Long Term Outlook



### How can industry decarbonise more?

#### Shift to renewables is not enough on its own

#### **Renewable Energy**

Smelters will have to increasingly use renewable energy.

**CBAM** could turn coal smelters into stranded assets

Seek "greener" alumina and bauxite

#### **CCUS & Offsets**

Residual emissions will be difficult to eliminate.

Carbon capture use or storage and offsets will play a role.

Source: CRU

#### **New Technology**

Examples: Alcoa and RTA JV to develop **inert** anode technology (Elysis).

Arctus Al trialling with Trimet.

Rusal is also working on inert anodes, with trial production at Krasnoyarsk.

The technology eliminates direct process emissions, as well as the need for carbon baking.

Hydro – **HalZero process** 

#### Recycling

Regulation: Legislation on drink cans, EoL vehicles

**Technology**: Better sorting & segregation of scrap.

**Infrastructure**: Improved waste collection and recovery, especially in Asia.

**Design**: Need for easier disassembly and sorting.

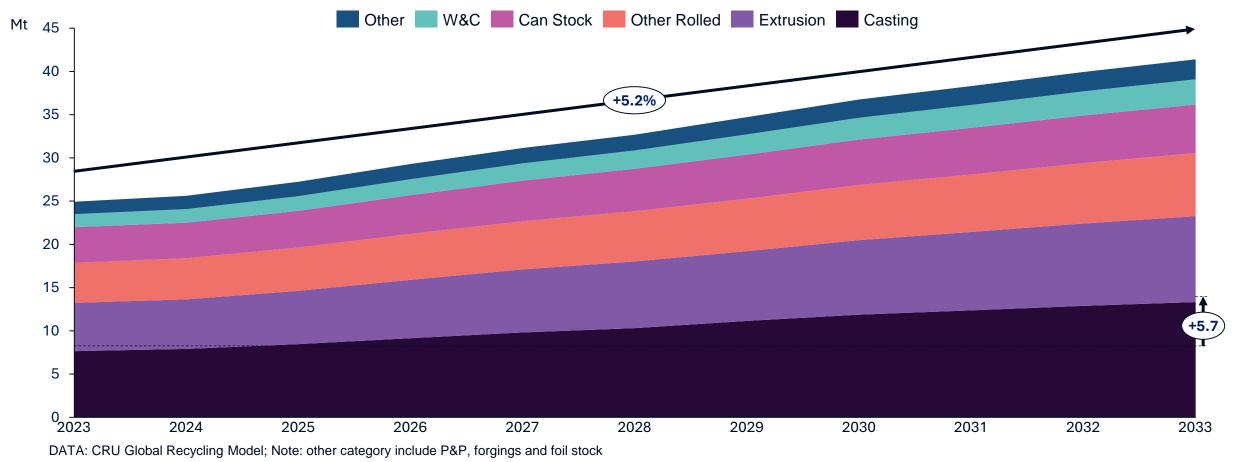
**Trade**: Treat waste close to source, large amounts of low-grade scrap exported to China and India.

Culture: Re-use, repair, recycle society.



# Global collected old scrap set to increase by 16.5 Mt over the next 10 years

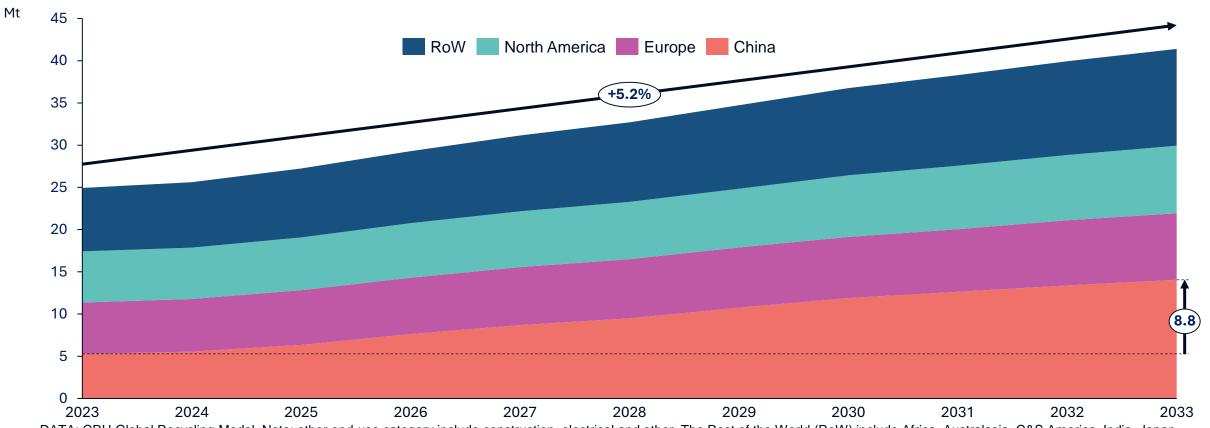
Estimated global old scrap collected by product group (2023 – 2033)





# Collected old scrap in China will increase by 8.8 Mt over the next 10 years

Estimated global old scrap collected by country or region (2023 – 2033)



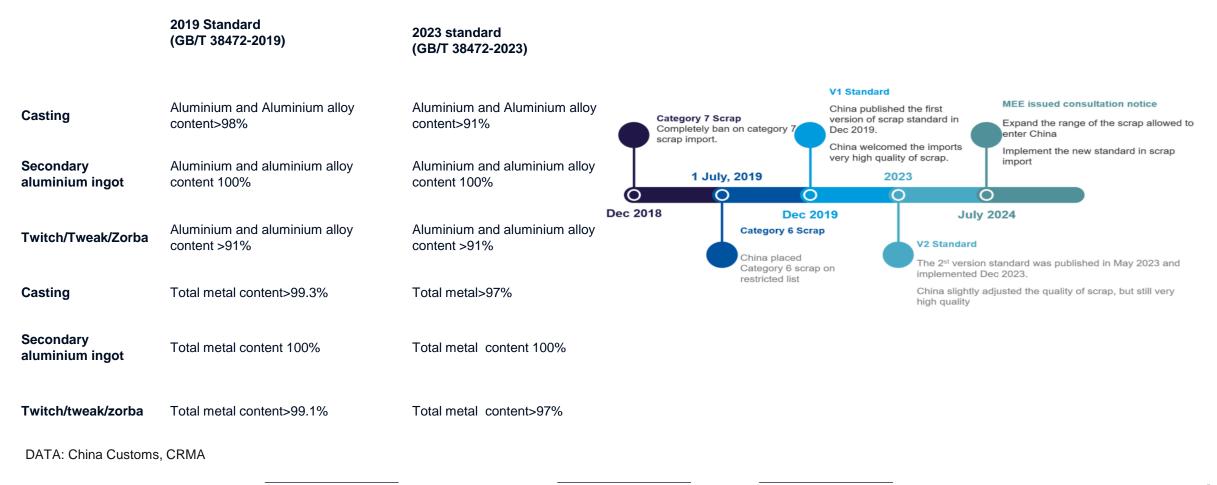
DATA: CRU Global Recycling Model. Note: other end-use category include construction, electrical and other. The Rest of the World (RoW) include Africa, Australasia, C&S America, India, Japan, Middle East, Rest of Asia, Russia and South Korea.



### Fight for scrap ahead as China moves to encourage quality scrap imports

### China relaxes scrap grades in V2 standard

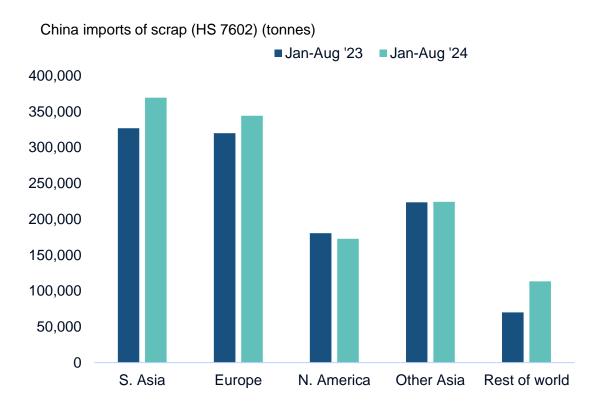
### China scrap policy changes over time

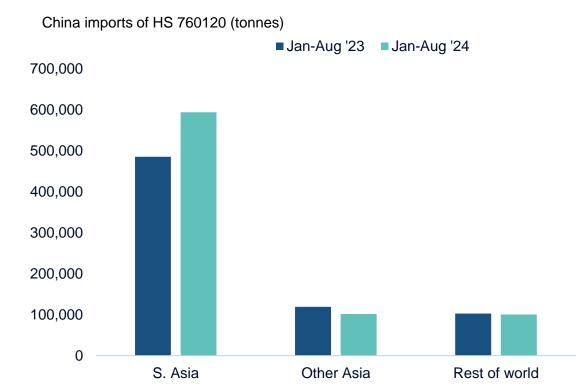




### China increases imports of scrap and RSI

#### Chinese imports of scrap up 9% YTD and on course to import ~1.8Mt for full year

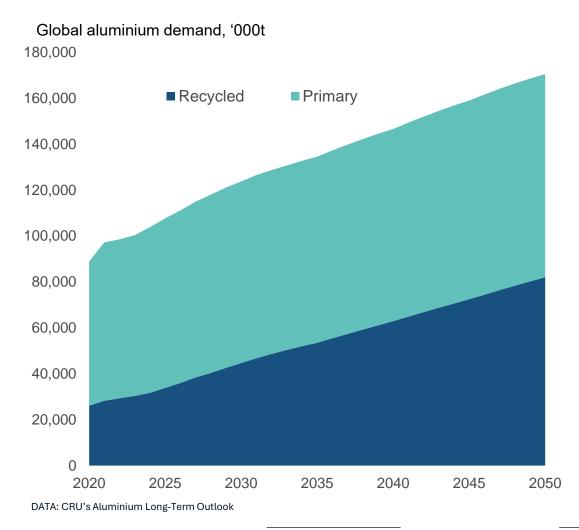




DATA: GTT, CRU. Note that imports of 760120 include primary based value-added products, but CRU estimates that majority of imports are RSI



### Our view is bullish on global recycled demand



- We expect recycled aluminium to take a larger share of the global total metal requirement for aluminium
- That said, we still expect that global primary demand will rise throughout the forecast period, albeit at a slowing pace
- In some countries we expect primary demand to be falling from later this decade, most notably China
- Under this context, we can expect scrap to become the new gold, and the fight is already on to secure long-term supply, especially for primary grade



### Key takeaways

To decarbonise the aluminium industry, it is necessary to decarbonise the sources of power.

New technologies required to decarbonise scope 1.

Low carbon aluminium demand will rise – eventually leading to tighter market and increased low carbon premia

Growth of recycled metal major part of solution – more collection, segregation and better design required



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# What will China's role in the global aluminium industry be?

Wan Ling

Principal analyst,

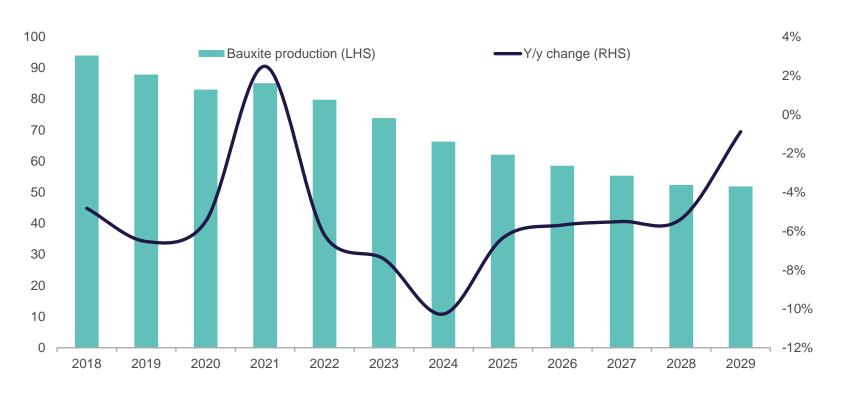
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### China bauxite supply facing more challenges

Dwindling domestic bauxite production in China

China bauxite production, Mt



# More efforts are being made on bauxite supply in China

Domestic bauxite quality and quantity are likely to decline over time

China is making more efforts to use bauxite underneath coal mines

China is trying to use coal ash as well.

DATA: CRU

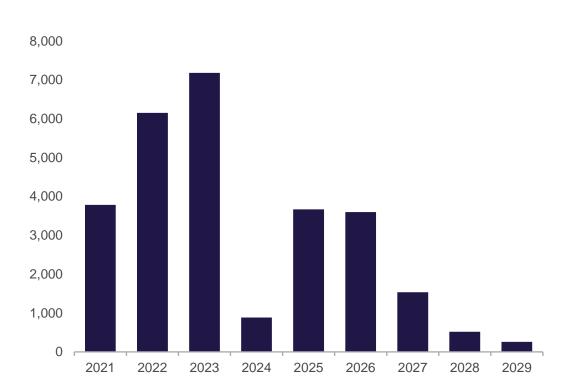
Bauxite and Alumina Market Outlook



### Chinese alumina capacity to increase substantially

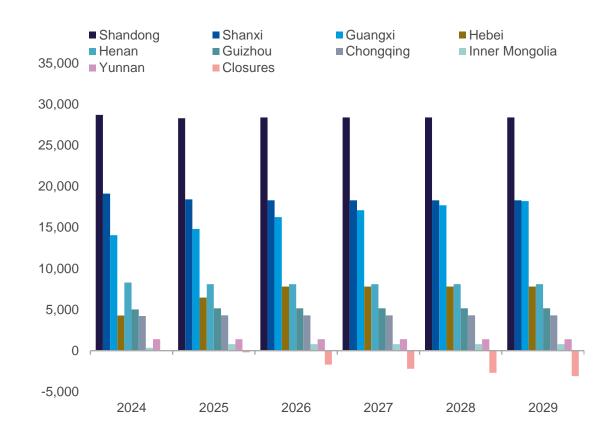
Another 10 Mt/y of capacity to be added in the Chinese alumina market

China's additions to alumina capacity, '000 t/y



Steep production gains in Hebei, but potential cuts depending on bauxite

China alumina production, '000 t



DATA: CRU

Bauxite and Alumina Market Outlook



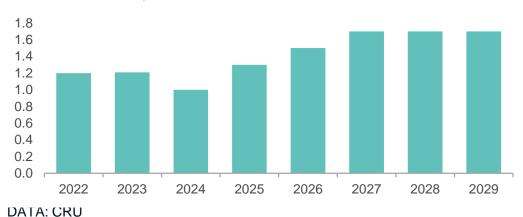
### China trying to diversify bauxite import source

#### Bauxite mining underway in Laos

#### Laos bauxite production, Mt 1.8 1.6 1.4 1.2 1.0 8.0 0.6 0.4 0.2 0.0 2022 2023 2024 2025 2026 2027 2028 2029

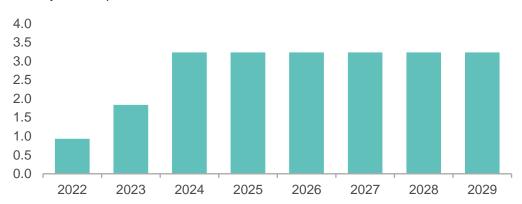
#### Sierra Leone providing upside to bauxite supply

#### Sierra Leone bauxite production, Mt



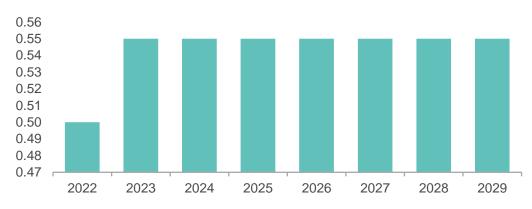
#### Turkey shifts to exporting additional volumes

Turkey bauxite production, Mt



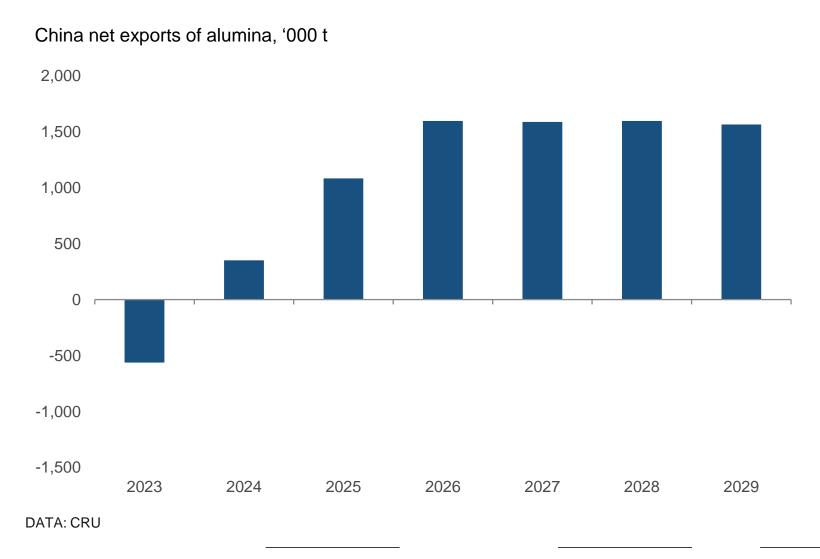
Montenegro providing limited volumes to China

#### Montenegro bauxite production, Mt





### China to shift to a net exporter of alumina



# China alumina capacity continuously grow

China called for prevent alumina industry from over investment in capacity, however, no capacity ceiling has been set for alumina industry.

The investment in alumina capacity continues in China, which will result in it becoming a net exporter of alumina over the medium term.

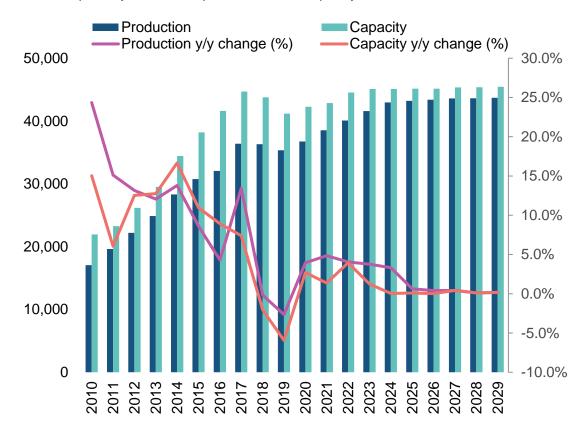
Alumina is a raw material. The risk is whether China will try to control the exports of alumina.



# China primary aluminium production to grow very slowly

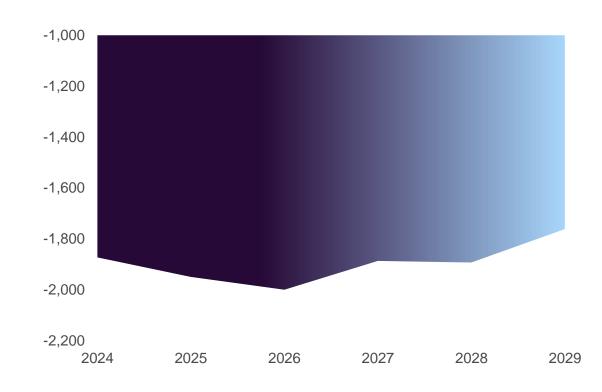
#### China smelting capacity to reach the ceiling

China primary aluminium production and capacity, 000 t



#### China will remain a net importer of primary aluminium

China net imports of primary aluminium, '000 t



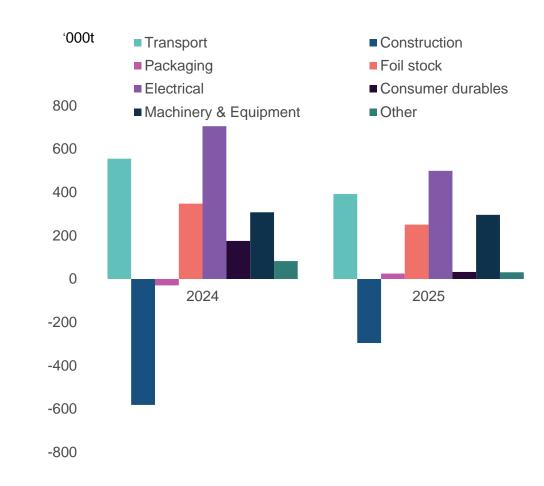


# Stimulus package to help semis demand maintain growth in China





#### China's semis demand growth by sectors



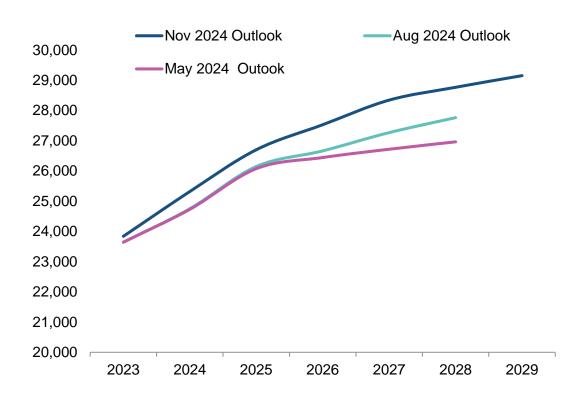
DATA: CRU



# China's rolling capacity growth faster than expected

Chinese rolling capacity revised up by 800 kt/y in 2028

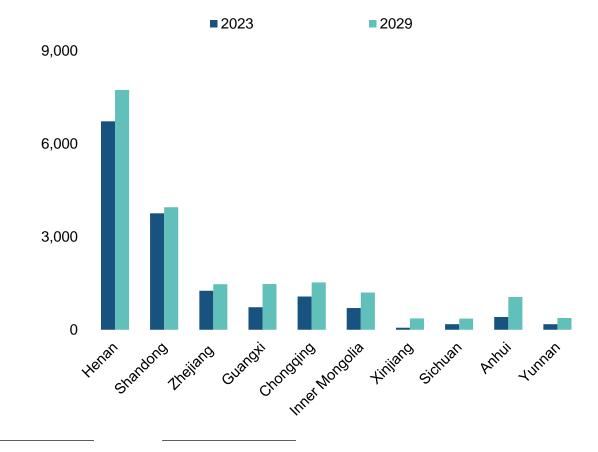
China rolling capacity, 2023-2029,000 t/y



DATA: CRU

Major provinces have big investments in new rolling mills

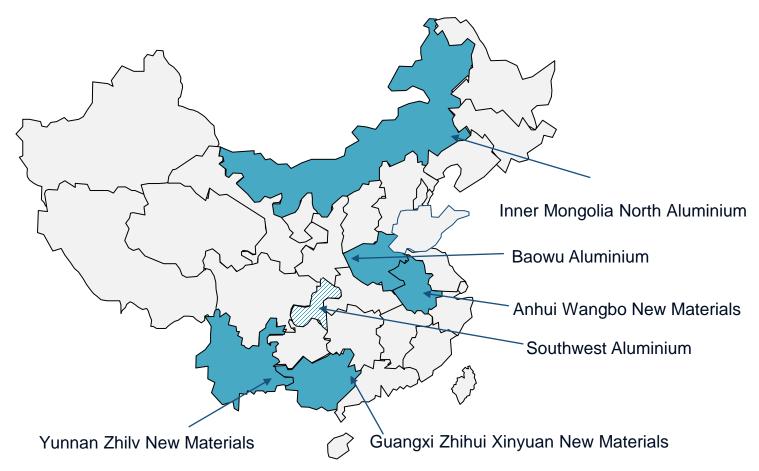
Rolling capacity changes in the major provinces with new investments, 000 t/y





# More modern projects are planned/constructed in China

New big rolling mills planned/constructed in China



# Most new rolling projects target 1+4 hot tandem mills

China has 15 hot tandem lines with technology at 1+4 and above. These hot tandem capacity totals 6.46 Mt/y. Except for the hot tandem at Asia Aluminium, which is idled, all the other 14 lines are operating. 6 of them use SMS Demag technology. Most of the hot tandem lines target can stock, auto body sheet, aerospace plate.

China is adding another two 1+4 hot tandem lines and one 1+1+4 hot tandem.

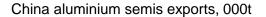
In addition, China has 6 1+3 hot tandem lines with capacity totaling 2.4 M t/y.

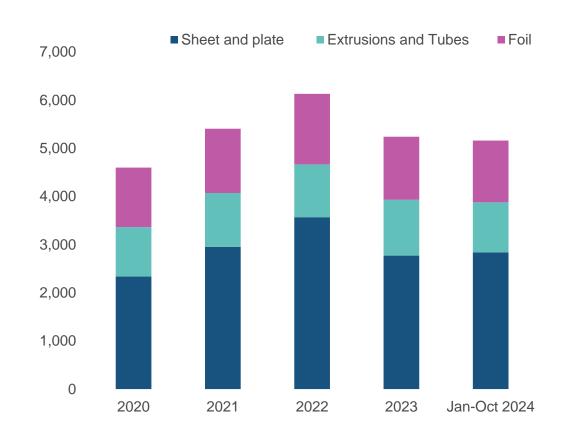
DATA: CRU

Aluminium Rolled Products Market Outlook

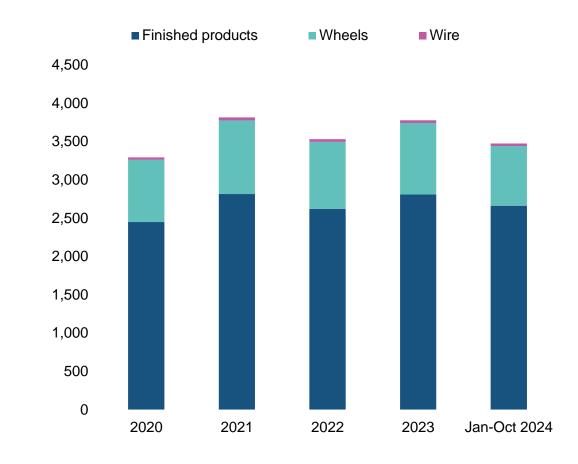


# China vat rebate removal, negative for semis, but positive for finished products





#### China finished products, wheels and wire exports, 000t





# Almost all types of scrap with grade over 91% can be exported into China

China simplified the scrap import policy

	HS codes	Inclusions	Others	UBC can be e
2023 version standard	Recycling material for cast aluminium alloys 760200020	≥91%	The quantity of the raw material containing the coating should not be greater than 5% of the total quantity of the raw material	into China und new policy
MEE's notice in July 24	Recycling material for pure aluminium, 76020030, Recycling material for wrought aluminium, 760200040	≥91%		The scrap adjustment been effective from 1: 2024.
MEE's final notice in Oct 24	Recycling material for pure aluminium, 76020040, Recycling material for wrought aluminium, 760200050, recycling material for cast aluminium, 760200020 and 760200030.	≥91%	Not mentioning the weight of coating	Under the new policy, welcomes imports of types of scrap with grincluding UBC.
				The import volume withe scrap availability

# exported der the

nt policy has 15 November

y, China almost all grade over 91%

will depend on ex-China.

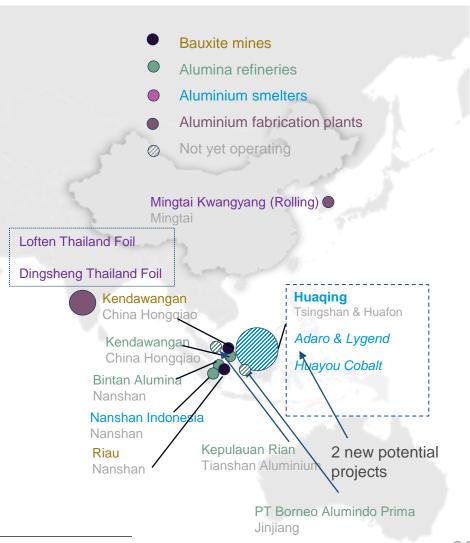
SOURCE: MEE, CRU



### China investment abroad to accelerate

New focus on the alumina and aluminium smelting projects in Southeast Asia



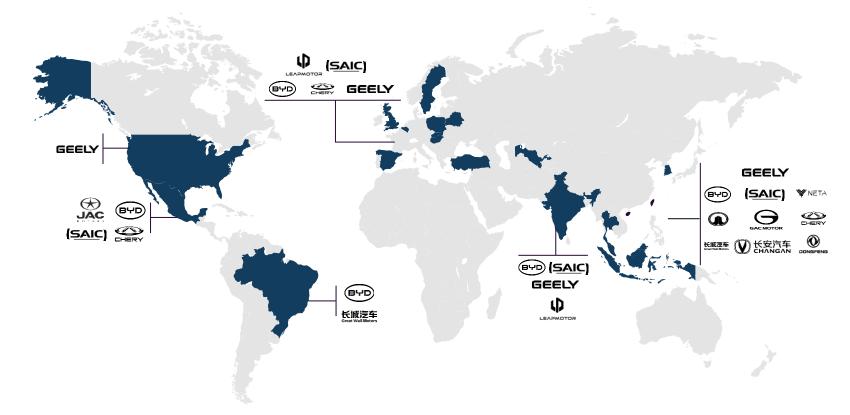


DATA: CRU



# Chinese companies are expediting global expansion, leveraging cost advantages

Major Chinese BEV overseas production plans



Intense domestic competition & rising protectionism prompts Chinese OEMs to build overseas

Expand overseas, where there is less competition, and an opportunity to maximize profits to offset shrinking margins in China

Localisation allows Chinese OEMs to bypass import tariffs

Localisation has emboldened them to focus on 'Rest of World' emerging markets

DATA: CRU, company announcements. Includes kit production



# China's roles in global aluminium market

	Supply	Demand	Import	Export	Overseas investment
Bauxite	Down	Up	Up	No	Up
Alumina	Up	Flat	Down	Up	Up
Primary aluminium	Flat	Up	?	No	Up
Aluminium semis	Up	Up	Down	?	Up
Aluminium scrap	Up	Up	Up	No	Flat

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