

Global lithium miners and refiners

Look beyond seasonal weakness

Key Points

- Lithium prices have tested marginal cash cost, leading to production cuts again into Dec. Recycling volume (13% of supply) is questionable.
- We suggest investors look beyond 4Q23 weak season. Restocking cycle should drive lithium price way above the marginal cost curve into 2024.
- Prefer Tianqi (OP) in China which is trading at long-term lithium px <Rmb120k/t. Near-term pressures from 4Q23 inventory write-offs.

- **Lithium price has tested marginal cash cost.** The resumption of lithium production in November was short-lived as marginal players' profitability deteriorated on lowered lithium prices. As of December 11, China spot lithium price dropped Rmb55k/t MoM to Rmb98.5k, resulting in **production cuts again in December**. According to SMM, China's Li_2CO_3 production is expected to decrease 5% MoM to 40.8kt in December, mainly from lepidolite (-11%) and recycling (-13%). Combined with flat LiOH production, China's total lithium salt output is expected to be -4% MoM to 56.8kt LCE in December, following a 4% increase in November.

- Despite reduced supply, our monthly balance still suggests a supply surplus in December given a 14% MoM seasonal demand loss from cathode and electrolyte. We expect the market surplus to expand by 2,278t MoM to 13.5kt LCE into December, after taking into account Chile's exports which dropped 19% MoM to 13.6kt in Nov. We cannot rule out the possibility that lithium prices could dip below the cost curve during the weak season.

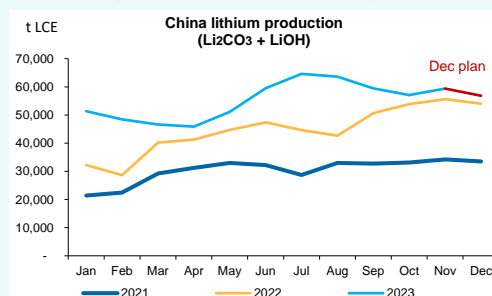
- **Questionable recycling numbers.** A potential upside risk to lithium prices in our monthly lithium S/D tracker is the recycling volume reported by SMM, which reached 84kt LCE in 11M23 (up from 49kt in 2022), equivalent to **140GWh recycled battery supply** (assuming 1GWh requires 600t LCE) without considering yield loss and secondary use. Assuming each battery has a first life of five years, the number seems too large compared to global battery shipments of **106GWh** in 2018, per GGII. Our monthly S/D forecast would be impacted significantly by this data accuracy, since the recycling supply accounts for **18%** of SMM's total Li_2CO_3 production or **13%** of total lithium salt production in 11M23.

- **Restocking cycle could drive lithium price above marginal cost curve.** We suggest investors look beyond 4Q23 as double-digit lithium demand growth over the next few years will likely to drive a new restocking cycle, as we have seen in other commodities even under much slower demand growth. In November, China's Li_2CO_3 inventory went up slightly, 8% MoM, to 49.6kt, while LiOH inventory (reported for the first time) declined 3% MoM to 29.3kt, resulting in total lithium salt inventory equivalent to 1.3 months of downstream demand (vs. 2.5 months in Mar 2023).

- **Prefer Tianqi in China and PLS in Australia.** We continue to prefer Tianqi-H as the stock price already has priced in a long-term lithium price below Rmb120k/t, lower than Rmb120-150k/t for Ganfeng. Spodumene and lithium salt inventory write-offs in 4Q23 are near-term risks. PLS is our preferred lithium producer in AUS, with PMT presenting the greatest upside on exploration over the near term.

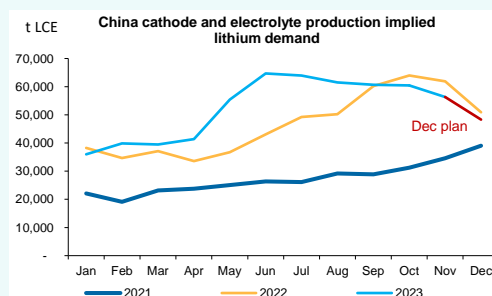
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Figure 1 - Lithium supply from China is expected to drop 4% in December, driven by lepidolite and recycle



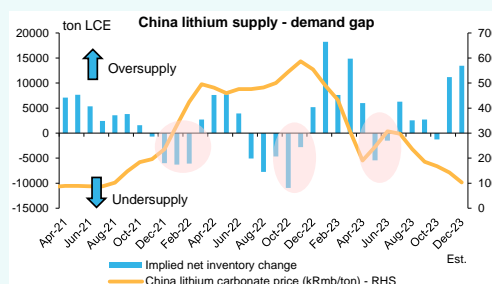
Source: SMM, Macquarie Research, December 2023

Figure 2 - Electrolyte and cathode production in December is likely to -14% MoM/ -5% YoY to 48kt LCE



Source: SMM, Macquarie Research, December 2023

Figure 3 - Lithium supply from China loosens in 4Q23 weak season

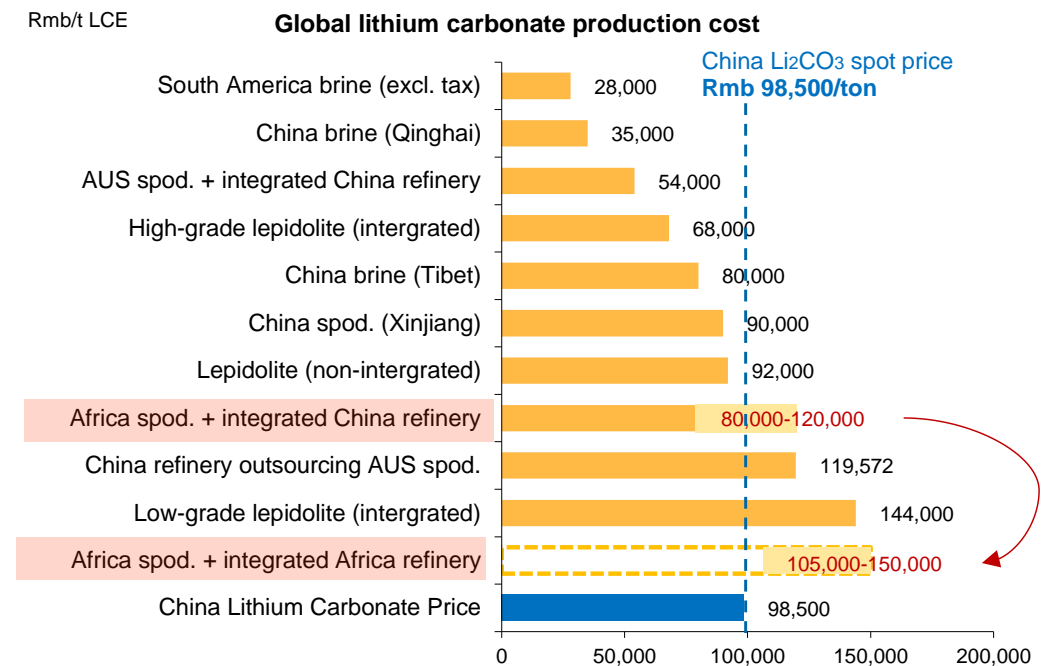


Source: SMM, Macquarie Research, December 2023

Cost curve support

- As of 11 December, spot Chinese Li_2CO_3 prices dropped Rmb55k/t MoM to Rmb98.5k, and LiOH dropped Rmb44k to Rmb103.5k/t, alongside lowered spodumene prices (down US\$530 MoM to US\$1,380/t).
- The lowered lithium prices have already touched the cost curve for marginal integrated players, which is Rmb144k/t for low-grade lepidolite players and 80k-120k/t for Africa supply.
- We define “non-integrated suppliers” as the companies that purchase spodumene concentrate at the spot price from the market. Off-take volumes are excluded.

Figure 4 - Estimated LCE production costs for Chinese producers (at spodumene concentrate price of US\$1,380/t)



Source: Company data, Macquarie Research, December 2023

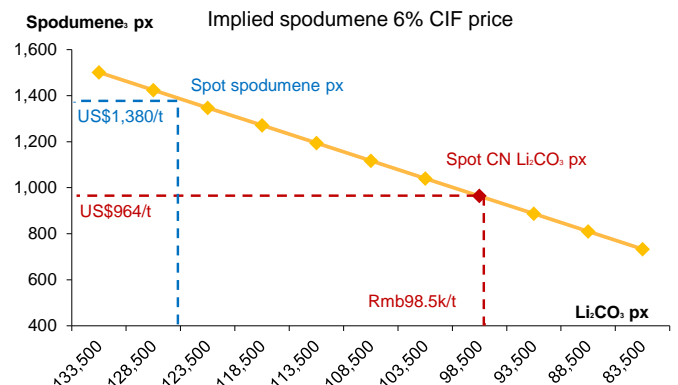
- Lithium refinery profitability: Based on our calculation, a lithium refiner which purchases spot spodumene at US\$1,810/t should sell lithium carbonate at Rmb153.5k/t, to ensure a GPM of 10% or low single digit NPM%.

Figure 5 - Lithium refiners should purchase spodumene at US\$964/t to ensure 10% GPM at current lithium price (Rmb98.5k/t)

	Unit	Value	Note
Lithium carbonate price	Rmb/t	98,500	a
Refinery GPM%	%	10%	b
Processing fee	Rmb/t	32,200	c
VAT	%	13%	d
USD/CNY		7.2	e
Unit consumption	t spod/ t LCE	8.0	f
Refinery recovery rate	%	90%	g
Implied spodumene 6% CIF price	US\$/ton	964	$= (a \times (1-b) - c) / (1+d) / e / f / g$

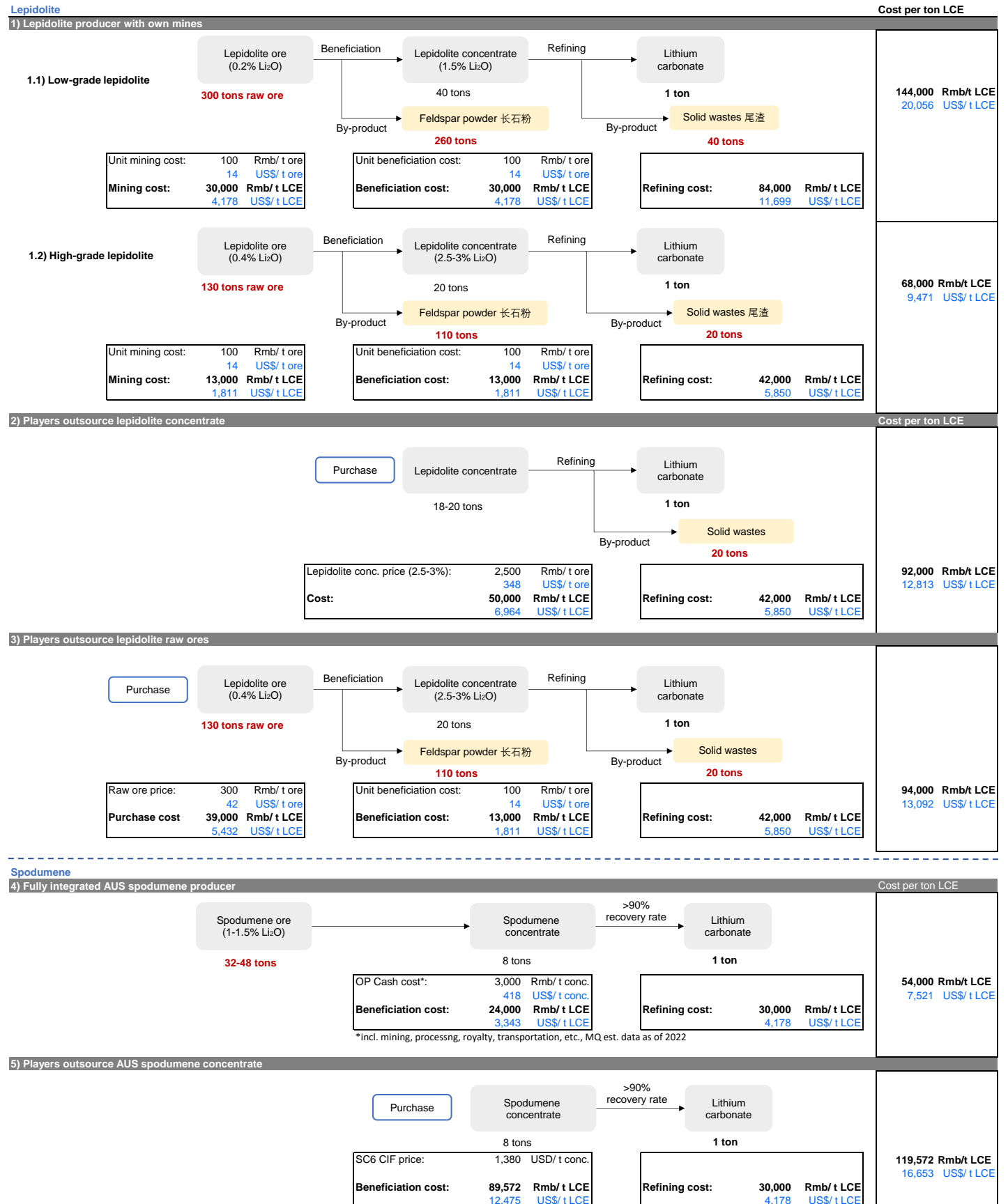
Source: Bloomberg, Macquarie Research, December 2023

Figure 6 - China Li_2CO_3 spot price implied spodumene price (US\$964/t) is much lower than the spot spodumene prices (US\$1,380/t)



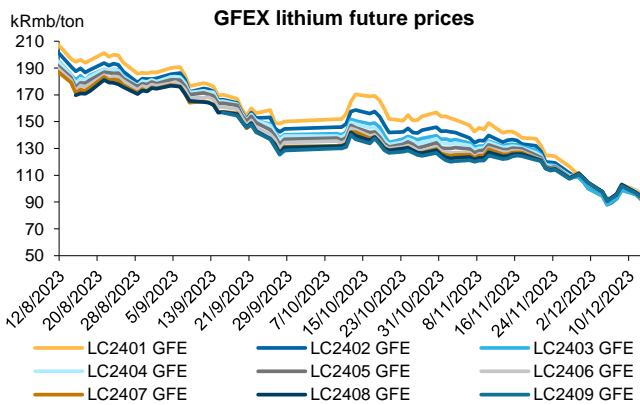
Source: Bloomberg, Macquarie Research, December 2023

Figure 7 - Hard-rock lithium production cost estimate - Chinese producers (priced as of Dec 11)



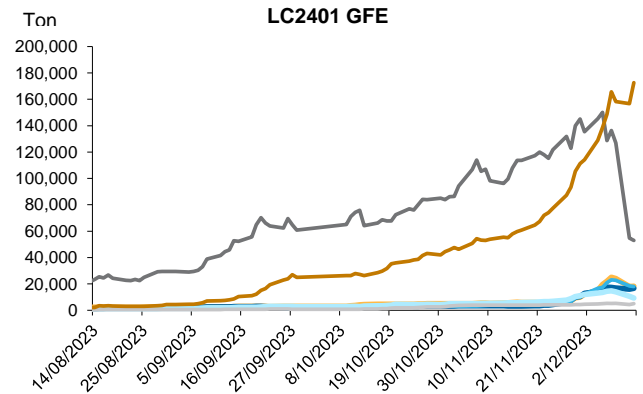
Source: Company data, SMM, Macquarie Research, December 2023

Figure 8 - Guangzhou lithium futures (Jan-July 2023 contracts) were trading at Rmb92-97k/t



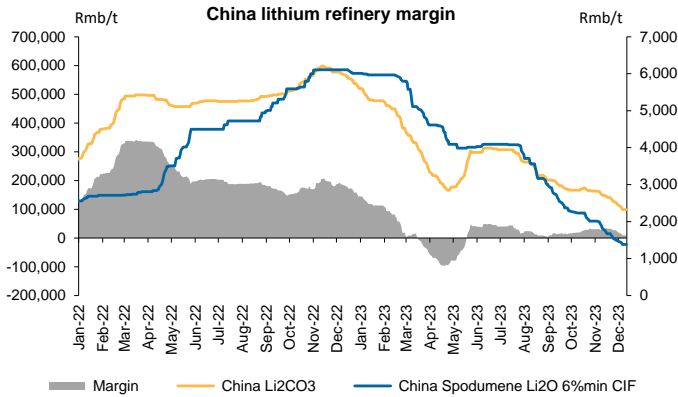
Source: Wind, Macquarie Research, December 2023

Figure 9 - Open interests of LC2401 from Guangzhou exchanges dropped sharply to 53kt by Dec 12



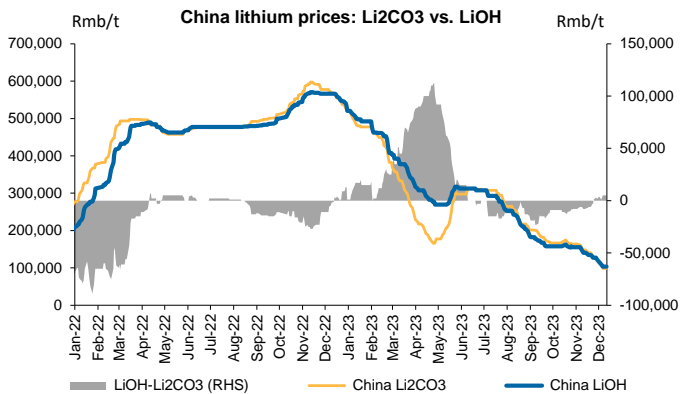
Source: Wind, Macquarie Research, December 2023

Figure 10 - China's Li₂CO₃ refining margin went down Rmb20,290/t WoW to Rmb9,002/t by Dec 11



Source: Bloomberg, Macquarie Research, December 2023

Figure 11 - China's LiOH recovered its premium over Li₂CO₃ since Nov 24, with premium at Rmb5,000/t as of Dec 11



Source: Bloomberg, Macquarie Research, December 2023

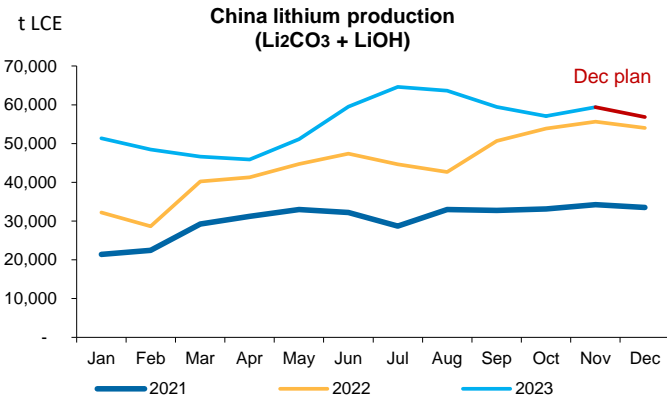
• Lithium supply cuts again in December:

- ⇒ According to SMM's production plan, China's lithium salt production could drop 2,543t in December, with Li₂CO₃ down 2,315t MoM, LiOH down 228t MoM.
- ⇒ Within Li₂CO₃, the supply cuts are mainly from lepidolite (-11% MoM) and recycle (-13% MoM), with brine (-1% MoM) and spodumene (+1% MoM) largely unchanged.

• Downstream demand further shrinks:

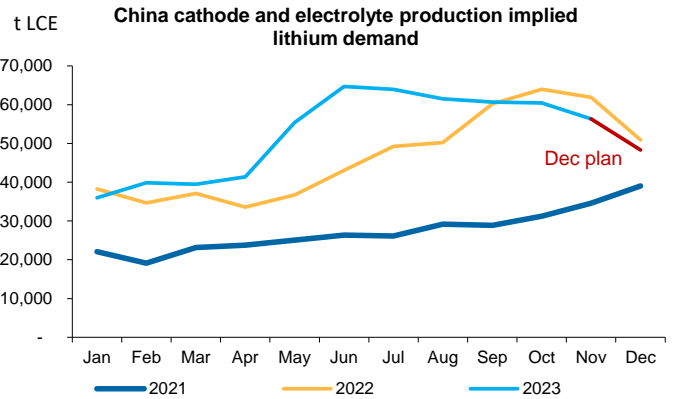
- ⇒ Cathode and electrolyte demand in December is expected to decline 14% MoM per SMM, or 8,020t.

Figure 12 - Lithium supply from China is expected to drop 4% in December, driven by lepidolite and recycle



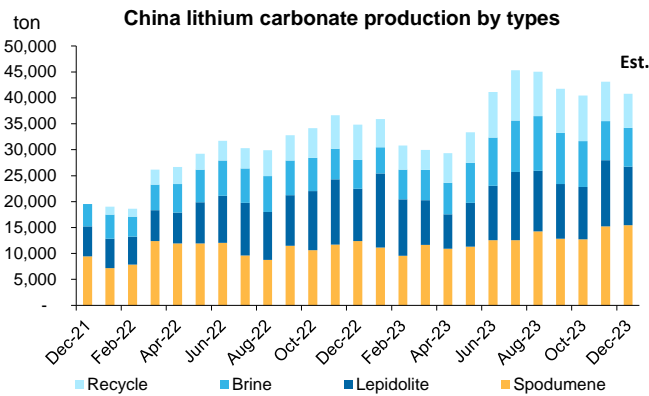
Source: SMM, Macquarie Research, December 2023

Figure 13 - Electrolyte and cathode production in December is likely to -14% MoM/ -5% YoY to 48kt LCE



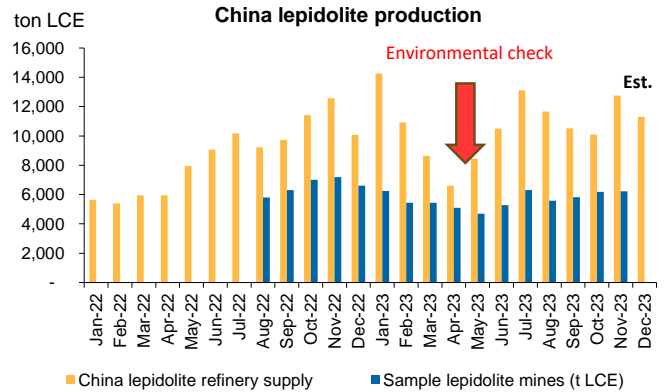
Source: SMM, Macquarie Research, December 2023

Figure 14 - China Li2CO3 supply from spodumene/ lepidolite/ brine/ recycle was +20%/ +26%/ -15%/ -13% MoM in Nov 2023, with total supply +7% MoM/ +18% YoY



Source: SMM, Macquarie Research, December 2023

Figure 15 - China lepidolite refinery supply +26% MoM to 12,750t LCE in Nov, then is expected to drop by 11% MoM in Dec

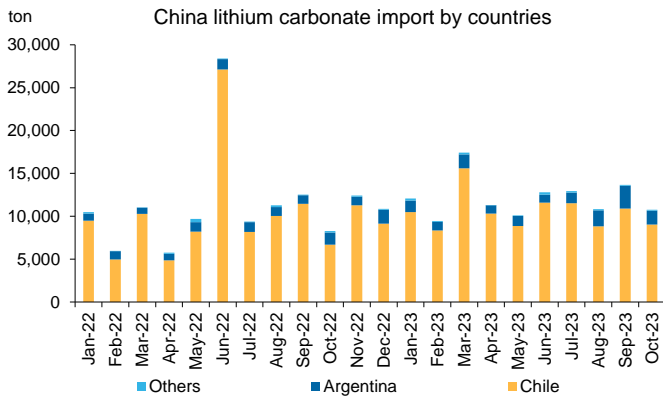


Source: SMM, Macquarie Research, December 2023

- Lithium imports from Chile to trend down in December.**

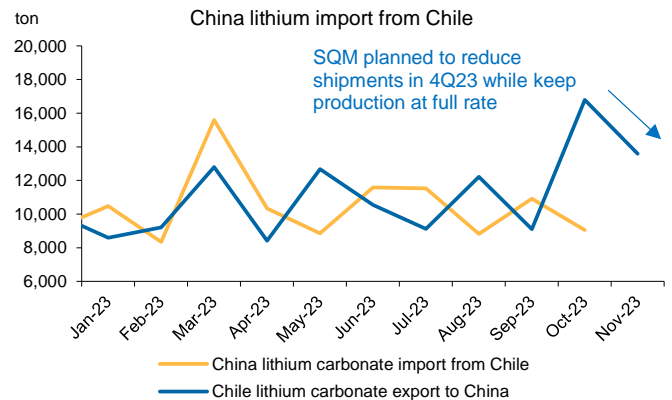
- ⇒ Chile exported 13.6kt of lithium salts to China in November (-19% MoM) at an ASP of US\$20k/t (-5% MoM). Considering 45-60 days of shipment period, Chilean lithium exports in November could affect Chinese import volumes in December.
- ⇒ Based on Chilean export data, China's lithium supply could turn to a surplus of 13kt LCE in December.

Figure 16 - A total of 87% of China's lithium carbonate imports were sourced from Chile in 10M23



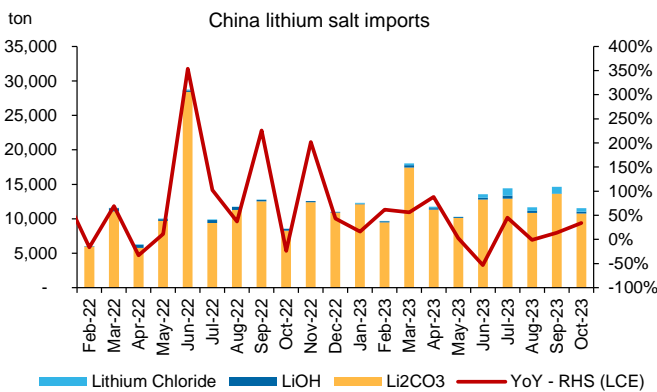
Source: China Customs, Macquarie Research, December 2023

Figure 17 - Chile resumed lithium salt exports to China in November



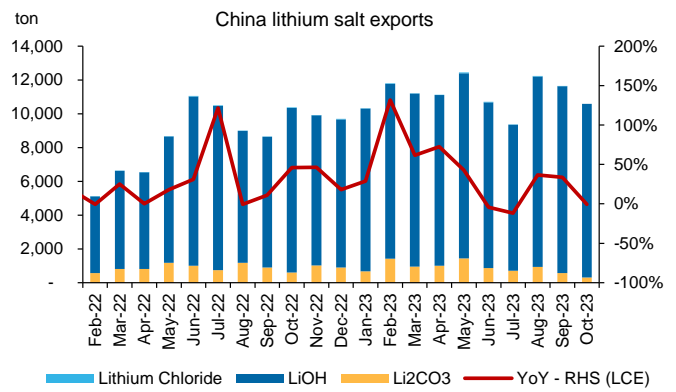
Source: China Customs, Chile Customs, Macquarie Research, December 2023

Figure 18 - China's lithium salt imports +34% YoY in October



Source: China Customs, Macquarie Research, December 2023

Figure 19 - China lithium salt exports -1% YoY in October



Source: China Customs, Macquarie Research, December 2023

Macquarie China monthly lithium supply-demand tracker

- We believe Chinese lithium supply, which is the sum of domestic lithium salt production (a) and imports (c), will be used to meet overseas demand (d) and domestic demand (b, that is, lithium salt consumption from electrolytes and cathode production). The gap between the supply and demand will go into inventory, or named "Implied net inventory change" in table below.

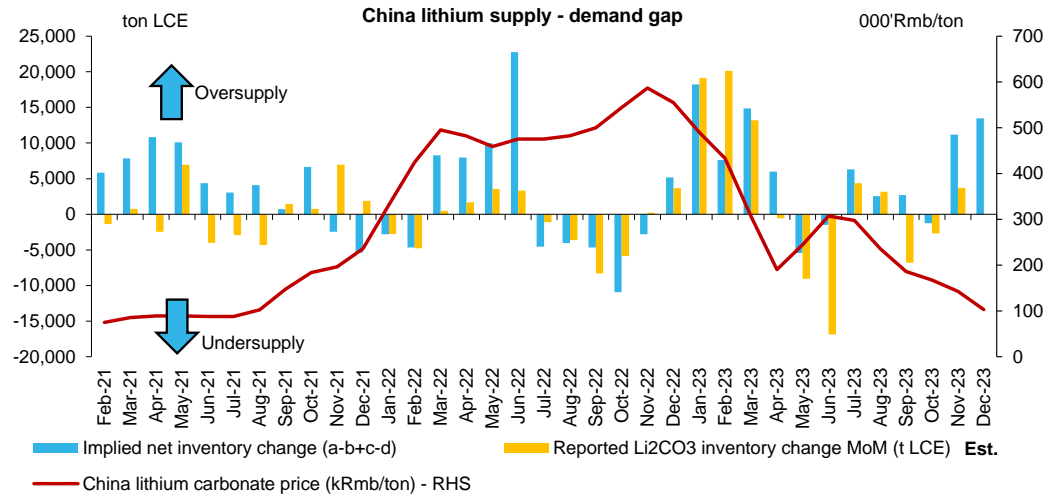
Figure 20 - Macquarie modeled China lithium supply - demand gap (assuming flattish lithium exports in Nov/Dec)

t LCE	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
China lithium salt supply (a)	55,635	54,043	51,363	48,464	46,656	45,875	51,121	59,479	64,603	63,625	59,411	57,079	59,374	56,831
Lithium demand from electrolyte/ cathode (b)	61,869	50,946	35,985	39,820	39,504	41,364	55,387	64,691	63,963	61,472	60,648	60,445	56,331	48,311
Import lithium salts (c)	12,544	10,989	12,264	9,664	17,948	11,691	10,237	13,478	14,248	11,565	14,510	11,447	17,476	14,277
Export lithium salts (d)	9,120	8,901	9,418	10,699	10,230	10,210	11,405	9,755	8,596	11,169	10,564	9,323	9,323	9,323
Implied net inventory change (a-b+c-d)	-2,810	5,185	18,224	7,610	14,871	5,993	-5,434	-1,490	6,292	2,549	2,708	-1,242	11,196	13,473
Reported Li2CO3 inventory change MoM (t LCE)	221	3,648	19,106	20,130	13,179	-555	-9,057	-16,858	4,369	3,172	-6,811	-2,704	3,716	N.A.
... inventory change from cathode makers MoM (t LCE)	-2,659	-1,532	-364	-246	-312	1,918	11,512	-1,415	-6,191	-981	7,009	-7,829	481	N.A.
...inventory change from refiners MoM (t LCE)	2,880	5,180	19,470	20,376	13,491	-2,473	-20,569	-15,443	10,560	4,153	-13,820	5,125	3,235	N.A.
Reported LiOH inventory change MoM (t LCE)	N.A.	N.A.	N.A.	N.A.	N.A.	261	-784	1,191	2,560	-929	-804	-54	-754	N.A.
... inventory change from cathode makers MoM (t LCE)	N.A.	N.A.	N.A.	N.A.	N.A.	-1,147	-1,414	-782	-215	-308	172	262	-211	N.A.
...inventory change from refiners MoM (t LCE)	N.A.	N.A.	N.A.	N.A.	N.A.	1,408	630	1,974	2,775	-621	-975	-316	-544	N.A.
China lithium carbonate price (kRmb/ton) - RHS	587	555	490	433	306	190	245	307	298	236	186	167	142	103

Note: content with blue font are predicted values

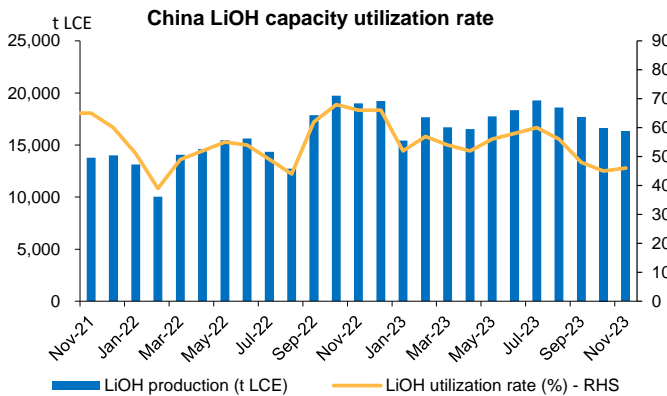
Source: SMM, China Customs, Bloomberg, Macquarie Research, December 2023

Figure 21 - Lithium supply should get loose in December given reduced demand in the weak season



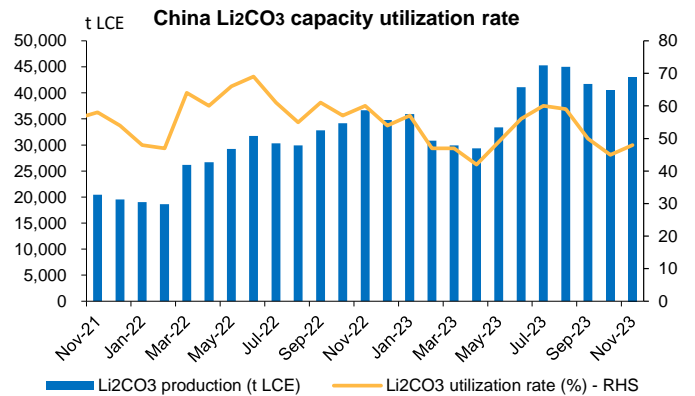
Source: SMM, Bloomberg, Macquarie Research, December 2023

Figure 22 - China LiOH capacity utilization rate +1pct MoM to 46% in Nov



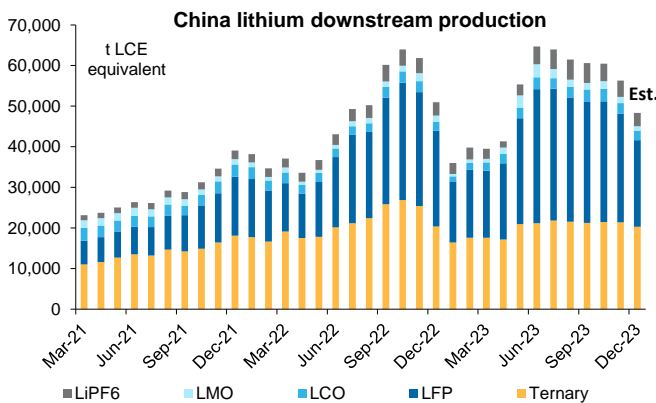
Source: SMM, Macquarie Research, December 2023

Figure 23 - China Li2CO3 capacity utilization rate +3pct MoM to 48% in Nov



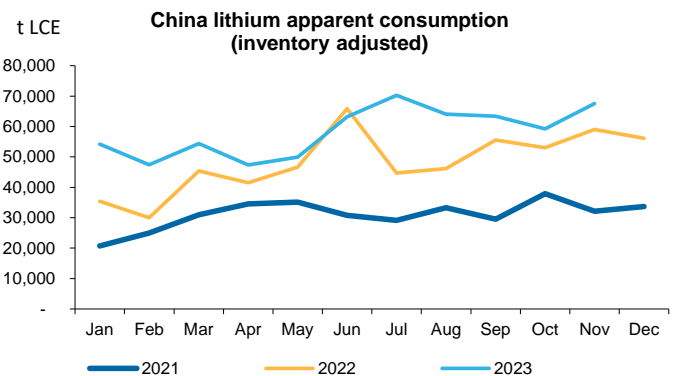
Source: SMM, Macquarie Research, December 2023

Figure 24 - China lithium demand from cathode materials and electrolyte could drop 14% MoM in Dec



Source: SMM, Macquarie Research, December 2023

Figure 25 - China lithium apparent consumption was +14% MoM in Nov



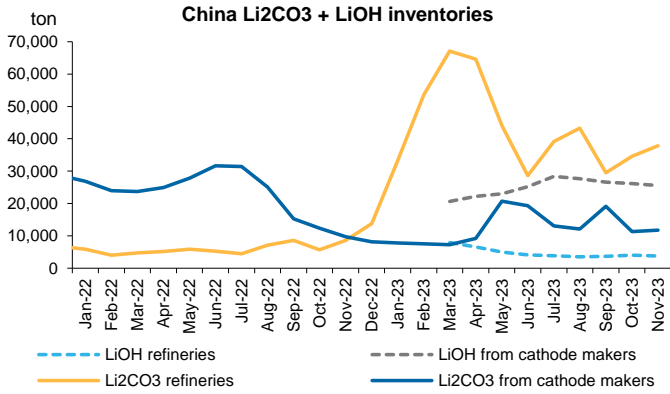
Source: SMM, Macquarie Research, December 2023

• **Where we are in the inventory cycle:**

⇒ Korean cathode makers finally started to deplete inventory in 3Q23. It still needs time to consume the existing inventories, as China's LiOH refiners reported reduced lithium purchases from Korean cathode manufacturers in 4Q23.

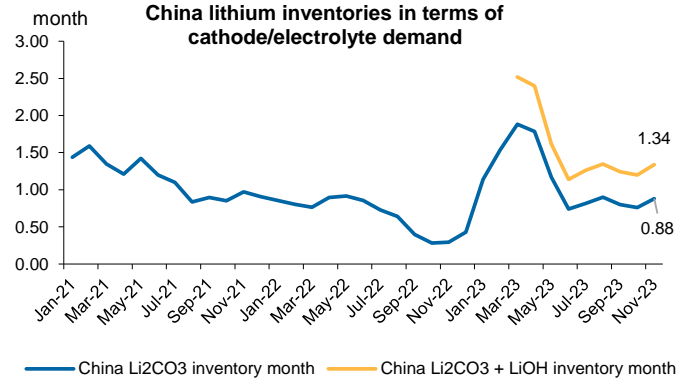
- ⇒ China cathode and battery makers have been destocking for three quarters. Despite low inventory now, there are no signs of restocking so far.
- ⇒ The last pillar is Spodumene inventory, which is difficult to monitor. AUS miners' inventory strategy would be key to watch.

Figure 26 - China Li₂CO₃ inventory was +8% MoM/ +171% YoY in Nov; China LiOH inventory was -3% MoM in Nov.



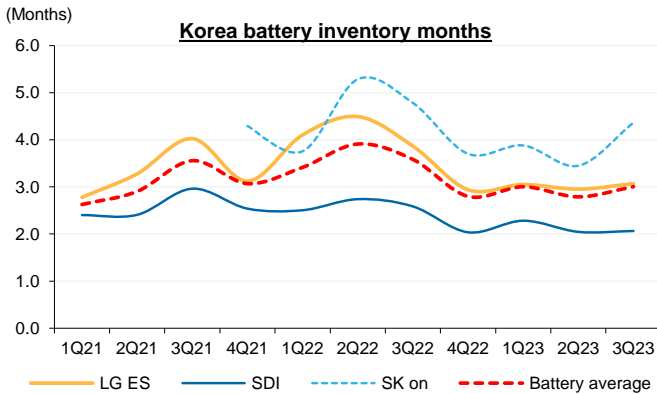
Source: SMM, Macquarie Research, December 2023

Figure 27 - China lithium salt inventories can only meet 1.3 months of demand in Nov



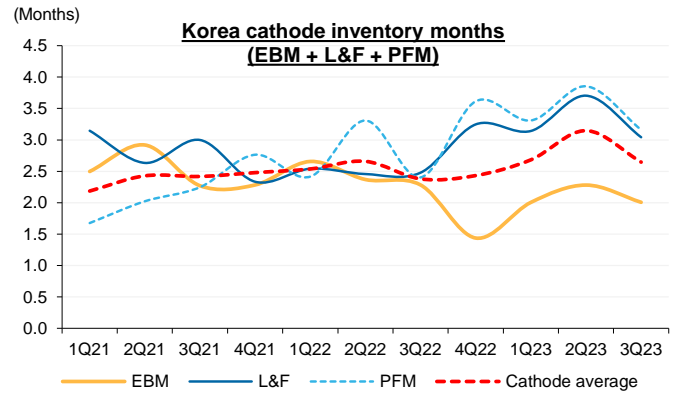
Source: SMM, Macquarie Research, December 2023

Figure 28 - Korea battery inventory was largely flattish at 3 months in 3Q23, similar to 1Q23 level



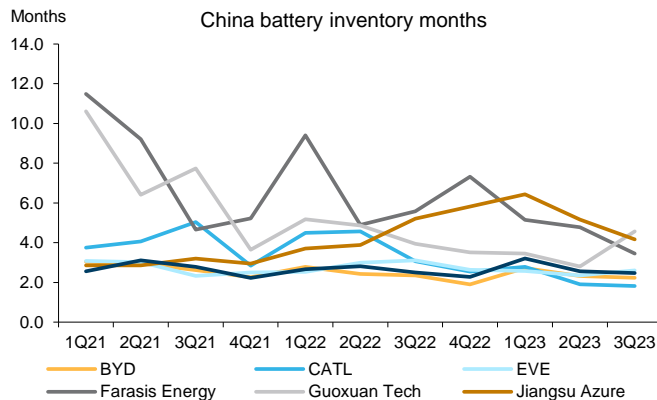
Source: Company data, Macquarie Research, November 2023

Figure 29 - Korea cathode inventory dropped 0.5 to 2.6 months by the end of 3Q23



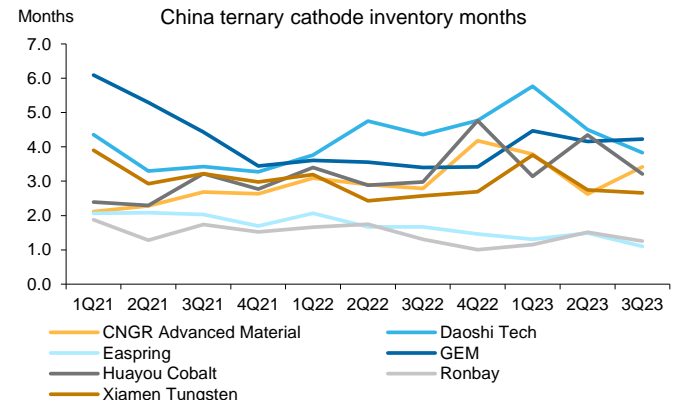
Source: Company data, Macquarie Research, November 2023

Figure 30 - China battery inventories from key listed companies averaged at 3.0 month by 3Q23, down from 3.1 month in 2Q23



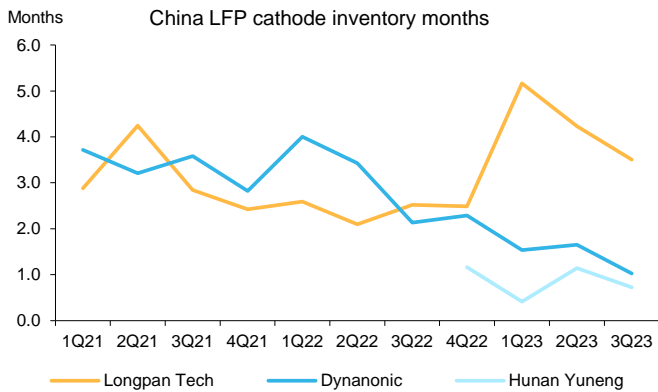
Source: Company data, Macquarie Research, December 2023

Figure 31 - China ternary cathode inventories from key listed companies averaged at 2.8 month by 3Q23, down from 3.1 month in 2Q23



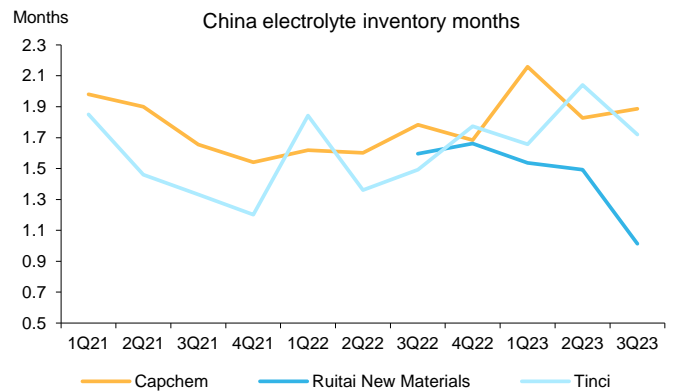
Source: Company data, Macquarie Research, December 2023

Figure 32 - China LFP cathode inventories from key listed companies averaged at 1.8 month by 3Q23, down from 2.3 month in 2Q23



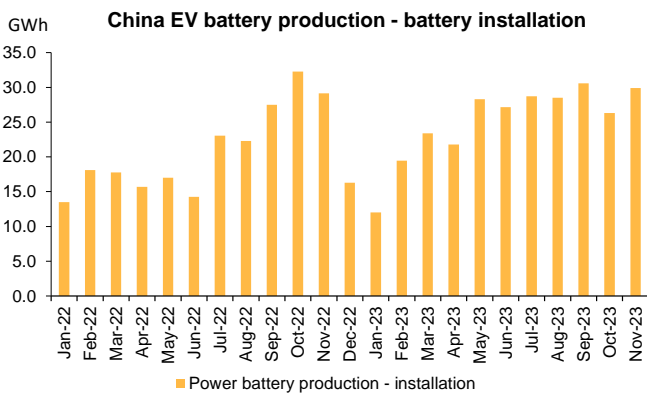
Source: Company data, Macquarie Research, December 2023

Figure 33 - China electrolyte inventories from key listed companies averaged at 1.5 month by 3Q23, down from 1.8 month in 2Q23



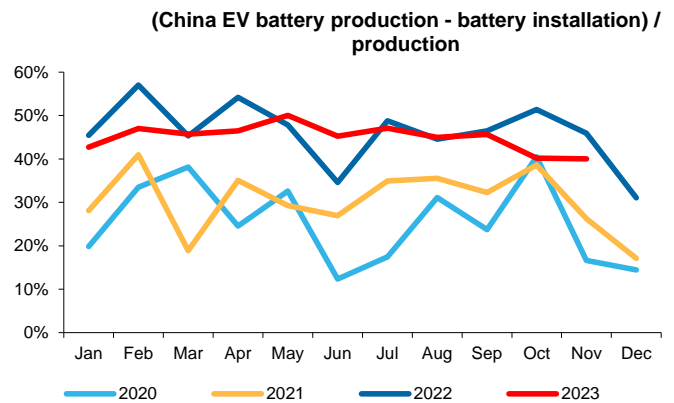
Source: Company data, Macquarie Research, December 2023

Figure 34 - China's power battery production was +14% MoM in Nov, and installation was +15% MoM in Nov



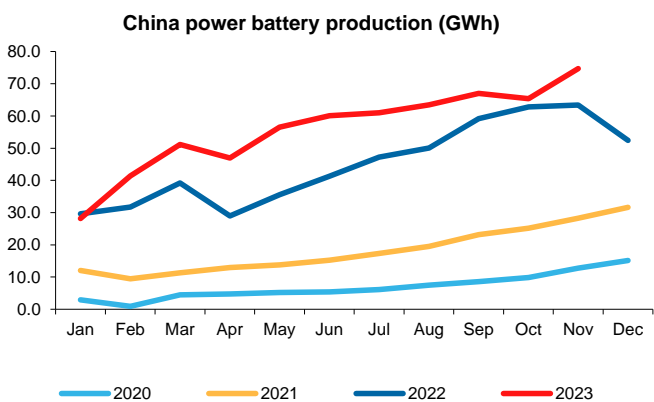
Source: CABIA, Macquarie Research, December 2023

Figure 35 - The ratio between power battery production and installation kept dropping



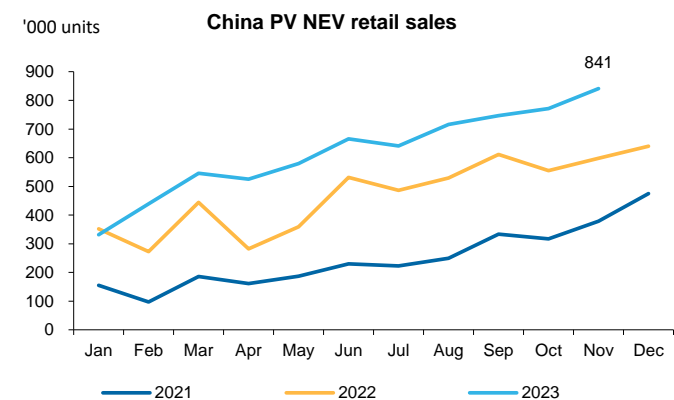
Source: CABIA, Macquarie Research, November 2023

Figure 36 - China's power battery production also has a strong seasonality, with more production in 4Q peak season



Source: CABIA, Macquarie Research, November 2023

Figure 37 - 2023 YTD China's NEV sales have been following the similar pattern as previous years



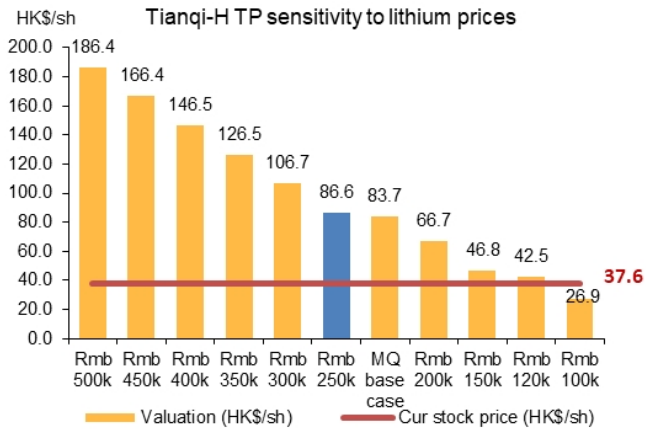
Source: CPCA, Macquarie Research, November 2023

Figure 38 - China lithium monthly supply/demand balance

	Nov-22	Dec-22	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	YoY	MoM
Production															
Li2CO3	36,651	34,813	35,926	30,803	29,945	29,349	33,382	41,123	45,314	45,022	41,724	40,426	43,093	18%	7%
- By product type:															
Battery grade	17,222	17,927	18,896	15,607	16,791	17,901	20,258	26,364	28,541	28,924	27,603	26,360	27,955	62%	6%
Industrial grade	19,428	16,885	17,030	15,196	13,154	11,447	13,124	14,759	16,773	16,098	14,121	14,265	15,138	-22%	6%
- By mine type:															
Spodumene	11,705	12,421	11,142	9,535	11,632	10,919	11,319	12,579	12,591	14,269	12,853	12,753	15,249	30%	20%
Lepidolite	12,567	10,084	14,267	10,913	8,649	6,613	8,452	10,489	13,110	11,666	10,527	10,085	12,750	1%	26%
Brine	5,907	5,536	5,038	5,726	5,851	6,072	7,678	9,299	9,917	10,567	9,883	8,843	7,512	27%	-15%
Recycle	6,471	6,771	5,479	4,629	3,814	5,744	5,933	8,756	9,696	8,520	8,461	8,745	7,582	17%	-13%
Sample lepidolite mines (t LCE)	7,200	6,600	6,250	5,450	5,450	5,100	4,700	5,270	6,316	5,576	5,830	6,176	6,222	-14%	1%
LiOH - net (t LCE)	18,984	19,230	15,437	17,661	16,711	16,526	17,739	18,356	19,289	18,603	17,687	16,653	16,281	-14%	-2%
LiOH - gross	25,210	25,246	21,235	24,371	23,891	23,385	25,108	25,868	26,636	25,352	23,999	21,904	20,970	-17%	-4%
LiOH - causticization	3,568	3,324	3,637	4,237	4,840	4,545	4,885	4,942	4,647	4,145	3,836	2,920	2,410	-32%	-17%
Li2CO3 + LiOH (t LCE)	55,635	54,043	51,363	48,464	46,656	45,875	51,121	59,479	64,603	63,625	59,411	57,079	59,374	7%	4%
Lithium salt import (t LCE)															
LCE equivalent import	12,544	10,989	12,264	9,664	17,948	11,691	10,237	13,478	14,248	11,565	14,510	11,447	17,476	39%	53%
YoY - RHS (LCE)	202%	44%	16%	62%	56%	88%	3%	-53%	45%	-1%	14%	34%	39%		
Lithium salt export (t LCE)															
LCE equivalent export	9,120	8,901	9,418	10,699	10,230	10,210	11,405	9,755	8,596	11,169	10,564	9,323	9,323	2%	0%
YoY - RHS (LCE)	46%	18%	29%	132%	62%	72%	43%	-4%	-12%	37%	34%	-1%	2%		
China lithium apparent cons.	59,059	56,131	54,209	47,430	54,374	47,356	49,954	63,202	70,255	64,021	63,356	59,203	67,526	14%	14%
China lithium real cons.	58,838	52,483	35,103	27,300	41,195	47,911	59,011	80,060	65,886	60,849	70,167	61,907	63,810	8%	3%
Inventory (t LCE)															
Li2CO3 refineries	8,580	13,760	33,230	53,606	67,097	64,624	44,055	28,612	39,172	43,325	29,505	34,630	37,865	341%	9%
Li2CO3 from cathode makers	9,718	8,186	7,822	7,576	7,264	9,182	20,694	19,279	13,088	12,107	19,116	11,287	11,768	21%	4%
Li2CO3 total	18,298	21,946	41,052	61,182	74,361	73,806	64,749	47,891	52,260	55,432	48,621	45,917	49,633	171%	8%
LiOH refineries					7,929	6,621	5,009	4,117	3,872	3,521	3,717	4,016	3,776	n.a.	-6%
LiOH from cathode makers					20,644	22,249	22,967	25,217	28,380	27,672	26,560	26,200	25,580	n.a.	-2%
LiOH total					28,573	28,870	27,976	29,334	32,252	31,193	30,277	30,216	29,356	n.a.	-3%
Lithium price (Rmb/ton)															
CN carbonate	586,773	554,727	489,643	433,150	306,457	190,100	244,643	307,357	297,690	235,804	185,974	167,441	142,409	-76%	-15%
CN spodumene	6,108	6,066	5,979	5,920	5,092	4,414	4,009	4,077	4,059	3,377	2,612	2,131	1,731	-72%	-19%
Mid-stream production (t LCE)															
Ternary	25,397	20,361	16,395	17,613	17,631	17,166	20,946	21,142	21,823	21,516	21,221	21,476	21,402	-16%	0%
LFP	28,033	23,608	15,095	16,739	16,482	18,793	26,079	33,046	32,527	30,630	29,857	29,740	26,698	-5%	-10%
LCO	2,752	2,203	1,203	1,675	2,013	2,306	2,650	2,932	2,556	2,604	3,057	3,076	2,674	-3%	-13%
LMO	1,969	1,496	574	847	903	1,497	2,973	3,232	2,216	1,769	1,615	1,869	1,517	-23%	-19%
LiPF6	3,719	3,279	2,719	2,946	2,475	1,601	2,739	4,340	4,841	4,953	4,897	4,283	4,039	9%	-6%
Electrolyte + cathode production	61,869	50,946	35,985	39,820	39,504	41,364	55,387	64,691	63,963	61,472	60,648	60,445	56,331	-9%	-7%
Cathode production	58,151	47,667	33,266	36,874	37,029	39,763	52,648	60,352	59,122	56,519	55,751	56,162	52,291	-10%	-7%
Battery Demand															
Power battery production (GWh)															
Ternary	24.2	18.5	9.8	14.6	18.2	17.6	18.6	17.7	20.4	23.0	25.3	23.6	27.7	14%	17%
LFP	39.1	33.9	18.3	26.8	32.9	29.3	37.8	42.2	40.5	40.2	40.5	39.7	43.8	12%	10%
Total	63.4	52.4	28.2	41.4	51.1	46.9	56.5	60.1	61.0	63.4	67.0	65.4	74.7	18%	14%
Power battery installation (GWh)															
Ternary	11.0	11.4	5.4	6.7	8.7	8.0	9.0	10.1	10.6	10.8	12.2	12.3	15.7	42%	28%
LFP	23.1	24.7	10.7	15.2	19.0	17.1	19.2	22.7	21.7	24.1	24.2	26.8	29.1	26%	9%
Total	34.3	36.1	16.1	21.9	27.8	25.1	28.2	32.9	32.2	34.9	36.4	39.1	44.8	31%	15%

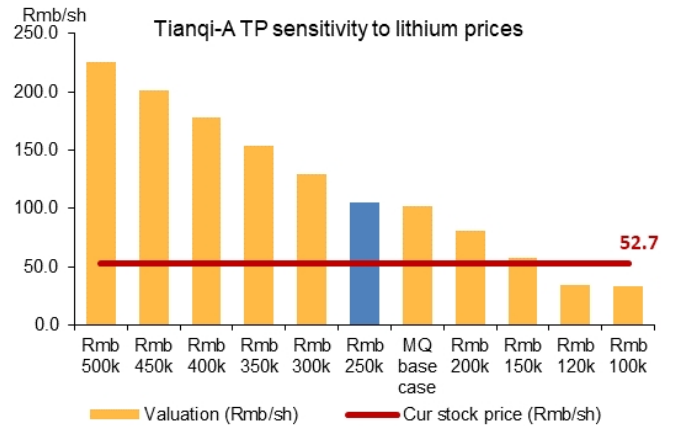
Source: SMM, CABIA, Wind, CAAM, Macquarie Research, December 2023

Figure 39 - Tianqi's current H share stock price implies long-term lithium price of <Rmb120k/ton



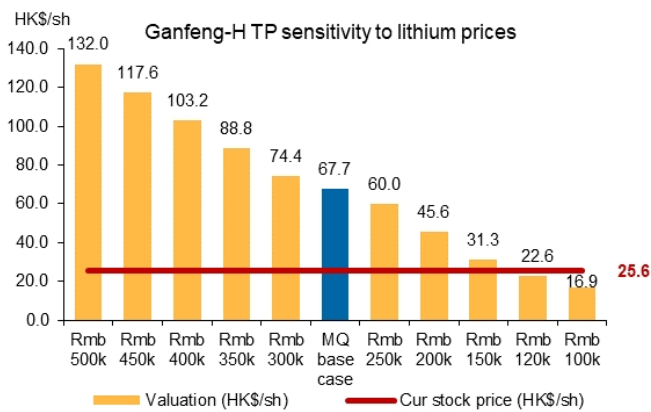
Source: Company data, Macquarie Research, December 2023

Figure 40 - Tianqi's current A share stock price also implies long-term lithium price of less than Rmb150k/ton



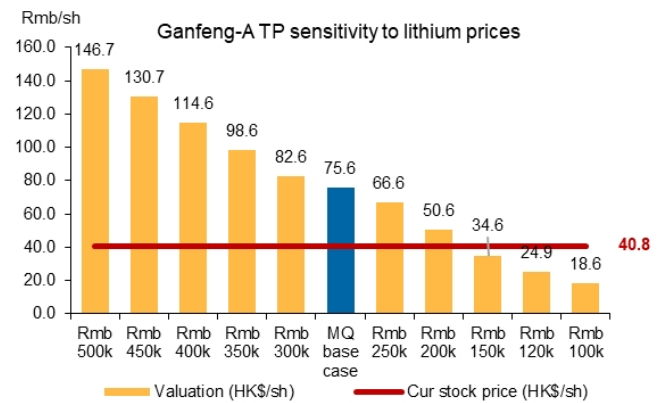
Source: Company data, Macquarie Research, December 2023

Figure 41 - Ganfeng's current H share stock price implies long-term lithium price of Rmb120-150k/ton



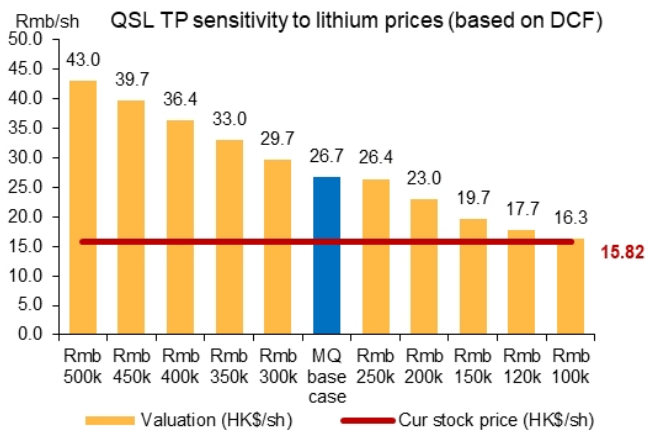
Source: Company data, Macquarie Research, December 2023

Figure 42 - Ganfeng's current H share stock price implies long-term lithium price >Rmb150k/ton



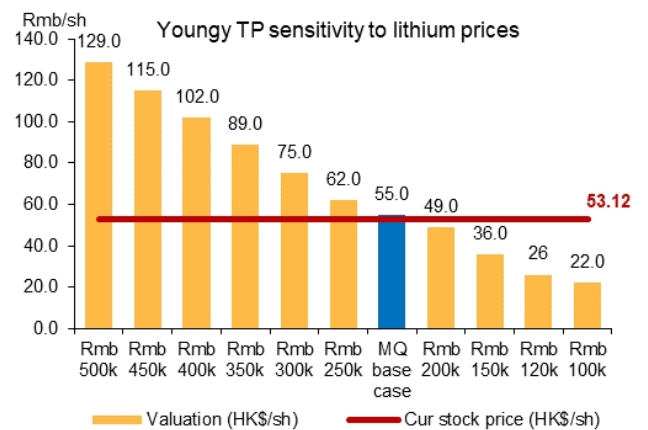
Source: Company data, Macquarie Research, December 2023

Figure 43 - QSL's current stock price only implies long-term lithium price <Rmb120k/ton



Source: Company data, Macquarie Research, December 2023

Figure 44 - Youngy's current stock price implies long-term lithium price of Rmb200-250k/ton



Source: Company data, Macquarie Research, December 2023

Figure 45 - MQ global lithium comps table (Data as of Dec 12)

Company	Ticker	Mkt cap (bn USD)	3m vol. (mn USD)	Rating	TP	Cur Px	Upside	PE 24E	25E	PB 24E	25E	23E EV/EBITDA	Analyst
China													
Ganfeng-H	1772 HK	10.49	17.3	OP	67.70	25.60	164%	2.6	1.5	0.7	0.5	5.2	Albert Miao
Ganfeng-A	002460 CI	10.49	164.2	OP	75.60	40.77	85%	4.4	2.6	1.2	0.8	8.8	Albert Miao
Tianqi-H	9696 HK	11.64	10.8	OP	86.90	37.60	131%	2.6	2.1	0.7	0.6	1.5	Albert Miao
Tianqi-A	002466 CI	11.64	217.4	OP	106.00	52.72	101%	3.9	3.1	1.1	0.8	2.3	Albert Miao
Youngy	002192 CI	1.92	105.0	N	55.00	53.12	4%	7.8	5.9	2.4	1.7	12.3	Xinyi Ye
Qinghai Salt Lake	000792 CI	11.98	47.4	OP	26.70	15.82	69%	5.2	3.5	1.6	1.1	3.6	Xinyi Ye
Australia													
Allkem	AKE AU	3.85	26.5	OP	17.00	9.13	86%	6.4	3.7	1.0	0.8	3.7	Austin Yun
Atlantic Lithium	A11 AU	0.20	0.1	OP	0.66	0.50	32%	n.a.	n.a.	2.0	1.5	-24.9	Austin Yun
Core Lithium	CXO AU	0.34	7.0	OP	0.60	0.24	150%	3.1	3.4	0.8	0.7	24.5	Adam Baker
Global Lithium	GL1 AU	0.21	0.4	OP	2.40	1.23	95%	n.a.	n.a.	1.8	1.9	-51.7	Austin Yun
IGO	IGO AU	3.85	38.4	OP	15.00	7.71	95%	6.2	3.4	1.4	1.0	11.5	Adam Baker
Liontown Resources	LTR AU	2.04	31.9	OP	2.70	128%	111%	n.a.	14.1	4.3	2.9	-78.6	Adam Baker
Leo Lithium	LLL AU	n.a.	4.9	OP	1.00	n.a.	n.a.	n.a.	2.9	5.1	1.8	-53.6	Austin Yun
Piedmont Lithium	PLL AU	0.47	0.7	OP	1.40	0.37	278%	1.3	1.1	0.6	0.4	5.9	Austin Yun
Mineral Resources	MIN AU	7.85	42.3	OP	85.00	61.02	39%	11.3	4.3	2.8	1.9	7.7	Jon Scholtz
Pilbara Minerals	PLS AU	6.95	104.8	OP	7.10	3.50	103%	4.8	3.4	2.3	1.5	2.3	Adam Baker
Galan Lithium	GLN AU	0.12	0.6	OP	1.40	0.50	183%	n.a.	n.a.	1.7	2.5	-12.8	Austin Yun
Sayona Mining	SYA AU	0.39	5.9	OP	0.17	0.06	198%	5.8	2.6	0.6	0.5	-17.6	Austin Yun
Argosy Minerals	AGY AU	0.13	0.8	N	0.18	0.15	24%	140.6	8.7	2.4	1.0	-45.2	Austin Yun

Source: Bloomberg, company data, Macquarie Research, December 2023

Important Disclosures

Recommendation definitions	Volatility index definition	Financial definitions
<p>Macquarie – Asia and USA Outperform – expected return >10% Neutral – expected return from -10% to +10% Underperform – expected return <-10%</p> <p>Macquarie – Australia/New Zealand Outperform – expected return >10% Neutral – expected return from 0% to 10% Underperform – expected return <0%</p> <p>During periods of share price volatility, recommendations and target prices may occasionally and temporarily be inconsistent with the above definitions.</p> <p>Recommendations – 12 months Note: Quant recommendations may differ from Fundamental Analyst recommendations</p>	<p>This is calculated from the volatility of historical price movements.</p> <p>Very high – highest risk – Stock should be expected to move up or down 60–100% in a year – investors should be aware this stock is highly speculative.</p> <p>High – stock should be expected to move up or down at least 40–60% in a year – investors should be aware this stock could be speculative.</p> <p>Medium – stock should be expected to move up or down at least 25–40% in a year.</p> <p>Low – stock should be expected to move up or down at least 15–25% in a year.</p> <p>* Applicable to select stocks in Asia/Australia/NZ</p> <p>Note: expected return is reflective of a Medium Volatility stock and should be assumed to adjust proportionately with volatility risk</p>	<p>All "Adjusted" data items have had the following adjustments made: Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests</p> <p>EPS = adjusted net profit / efpowa* ROA = adjusted ebit / average total assets ROA Banks/Insurance = adjusted net profit /average total assets ROE = adjusted net profit / average shareholders funds Gross cashflow = adjusted net profit + depreciation *equivalent fully paid ordinary weighted average number of shares</p> <p>All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).</p>

Recommendation proportions for quarter ending 30 September 2023

	AU/NZ	Asia	USA	
Outperform	55.31%	64.52%	63.21%	(for global coverage by Macquarie, 2.50% of stocks followed are investment banking clients)
Neutral	36.98%	21.69%	34.91%	(for global coverage by Macquarie, 0.64% of stocks followed are investment banking clients)
Underperform	7.72%	13.79%	1.89%	(for global coverage by Macquarie, 0.00% of stocks followed are investment banking clients)

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