

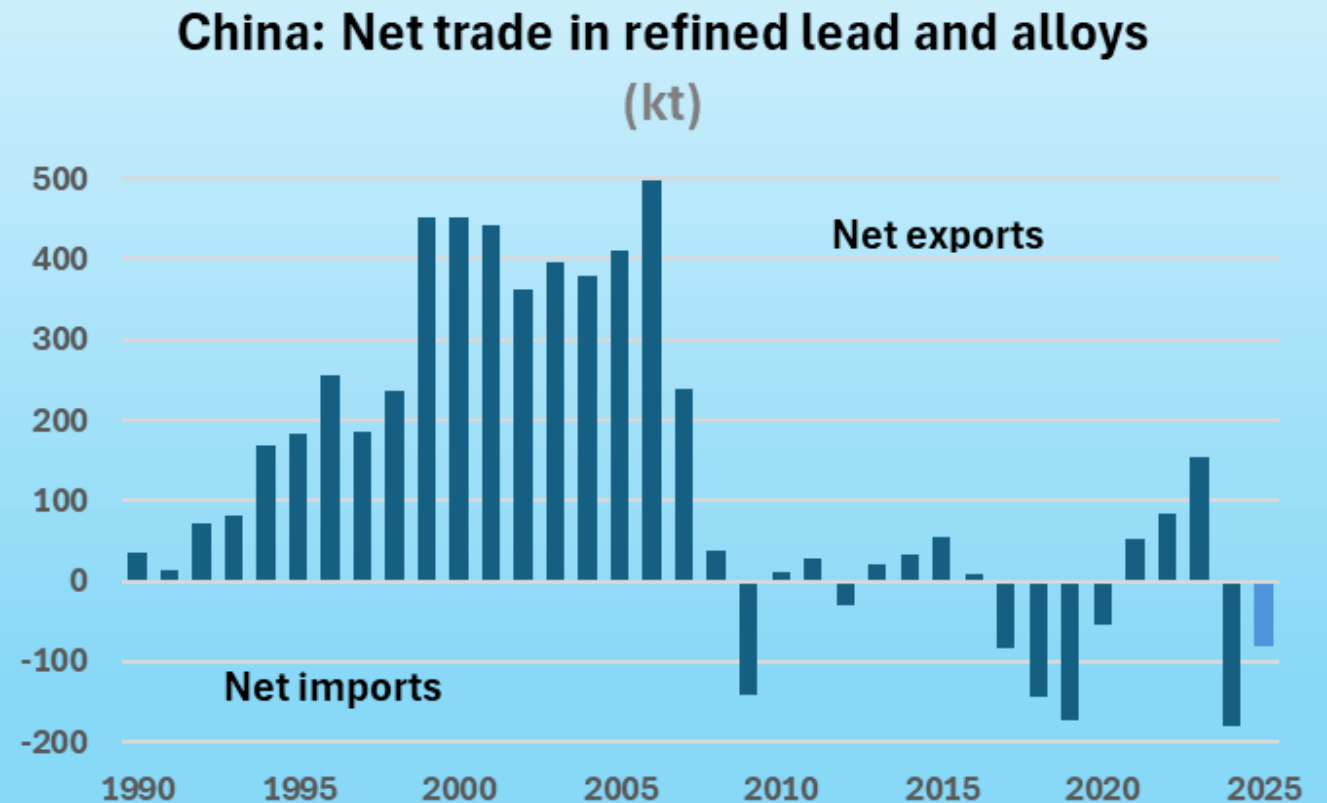
Is China on the path to a significant structural surplus in lead supply?

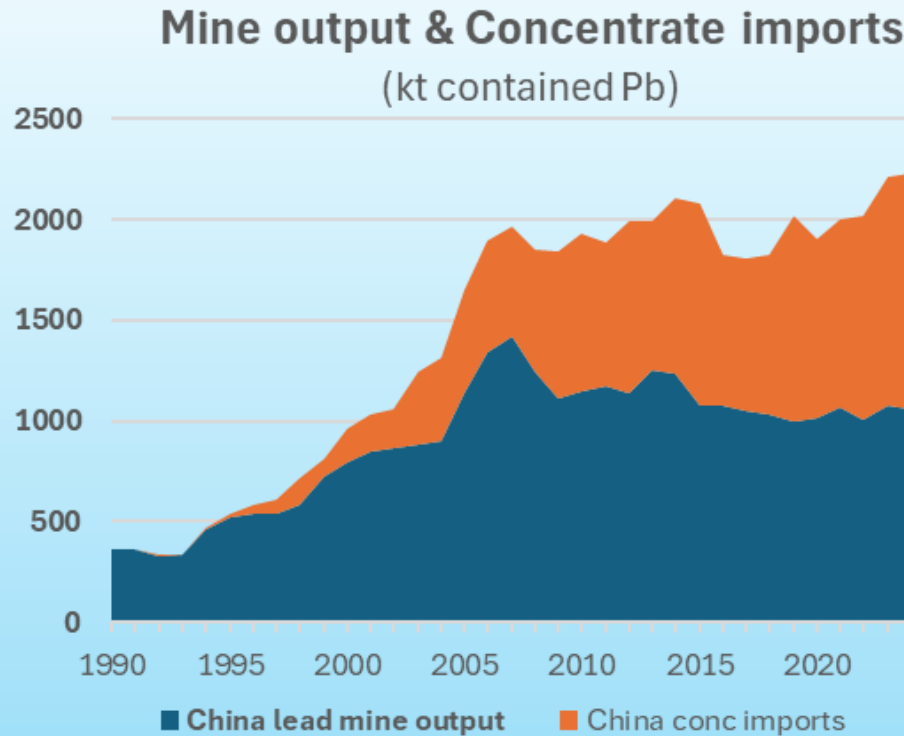
Huw Roberts
CHR Metals Limited

Pb 2025
Amsterdam June 2025

China has been both an exporter and importer of refined lead, alloys and bullion

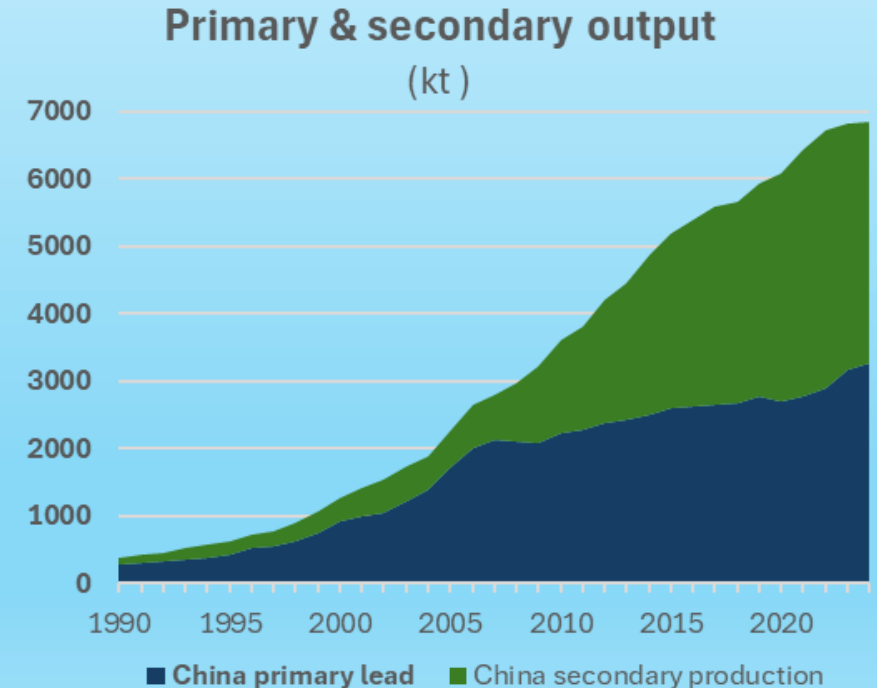
- China was a significant net exporter of refined lead from mid-1990s until 2007
- Ending exports was policy, not market driven
- VAT rebate on exports cancelled at the end of 2006 and 10% export tariff imposed in 2007
- Trade after 2008 reflects domestic market dynamics and arbitrage opportunities





- **Rapid increase in domestic mine production from mid-1990s and rising imports of lead concentrates underpinned growing output of primary refined lead...**

- **...together with a very fast increase in secondary lead production from 2005**
- **The emergence of lead battery powered e-bikes together with growing conventional vehicle fleet generated significant volumes of battery scrap for recycling**

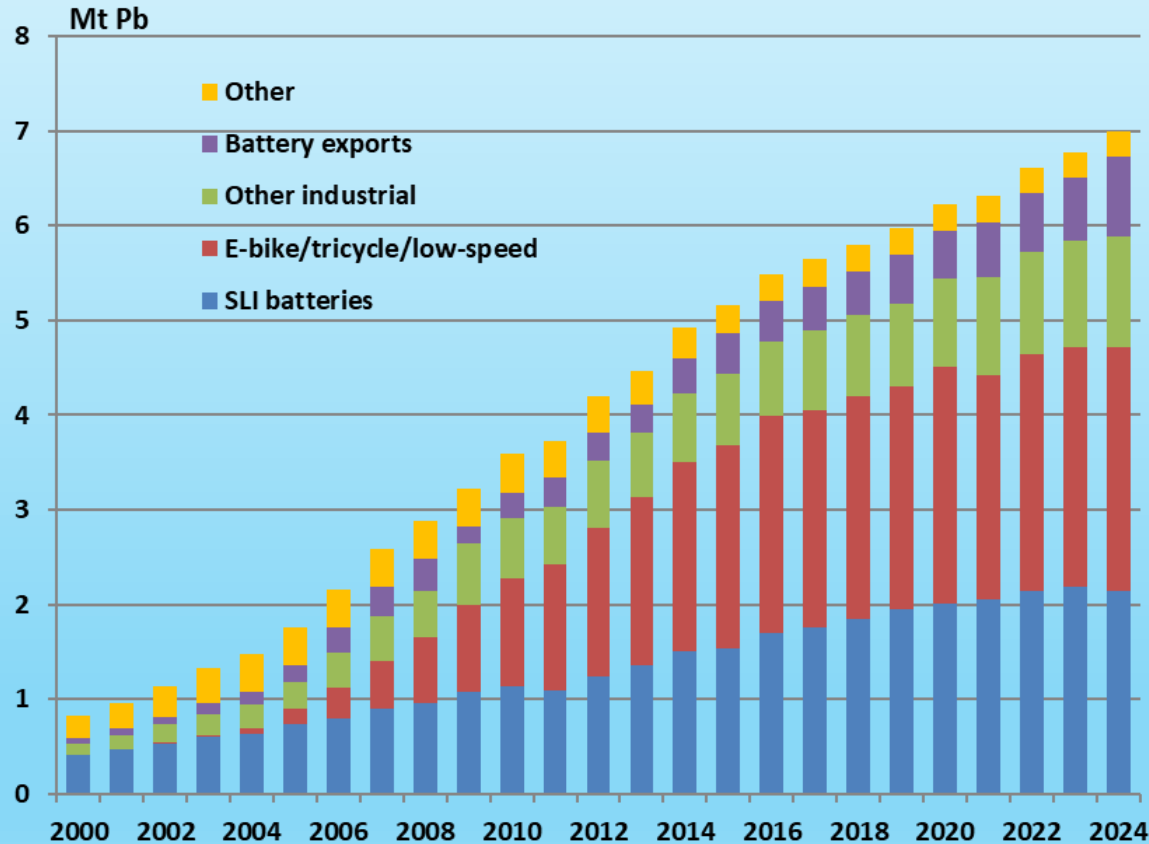


China's refined lead production remains on a rising trend

- Increases in both primary and secondary lead production have slowed in recent years due to constraints on feed supplies – there is no shortfall in capacity to process lead concentrates or lead battery scrap
- Tighter controls on licensing and permitting and enforcement of higher safety and environmental standards have slowed domestic mine development
- Growth in mine production outside China has also been slow, but concentrate imports into China have risen at the expense of primary output elsewhere
- Growth in volume of domestic battery scrap generated has slowed due to maturing of e-bike/e-trike fleets and increasing sales of electric vehicles
- Despite these developments, unnecessary new primary and secondary smelting capacity continues to be added resulting in fierce competition for raw materials

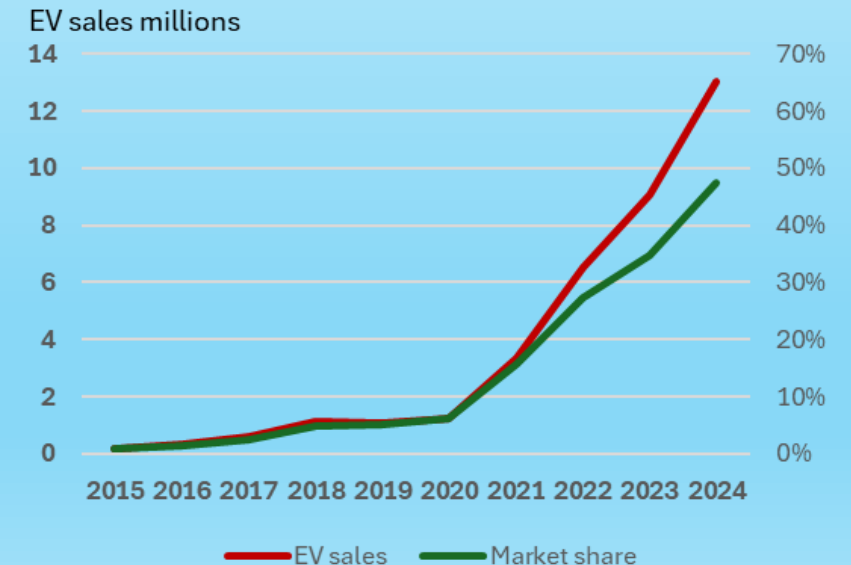
Evolution of domestic consumption and implication for future lead market balances

CHINA'S LEAD CONSUMPTION BY END USE



- Pattern of lead end uses in China is not that typically seen in other countries
- EV sales, including exports, have soared since 2020

China's electric car sales



Outlook for China's domestic lead demand

**OE SLI battery sales
for vehicles made in
China probably
peaked in 2017 ...**

**...and will be one-third
lower in 2025 than in
2017, and a further 40%
lower by 2035**

**Lead battery sales into
the e-bike and e-trike
markets in the last few
years have benefitted
from rule changes...**

**...and negative
perceptions around
lithium batteries**

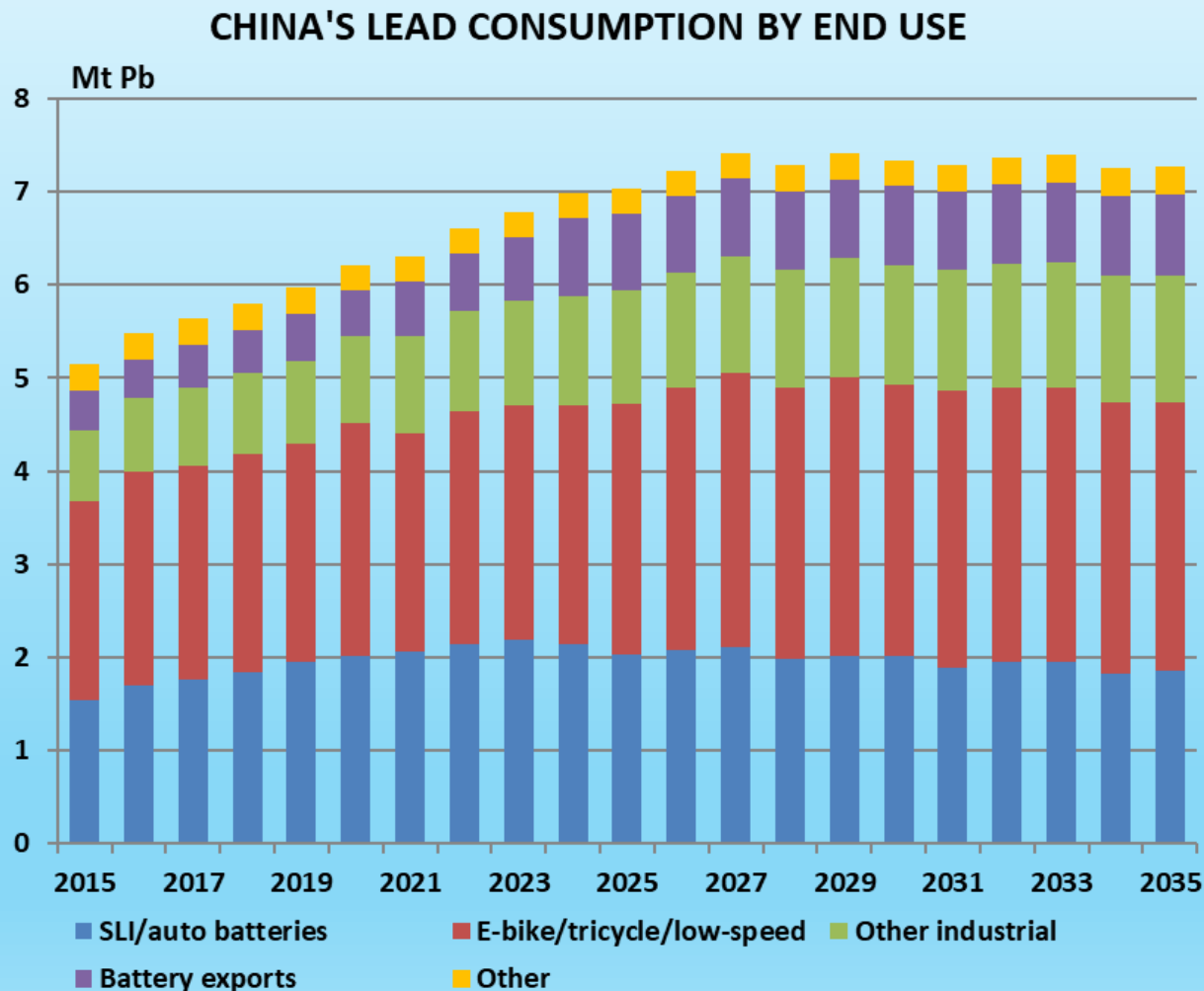


- Pace of EV adoption for cars and commercial vehicles
- BEV or plug-in?
- Auxiliary battery, Pb or Li?



- Market is mature with little room for further growth
- Risk of substitution by lithium or sodium-ion batteries

China's peak lead demand likely between 2027 and 2029



- Gradual decline in SLI/auto battery demand assuming 75% of new cars produced by 2035 are electric
- China continuing to export both ICE and electric cars
- Some fall-off in e-bike and e-trike market due to competition from Li and Na batteries
- Risks include rapid switch to Li batteries in all vehicles for SLI and auxiliary function

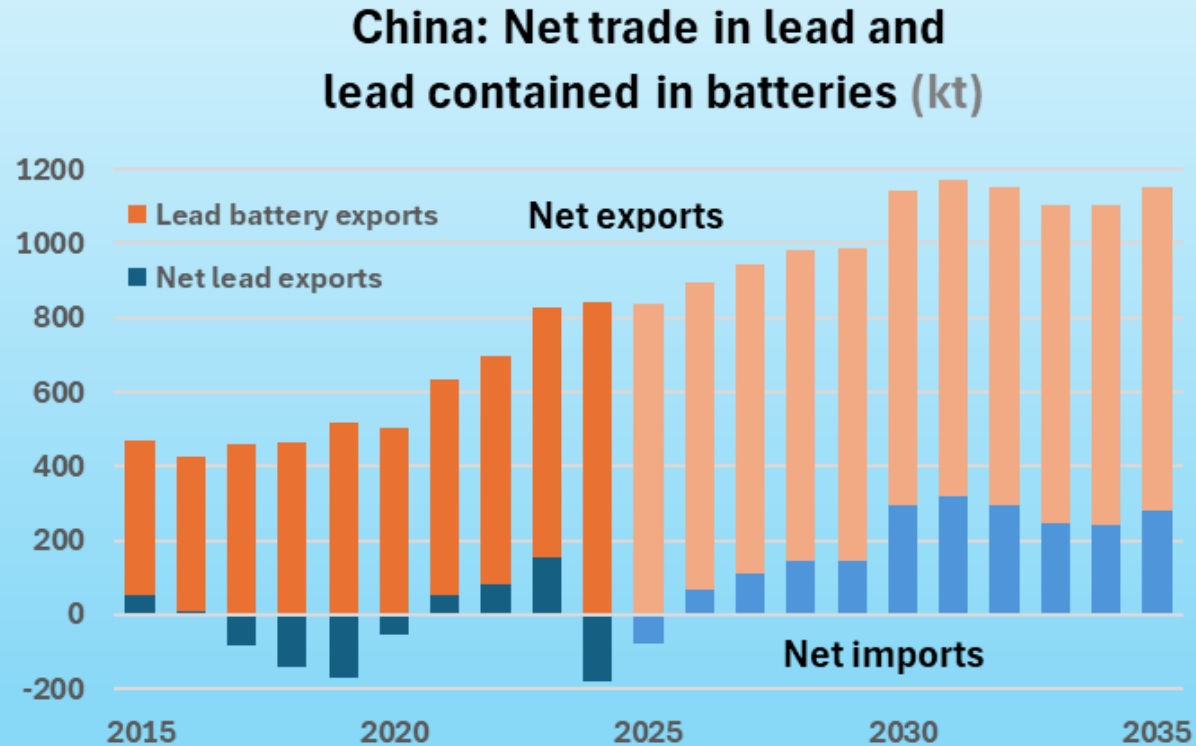
Forecast net trade in refined lead and alloys



Key assumptions

- China's lead mine production increases through to 2030
- Chinese smelters continue to import more than 1 Mt per annum lead in concentrates
- Stable output of *primary* lead adding to China's overall "stock" of lead in circulation
- Small annual increases in lead battery exports
- **LME lead prices above Chinese domestic lead prices**

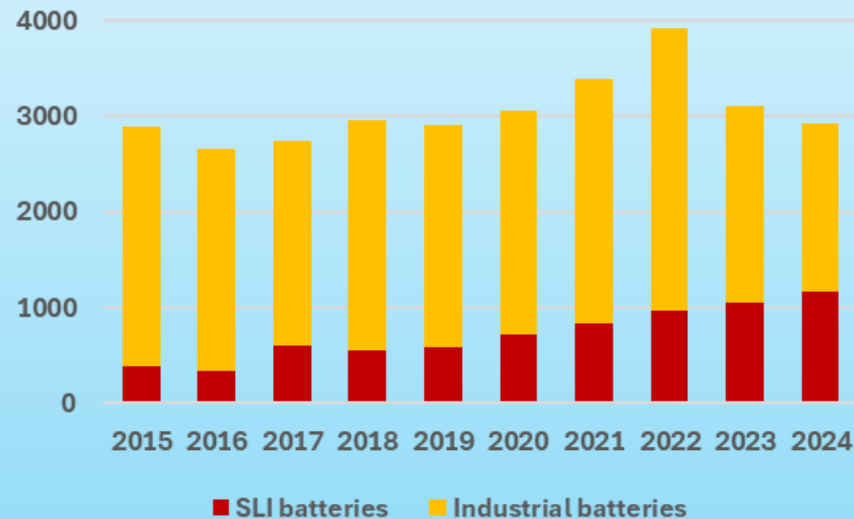
Not all lead exported from China is an ingot!



- China began exporting significant volumes of lead batteries 20 years ago
- Exports have increased sharply over the past five or six years
- Battery exports have, so far, prevented a structural surplus in China's domestic lead market
- Restrictions on battery exports and domestic taxes are encouraging Chinese battery makers to expand manufacturing capacity outside China

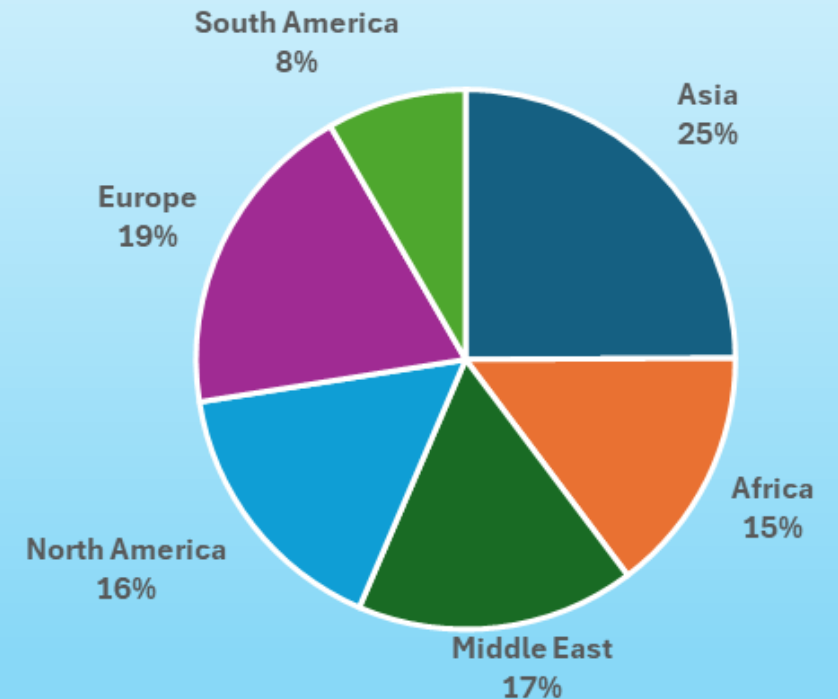
Battery exports contribute to domestic demand for lead

China: Battery exports
(US\$ millions)



- Recent years have seen an increase in the value of SLI battery exports
- We estimate that around 800kt lead was exported in SLI and industrial batteries in 2024 + those fitted in exported ICE cars

SLI battery exports in 2024 by value

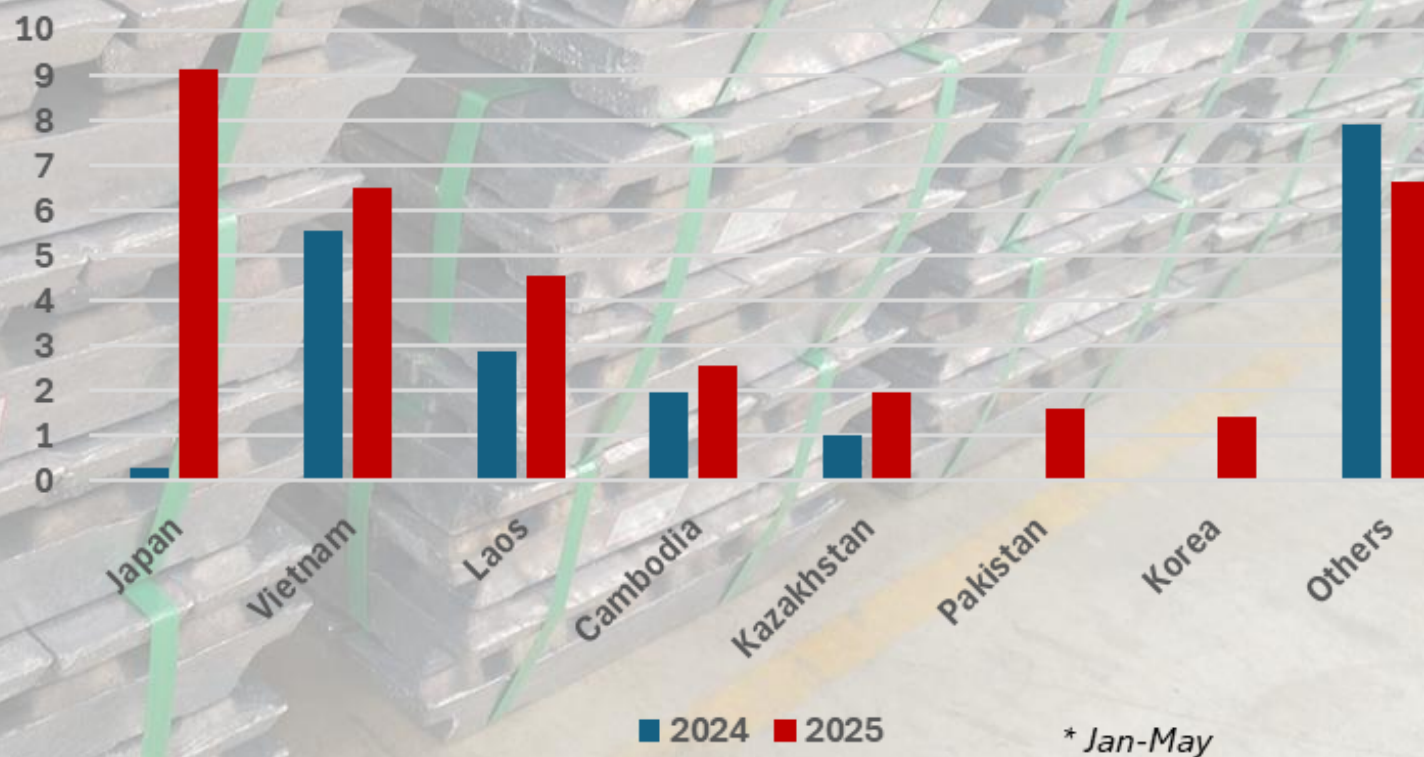


- SLI batteries are exported to all regions

Not all the lead imported into China is refined ingot or a recognised battery-grade alloy!

- China has imported lead alloys in various quantities over many years
- A recent development is rising imports of what we assume is secondary lead bullion
- Lead alloy (780199) imports in 2024 totalled 69kt, imports in 2025 to May total 34kt

China: Lead alloy imports YTD* 2024 & 2025 (kt)



China's secondary lead producers seek to increase import of secondary bullion

- China has a massive capacity surplus in facilities to process lead battery scrap – and is continuing to add to this surplus
- Consequence is that competition for secondary feed has driven price of battery scrap sky high relative to underlying price of refined lead
- China's stand-alone secondary lead producers are not profitable
- Companies would like to import battery scrap, which is banned, or failing that, set up recycling operations offshore to produce secondary bullion for import into China – bypassing ban on importing battery scrap
- If pursued, this development would result in a significant rebalancing of international trade in refined lead and guarantee a permanent structural surplus in China's domestic lead market

Key issues and developments to watch

- On current trends, China is set to develop a structural surplus in refined lead
- Exports of refined lead or lead batteries will have to increase to balance the domestic market
- For now, China's export VAT regime remains an impediment to lead and battery exports – LME/Shanghai price differential the key
- China has a massive, and still growing, capacity surplus in facilities to recycle lead battery scrap
- Imports into China of secondary bullion are increasing, with the potential to disrupt current scrap battery flows and established recycling operations in Asia and possibly further afield
- Lead miners, smelters and battery makers need to do more to retain existing markets and develop new markets for lead batteries



CHR Metals

- Providing independent, detailed analysis and forecasts of global lead and zinc industries
- Covering all aspects of mine and smelter supply and end-use consumption
- Data from original sources wherever possible
- A particular focus on Chinese market
- Offices in the UK and Xi'an
- Clients include producers, consumers, traders and hedge funds

For more information please
contact Huw.Roberts@chrmetals.com