Canaccord Genuity Capital Markets

Rating and Target Price Changes

EV Materials

Global Equity Research

22 August 2022

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Company	Rating	Price	Target
EV Materials			
AKE-ASX	Buy	A$12.16	A$21.30↑
previous			*A$17.10*
CXO-ASX	Hold↓	A$1.40	A$1.50↑
previous	*Speculative Buy*		*A$1.00*
FL-TSXV	Spec Buy	C$2.40	C$4.75↑
previous			*C$4.00*
GLN-ASX	Spec Buy	A$1.28	A$3.40
IGO-ASX	Hold↓	A$12.07	A$13.25↑
previous	*Buy*		*A$11.00*
INR-ASX	Hold	A$0.69	A$0.75↓
previous			*A$0.85*
LAC-TSX	Spec Buy	C$38.94	C$50.50↑
previous			*C$49.00*
LKE-ASX	Spec Buy	A$1.19	A$1.65
LLL-ASX	Spec Buy	A$0.55	A$1.90↑
previous			*A$1.00*
LPI-ASX	Spec Buy	A$0.60	A$1.45↑
previous			*A$1.20*
LTR-ASX	Spec Buy	A$1.71	A$2.30
PLL-ASX	Spec Buy	A$0.91	A$2.05↑
previous			*A$1.70*
PLS-ASX	Buy	A$3.06	A$4.50↑
previous			*A$3.60*
PSC-ASX	Hold↓	A$0.11	A$0.11
previous	*Speculative Buy*		
RCK-TSXV	Spec Buy	C$3.51	C$4.50↓
previous			*C$7.00*
SGML-TSXV	Spec Buy	C$27.20	C$45.00↑
previous			*C$31.00*
SLI-TSXV	Spec Buy	C$8.32	C$15.00↑
previous			*C$14.00*
VUL-ASX	Spec Buy	A$8.03	A$19.00↓
previous			*A$23.00*

Priced as of close of business 18 August 2022

Please refer to the important disclosure section of this report.

Lithium | 2H'22 recharge: "giga-demand" needs major supply growth

Supply is coming, but how much and when? Elevated pricing is delivering strong earnings/cash flow for lithium producers (funding expansions) and incentivising greenfield projects/juniors. Our forecast revisions see average YoY supply growth of 30% to 2025E, but in the short term, we don't expect material *new* supply until early 2023. Longer term, we expect supply growth of 285% to 2.3Mt LCE by 2030; however, the timeline warrants some cynicism, due to the industry's track record of project delays, rising capital intensities/financing risk (Figure 5), permitting and government intervention risks and technical risks/new process techs/"unconventional" Resources (capacity ≠ market supply).

Demand - EV uptake remains resilient in the face of short term macro risks; battery factory roll out suggests we are conservative: 2022 EV sales are on track to record ~40% YoY growth, but recession concerns present downside risks to any bullish 2022/23 forecasts, in our view. We lower our 2022-24 EV forecasts, but lithium demand impacts are offset by increased average battery sizes (Figure 44). OEM/government EV targets support our long-term forecasts, with sales modelled to increase by 435% to 46m units by 2030 (implied LCE demand +343% vs 2022E to 2.8Mt). Upside comes in the form of our battery factory driven **"*giga-demand*"** scenario (Figure 10), with implied LCE demand up to 5Mt LCE vs CGe base case at 2.8Mt. Applying a conservative 50% battery factory utilisation rate implies +20% in 2030 EV sales over our base case of 46m (implied EV penetration of 60%).

What if we said more supply = more demand? Out to 2030, we see demand growth outpacing supply, but our revised SxD sees only minor deficits through 2023-25 (Figure 11), before major deficits return from 2028. In spite of demand upside risks, we are not proponents of the "*perpetual major deficits*" view. Major supply shortfalls would constrain battery production, so significant increases beyond visible supply are needed to achieve OEM/government/consensus EV targets. In our view, this supports higher pricing to incentivise investment in new supply (CGe ~US$48b to meet 2030E demand).

Pricing likely towards a peak; our case for higher long-term prices: We expect new supply in 2023/24 to alleviate market tightness and see prices ease. However, MtM for YTD 2022 and the need for higher incentive prices sees our 2022-25 average Li_2CO_3/LiOH lift prices over 2022-25 to US$44k/t, and SC6 to US$2,900/t. We find justification for our upgraded long-term pricing in rising capital intensities (higher prices needed to deliver minimum IRRs) and marginal cost analysis, with our long-term chemical/concentrate pricing lifted 29% and 50% to US$22.5k/t and US$1,500/t, respectively. In our view, long-term consensus (Visible Alpha) is too low at Li_2CO_3/SC6 at US$15k/t and US$1,000/t respectively (noting consensus SxD forecasts, Figure 18).

Lithium equities: Despite macro headwinds, continued strong pricing and a return of "risk-on" investor sentiment has seen a recovery in equities in recent weeks (Figure 93). Average implied pricing has recovered to near 2022 peaks at US$18k/t LCE, but remains well below "spot" (Li_2CO_3 China EXW US$69k/t)/our revised long-term assumptions, and (coincidentally?) not far above long-term consensus (FactSet). We reiterate our overall bullish equity stance on top-down views/valuation support, but prefer producers over developers (with some exceptions) in the near term on relative valuations/pricing leverage.

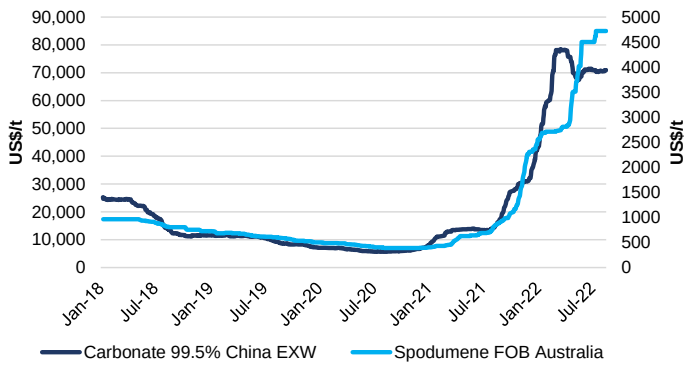
CG global lithium sector coverage: Our target prices have increased by an average of 15%, with higher pricing partially offset by capex/opex inflation and project timeline revisions. We are downgrading our ratings on IGO-ASX, CXO-ASX and PSC-ASX on valuation. See sidebar and Company updates section for details.

Our global top sector picks include AKE-ASX, PLS-ASX, SGML-TSX and LLL-ASX.

Contents

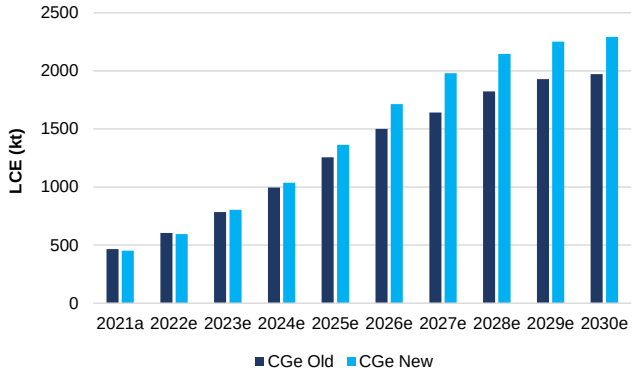
Investment summary

Figure 1: Lithium pricing hits record highs in 2022 on supply shortfalls and strong demand



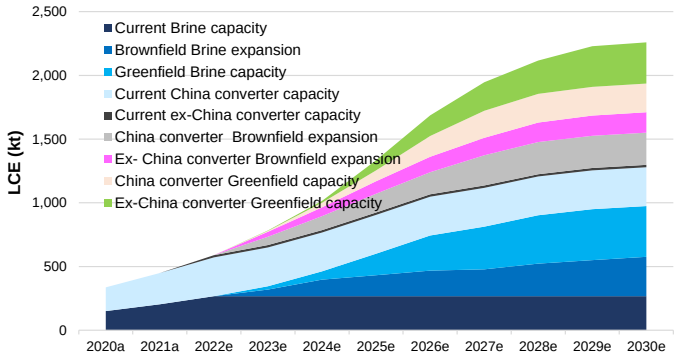
Source: Asian Metal

Figure 2: Supply growth is expected to accelerate into 2023. We think demand indicators/higher pricing will continue to incentivise new supply over the longer term...



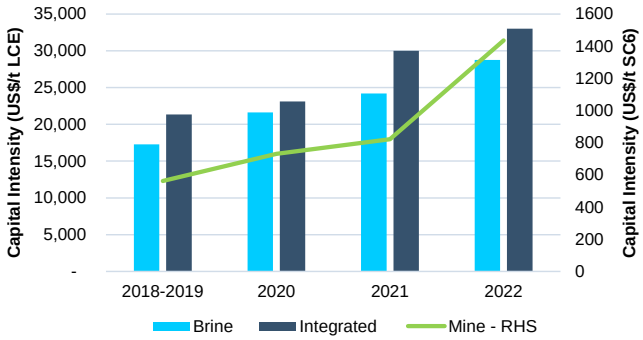
Source: Company reports, Canaccord Genuity estimates

Figure 3: ...but there is risk to supply expectations – 57% of modelled new supply out to 2030 expected to come from greenfield projects (i.e. higher risk)



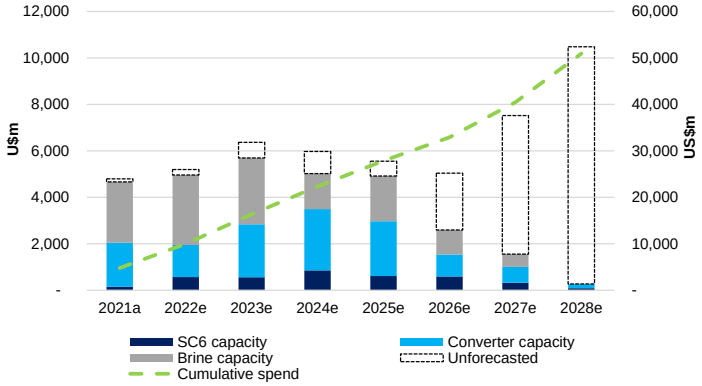
Source: Company reports, Canaccord Genuity estimates

Figure 4: Lithium projects are getting more expensive to build - average greenfield project capital intensities having risen by ~50% since 2018



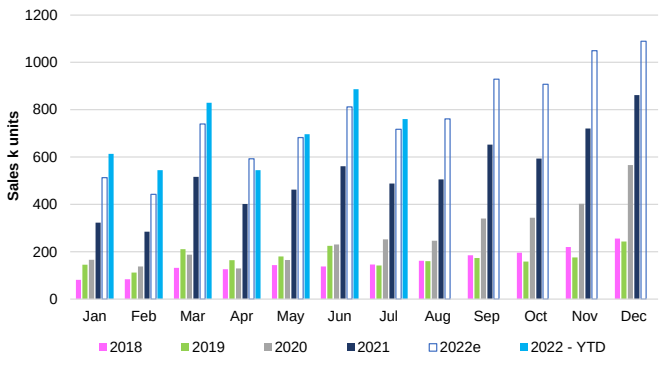
Source: Company reports

Figure 5: Average capital intensities imply an estimated ~US$48bn investment in upstream capacity is needed in order to meet our 2030 demand forecast; current expenditure plans appear insufficient to meet this forecast



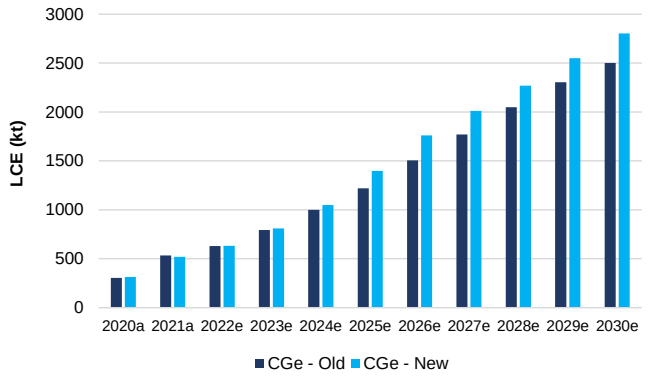
Source: Company reports, Canaccord Genuity estimates

Figure 6: It's been a bumpy ride, but EV sales continue to trend up. Significant increases in EV adoption rates in the long term are now the prevailing view, but global growth uncertainty presents short-term risks



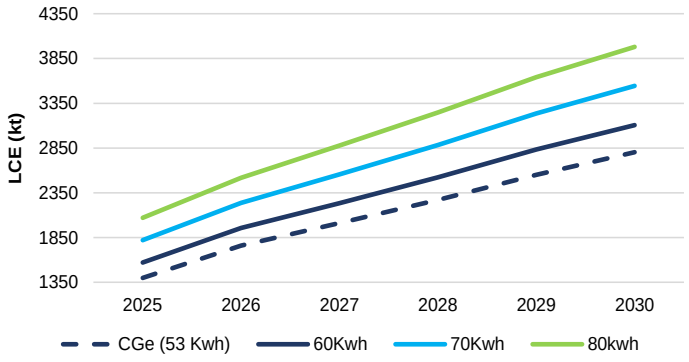
Source: Rho Motion, Canaccord Genuity estimates

Figure 7: Even though we have tempered our 2022-24 EV forecasts, we still expect average demand growth of 28% out to 2025 (2022E-30E CAGR 20%), with upgraded 2030 demand forecasts to 2.8Mt LCE



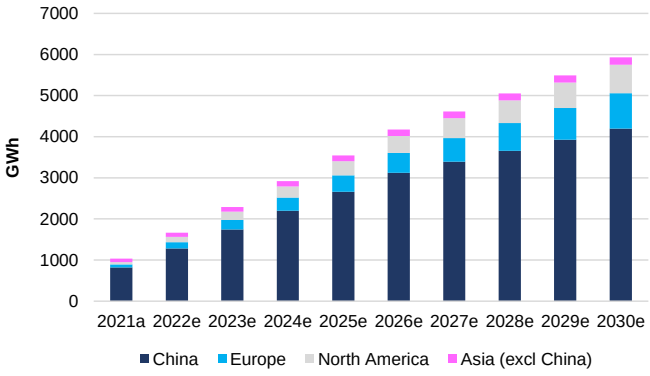
Source: Company reports, Canaccord Genuity estimates

Figure 8: Our demand forecasts could be conservative, with our estimates highly sensitive to average EV battery sizes. Our base case is predicated on an average battery size of 53kWh



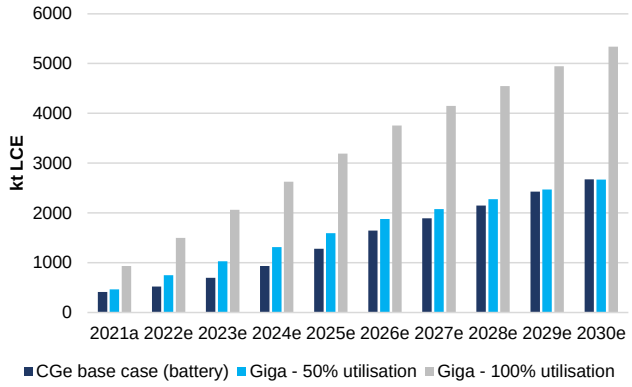
Source: Canaccord Genuity estimates

Figure 9: Are we being too conservative in our demand estimates? Battery manufacturing capacity is forecast to grow by 280% out to 2030 to ~6TWh



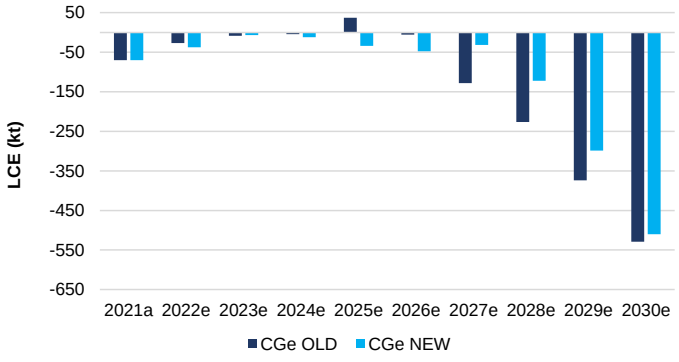
Source: Benchmark Mineral Intelligence

Figure 10: "Giga-demand" - based on our assumed battery factory scrap/utilisation rates, implied lithium demand could be significantly higher than we have forecast



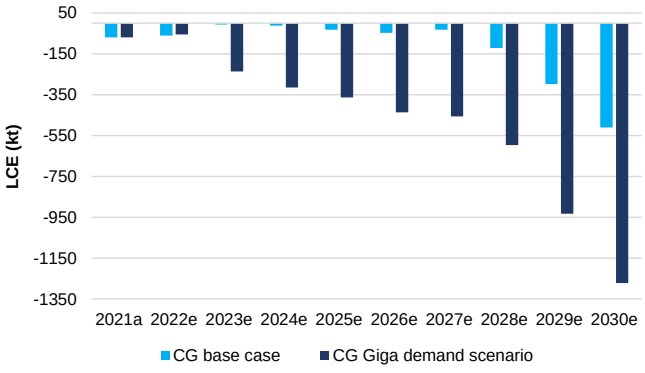
Source: Benchmark Mineral Intelligence, Canaccord Genuity estimates

Figure 11: We think lithium remains in deficit – our updated SxD forecasts now call for greater deficits in 2022, minor deficits through 2023-25 (reflecting macro risks and increased supply) and major deficits from 2028



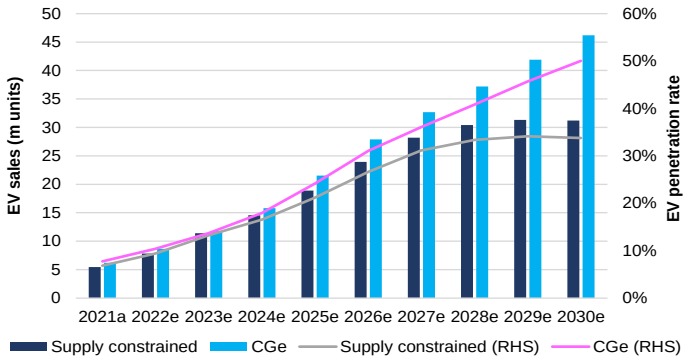
Source: Company reports, Canaccord Genuity estimates

Figure 12: A giga-demand scenario implies significant market deficits; however, we are not proponents of the "perpetual major deficits" view



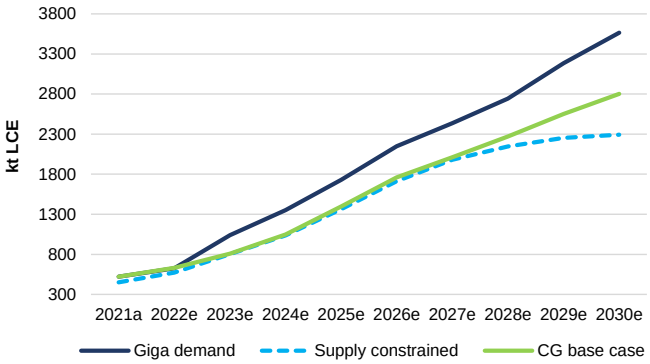
Source: Company reports, Canaccord Genuity estimates

Figure 13: Potential for market undersupply could constrain battery production and EV sales – supply constrained EV sales estimates fall well below our forecast base case from mid-decade…



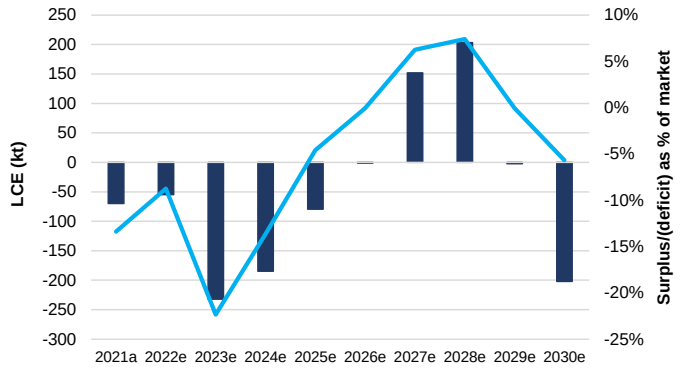
Source: Company reports, Canaccord Genuity estimates

Figure 14: …therefore, our perpetual deficits/giga-demand scenarios are hypothetical in the absence of major increases in supply – battery production/EV sales will be limited to available raw material supply



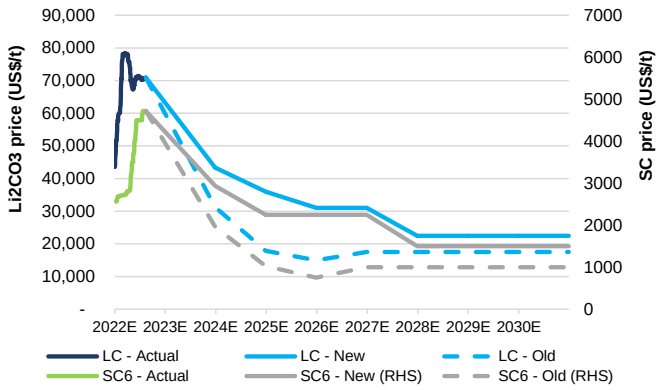
Source: Company reports, Canaccord Genuity estimates

Figure 15: What if we said more supply = more demand? A "super supply" scenario applied to giga-demand forecasts would still see market deficits, but would present an overall more sustainable market balance over time (see here)



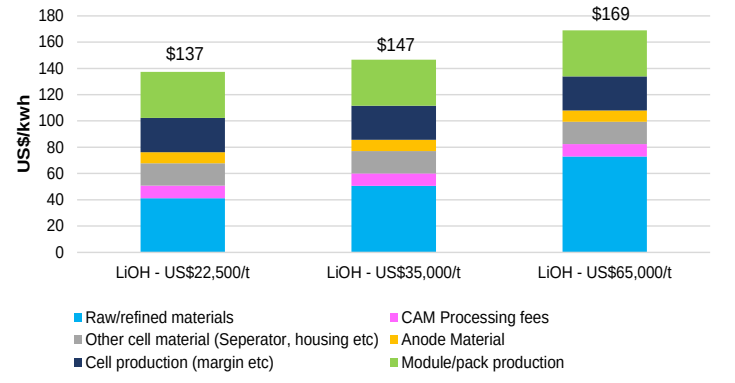
Source: Company reports, Canaccord Genuity estimates

Figure 16: We have revised our pricing forecasts to reflect our updated SxD forecasts – we believe additional supply should see prices pull back, but how far they pull back is the main question



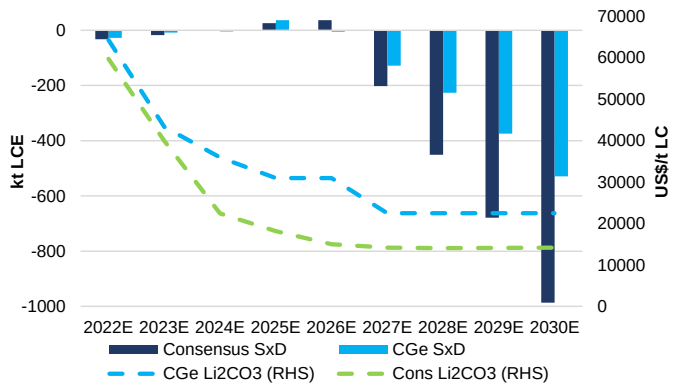
Source: Asian Metal, Canaccord Genuity estimates

Figure 17: We don't think current prices are sustainable in the long term – battery pack costs are sensitive to lithium prices. However, demand has so far been relatively inelastic (YoY EV sales growth of 50% vs +150% in LC prices)



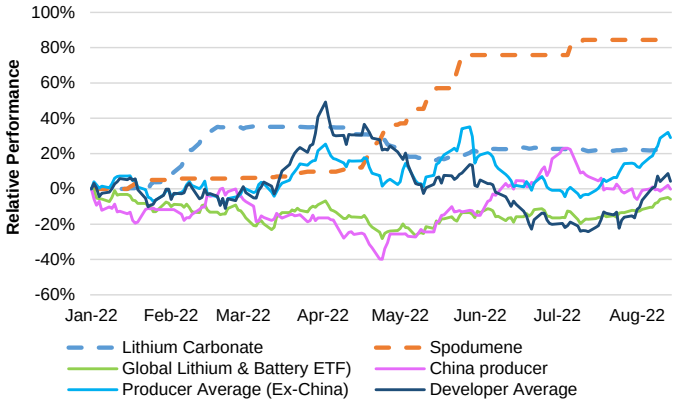
Source: Roland Berger, Canaccord Genuity estimates

Figure 18: In our view, consensus' long-term price forecasts are too low vs market SxD expectations – we find justification for higher long-term pricing in higher capital intensities and marginal costs analysis



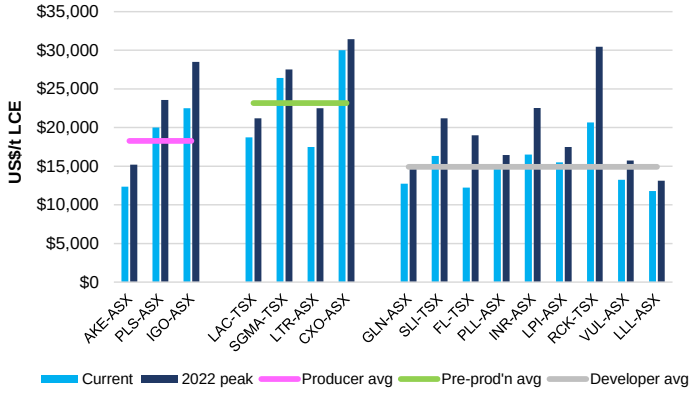
Source: Visible Alpha, Company reports, Canaccord Genuity estimates

Figure 19: Lithium equity performance – lithium prices up and staying up, yet equities underperforming on a relative basis. This suggests to us that investors expect pricing to pull back



Source: FactSet

Figure 20: Implied LCE prices – equity valuations down from recent peak, but implied prices well below spot levels and our updated long-term pricing assumptions; advanced developers look expensive relative to producers



Source: FactSet, Canaccord Genuity estimates

Figure 21: CG global lithium coverage – summary of target price and rating changes

Ticker	Name	New Rating	Old Rating	Exchange	Analyst	Lithium type	Price	Market cap ($m)	Old TP	New TP	Chg (%)	NAVS	P/NAV
IGO	IGO Limited	HOLD ↓	BUY	ASX	TH	Integrated	A$12.07	9,140	A$11.00	A$13.25	20%	A$10.00	1.21›
PLS	Pilbara Minerals	BUY	BUY	ASX	TH	SC	A$3.06	9,109	A$3.60	A$4.50	25%	A$3.62	0.85›
AKE	Allkem Limited	BUY	BUY	ASX	RS	Integrated	A$12.16	7,754	A$17.10	A$21.30	25%	A$21.41	0.57›
LAC	Lithium Americas	SPEC BUY	SPEC BUY	TSX	KL	Brine	C$38.94	5,230	C$49.00	C$50.50	3%	C$66.00	0.59›
LTR	Liontown Resources	SPEC BUY	SPEC BUY	ASX	RS	SC	A$1.71	3,745	A$2.30	A$2.30	0%	A$2.30	0.74›
SGML	Sigma Lithium	SPEC BUY	SPEC BUY	TSXV	KL	SC	C$27.20	2,738	C$31.00	C$45.00	45%	C$34.00	0.80›
CXO	Core Lithium	HOLD ↓	BUY	ASX	TH	SC	A$1.40	2,423	A$1.00	A$1.50	50%	A$0.93	1.50›
LKE	Lake Resources	SPEC BUY	SPEC BUY	ASX	RS	Brine	A$1.19	1,654	A$1.65	A$1.65	0%	A$1.65	0.72›
PLL	Piedmont Lithium	SPEC BUY	SPEC BUY	ASX	RS	Integrated	A$0.91	1,645	A$1.70	A$2.05	21%	A$2.05	0.44›
INR	Ioneer Ltd	HOLD	HOLD	ASX	TH	Integrated	A$0.69	1,459	A$0.85	A$0.75	-12%	A$0.75	0.91›
SLI	Standard Lithium	SPEC BUY	SPEC BUY	TSXV	KL	Brine	C$8.32	1,371	C$14.00	C$15.00	7%	C$15.00	0.55›
VUL	Vulcan Energy	SPEC BUY	SPEC BUY	ASX	TH	Brine	A$8.03	1,151	A$23.00	A$19.00	-17%	A$19.00	0.42›
FL	Frontier Lithium	SPEC BUY	SPEC BUY	TSXV	KL	Integrated	C$2.40	509	C$4.00	C$4.75	19%	C$4.75	0.51›
LLL	Leo Lithium	SPEC BUY	SPEC BUY	ASX	RS	SC	A$0.55	653	A$1.00	A$1.90	90%	A$1.90	0.29›
GLN	Galan Lithium Ltd	SPEC BUY	SPEC BUY	ASX	RS	Brine	A$1.28	390	A$3.40	A$3.40	0%	A$3.40	0.38›
RCK	Rock Tech Lithium	SPEC BUY	SPEC BUY	TSXV	KL	SC	C$3.51	264	C$7.00	C$4.50	-36%	C$4.50	0.78›
LPI	Lithium Power Int	SPEC BUY	SPEC BUY	ASX	RS	Brine	A$0.60	209	A$1.20	A$1.45	21%	A$1.45	0.41›
PSC	Prospect Resources	HOLD ↓	SPEC BUY	ASX	TH	SC	A$0.11	49	A$0.11	A$0.11	0%	A$0.11	0.95›
ALL	Atlantic Lithium	R	R	AIM	AB	SC	R	R	R	R	R	R	R

Source: FactSet (prices as at 18 August 2022), Canaccord Genuity estimates; RS – Reg Spencer, TH – Tim Hoff, KL – Katie Lachapelle, AB – Alex Bedwany

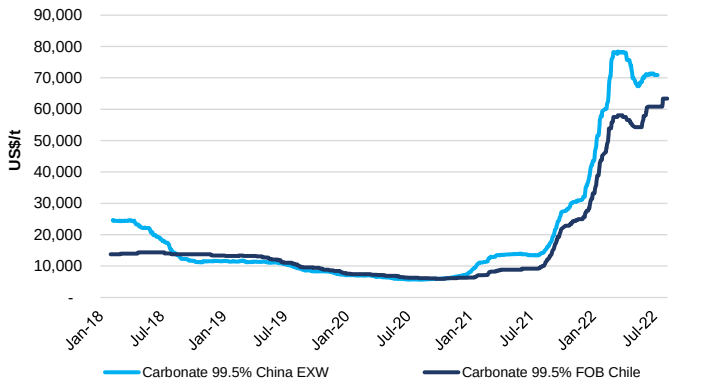
Lithium | 2H'22 recharge

Lithium prices hit all-time highs in 2022

In Lithium | 1H'22 – higher for longer we opined on the potential for higher-than-expected lithium product prices based on stronger demand and a lagging supply response. Lithium carbonate (China EXW) and SC6 (FOB Australia) prices have subsequently hit all-time highs of US$75,000/t and US$4,500/t (as per Asian Metal), respectively, against our prior peak pricing forecasts of US$54,000/t LC and US$3,600/t SC6.

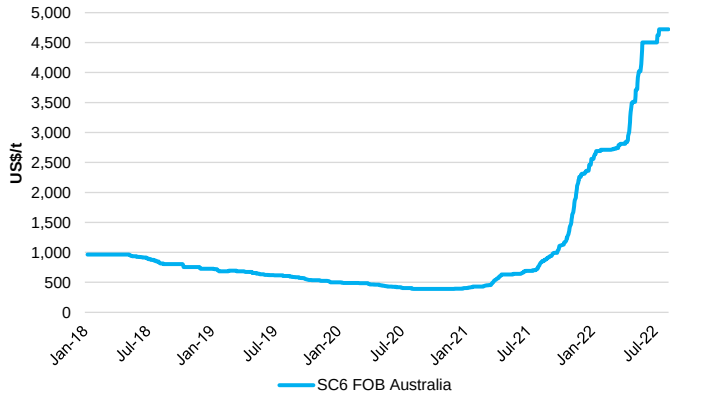
In our view, strong lithium product price performance can be attributed to continued strong demand in the face of a lagging supply response due to a lack of investment in new capacity through cycle lows in 2019-21, compounded by long leads times for new supply.

Figure 22: Li_2CO_3 min 99.5% China EXW prices/FOB South America – 2018-22



Source: Asian Metal

Figure 23: SC6 FOB Australia prices – 2018-22



Source: Asian Metal

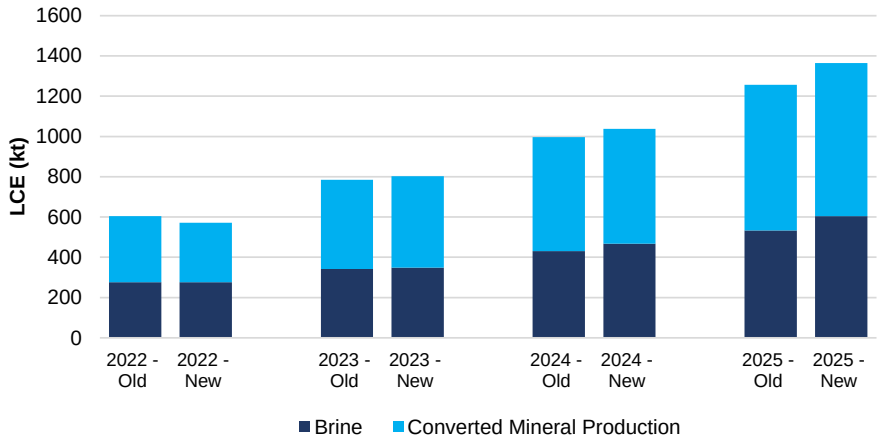
Lithium prices are well beyond "incentive" levels, in our view. This represents a major boon for incumbent producers, where we estimate operating margins for brine and spodumene operations currently exceed 75% and 85%, respectively. This cash flow is helping to fund accelerated capacity expansions, while for developers, is incentivising an extensive pipeline of development projects.

Supply is coming… but how much and when?

We have revised our lithium market supply forecasts following recent company announcements of accelerated capacity expansions and revised mine starts/project development timelines (Figure 24).

Key near-term revisions include bringing forward production from Wodgina and Mt Holland, along with an increase in brine production from the Atacama. Overall, we see an average 5% increase to modelled supply over CY23-25.

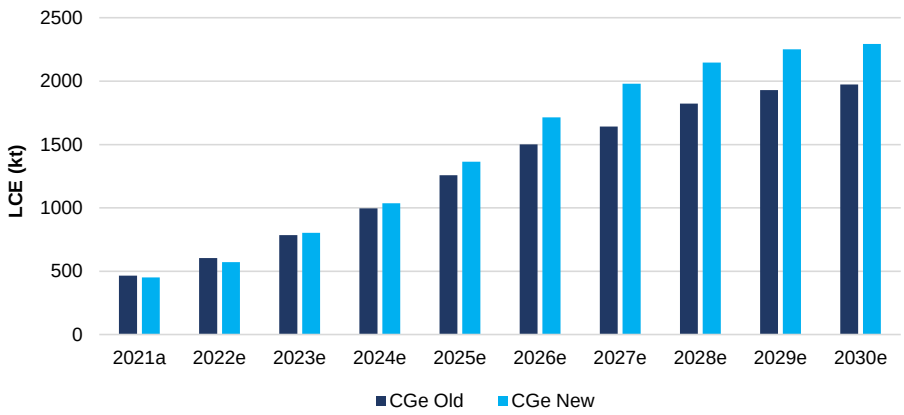
Figure 24: Near-term LCE supply forecast changes



Source: Canaccord Genuity estimates

Over the longer term, we model supply increasing to 2.3Mt LCE by 2030 (+301% vs 2022E), with YoY supply growth expected to average 15%.

Figure 25: Old vs new supply forecasts

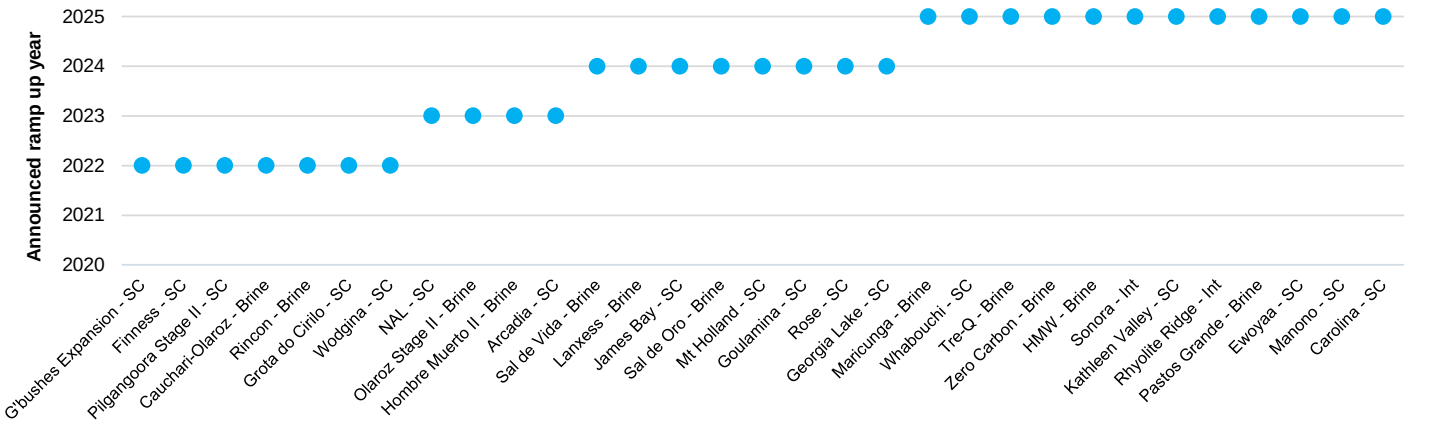


Source: Company reports, Canaccord Genuity estimates

In the medium term, we also see increasing probability (permitting/approvals, financing driven by higher incentive prices; see The case for higher long-term pricing) of new supply from an extensive pipeline of development projects and brownfield expansions of existing operations, as well as development of "unconventional" or lower grade Resources such as Direct Lithium Extraction brine and lithium micas.

Our research indicates 31 projects (brownfield expansions and greenfield developments) that are currently slated to enter production between 2022 and 2026 (based on company announcements).

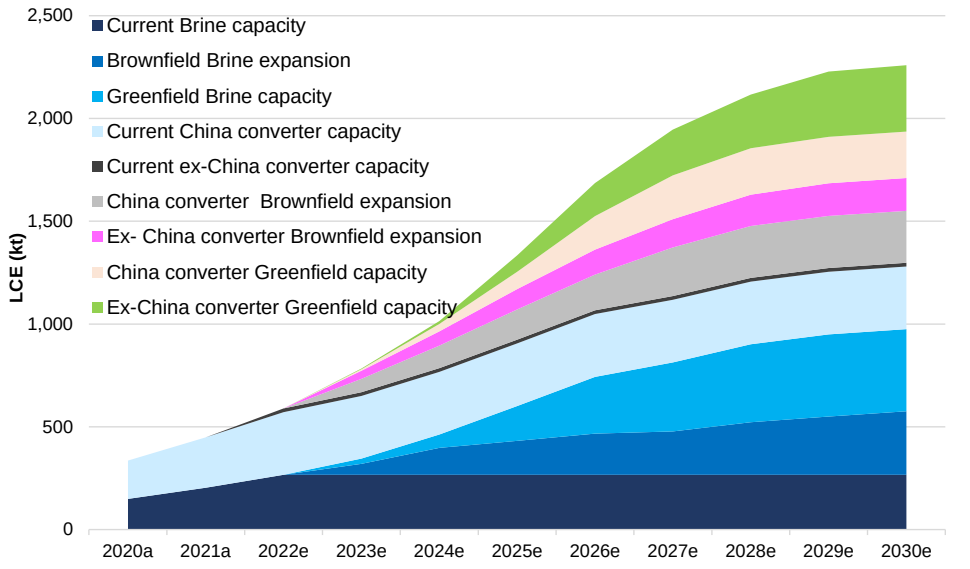
Figure 26: Near term development/expansion project pipeline with project start date based on company announcements;



Source: Company reports

We break down our modelled supply growth in Figure 27, which shows that greenfield projects represent 57% of our modelled 2030 LCE supply, vs brownfield expansions of existing capacity. Further categorisation sees converted hard rock becoming a critical component of future supply with an estimated 961kt of incremental capacity to 2030 (58%), vs increases in brine capacity of 708kt.

Figure 27: CGe supply forecasts by production source



Source: Company reports, Canaccord Genuity estimates

Why we think it pays to be conservative on supply growth

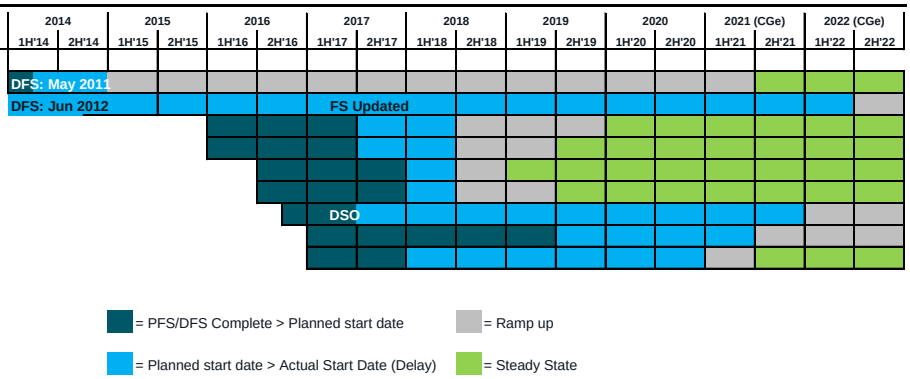
The industry has a poor track record

Despite our modelled capacity growth increasing by >300% by 2030, we see downside risks to our supply projections. Our research suggests that production from new lithium projects **is delayed by an average 2.5 years from original announced timelines**, excluding production ramp ups (Figure 28). Delays have been driven by numerous factors including permitting/approvals, lithium price cycles (impacts financing) and technical challenges during commissioning and production ramp-up.

In our view, greenfield developments carry the greatest risk in achieving project timelines, ramp up and production targets. Noting our estimates of 57% of modelled 2030 supply coming from greenfield developments, this warrants some level conservatism when assessing future supply.

Figure 28: Lithium projects have historically been late – planned vs actual production start (current producing operations)

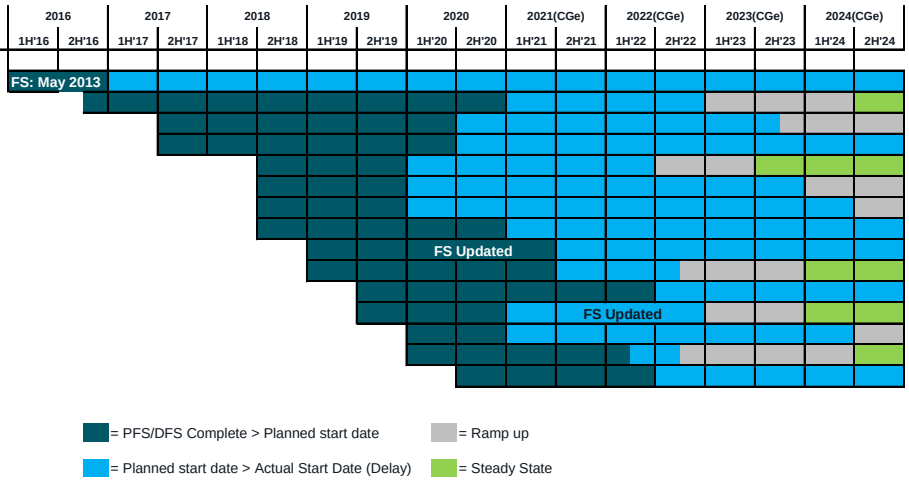
Company	Project	Dvlpt	Type	Capacity (LCE)
Selected current projects				
Orecobre	Olaroz Stage I	G'field	Brine	17.5
LAC/Ganfeng	Cauchari-Olaroz	G'field	Brine	40
Albemarle	La Negra II+	B'field	Brine	20
Altura Mining	Pilgangoora	G'field	H/rock	23
AMG	Mibra	G'field	H/rock	12
Pilbara Minerals	Pilgangoora Stage I	G'field	H/rock	40
Mineral Resources	Wodgina	B'field	H/rock	100
Talison	G'bushes Expansion	B'field	H/rock	85
SQM	Atacama Expansion	B'field	Brine	49



Source: Company reports, Canaccord Genuity estimates

Figure 29: Lithium projects have historically been late – planned vs actual production start (planned/new projects)

Company	Project	Dvlpt	Type	Capacity (LCE)
Selected new projects				
Nemaska	Whabouchi	G'field	H/rock	31
Orecobre	Olaroz Stage II	B'field	Brine	25
Livent	H/Muerto Expansion	B'field	Brine	20
Critical Elements	Rose	G'field	H/rock	20
Pilbara Minerals	Pilgangoora Stage II	B'field	H/rock	60
SQM	Atacama Expansion II+	B'field	Brine	20
Allkem	Sal de Vida	G'field	Brine	30
ioneer	Rhyolite Ridge	G'field	H/rock	20
Piedmont Lithium	Carolina	G'field	H/Rock	38
Tianqi/IGO	Kwinana	G'field	Conv	24
Lithium Power Int	Maricunga	G'field	Brine	30
Sigma Lithium	Grota do Cirilo Stage I	G'field	H/rock	50
WES/SQM	Mt Holland	G'field	H/rock	50
Albermarle	Kemerton	G'field	Conv	25
LAC	Thacker Pass	G'field	Clay	40



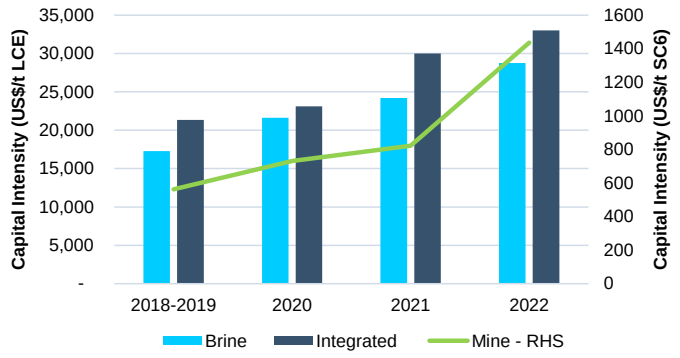
Source: Company reports, Canaccord Genuity estimates

Capital intensities are rising, and investment in new capacity is currently well short of what is needed

We estimate weighted average capital intensities for new lithium chemical supply at US$21,000/t LCE (incl. US$26,000/t for greenfield brines, and US$31,000/t for greenfield integrated hard rock projects). Moreover, we note that projects are becoming more expensive to build, with capital intensities having risen by an average of ~50% since 2018 (Figure 30).

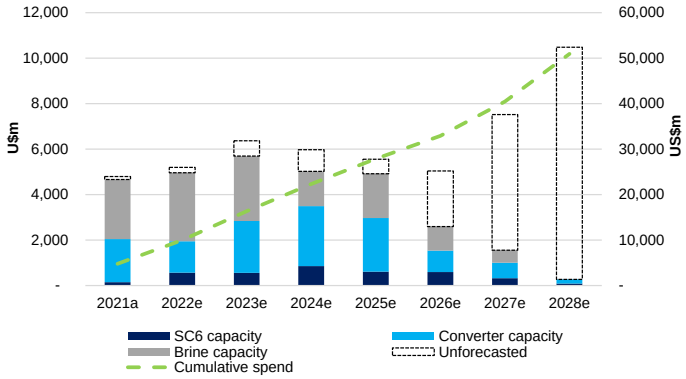
Adjusting this for capital cost inflation (15-20%?), this implies a required investment of ~US$48bn to meet our 2030 demand projections (see Demand). Figure 31 illustrates implied capital investment required to deliver our modelled supply forecasts. **In our view, current rates of capital investment fall well short of what is required**, impacting future supply potential.

Figure 30: Average greenfield lithium project capital intensities over time based on feasibility studies



Source: Company reports, Canaccord Genuity estimates

Figure 31: Investment required to solve our forecast 2030 market deficit scenario*



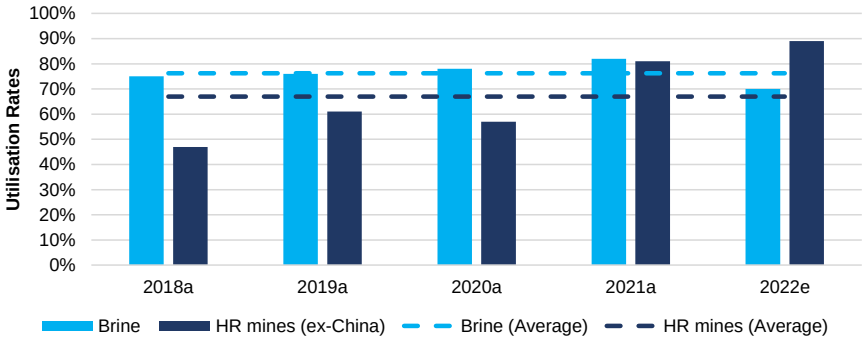
* Assumes two-year construction lead time, excludes commissioning/ramp-up
Source: Company reports, Canaccord Genuity estimates

Capacity ≠ market supply

A common misunderstanding is the notion that "capacity" is equal to "supply". Technical challenges during commissioning and ramp-up are common with new lithium projects. Even while at steady state, both internal and external factors see lithium operations operate below installed capacity.

Our research suggests that on average, **lithium projects (both brine and hard rock) run at utilisation rates of between 70-80%** (Figure 32). As operating expertise and utilisation rates for existing operations improve, overall industry averages are expected to remain lower given the pipeline of new projects which then need to go through commissioning and (often extended) ramp-ups.

Figure 32: Historical utilisation rates across hard rock mines and brines



Source: Company reports, Canaccord Genuity estimates

The risks of new processing technologies and "unconventional" resources

The current pricing environment combined with new processing technologies has dramatically improved the economic potential of developing lower grade lithium resources (i.e., lower grade/poor chemistry salars, geothermal brines, sedimentary hosted deposits/clays, lithium micas).

While we have a positive view on the role that new processing technologies (the lithium industry's reach should exceed its grasp) and exploitation of "unconventional" resources (sedimentary deposits, micas) *could* have on future lithium supply (up to 15% of CGe 2030E supply), these projects are not without risk. Technology/ processing and scale-up risks, permitting/approvals, capital intensity, operating costs, and sustainability factors (i.e., water consumption, waste disposal, etc.) will all influence potential supply from these sources over the longer term.

We have previously published research on sedimentary lithium deposits (see Rhyolite Ridge positioning for production and Direct Lithium Extraction (see Not unconventional... Untapped! and Direct Lithium Extraction virtual conference - key takeaways. Below we undertake a brief look at other "non-conventional" resources such as lithium micas, including their economics and potential role in future market supply.

Hard rock lithium - not all lithium minerals are created equal

The main lithium-bearing mica minerals include lepidolite, zinnwaldite and lithium-bearing muscovites. The elemental lithium content of these micaceous minerals can be as high as spodumene and higher than other lithium-bearing aluminosilicates such as petalite (Figure 33).

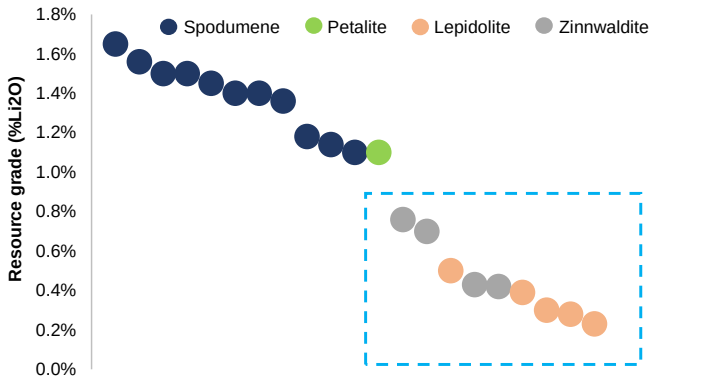
However, elemental lithium content should not be confused with in-situ Resource grades (i.e., expressed as lithium oxide, Li_2O), which is a key driver of project economics. As per Figure 34, spodumene/petalite deposits typically carry 2-3x the in-situ Li_2O grades vs micaceous lithium ores such as lepidolite.

Figure 33: Lithium minerals and elemental lithium content (blue – lithium aluminosilicates; green – lithium micas)

Mineral	Chemical formula	Elemental Li content (% Li)	Comments
Spodumene	$LiAlSi_2O_6$	3.7	Most common economic hard-rock lithium mineral
Petalite	$LiAlSi_4O_{10}$	1.6 - 2.3	ie. Bikita/Arcadia - Zimbabwe
Eucryptite	$LiAlSiO_4$	2.1 - 5.5	Secondary alteration product of spodumene
Hectorite	$Na_{0.3}(Mg,Li)_3Si_4O_{10}(OH)_2$	0.5	Product of hydrothermally altered volcanic ash ie. Thacker Pass, Nevada
Jadarite	$LiNaSiB_3O_7(OH)$	7.3	ie. Jadar, Serbia
Lepidolite	$K_2(Li, Al)_{5-6}\{Si_{6-7}Al_2\text{-}1O_20\}$	1.4 - 3.6	Micaceous lithium mineral often found with spodumene
Zinnwaldite	$KLiFeAl(AlSi_3)O_{10}(F,OH)_2$	1.6	ie. Zinwald/Cinovec - Eastern Europe; San Jose, Spain
Amblygonite	$(Li,Na)AlPO_4(F,OH)$	3.4 - 4.7	Lithium flourophosphate; occurs as a secondary lithium mineral with spodumene etc.

Source: Company reports

Figure 34: Resource grade plot of various lithium deposits by mineralogy



Source: Company reports

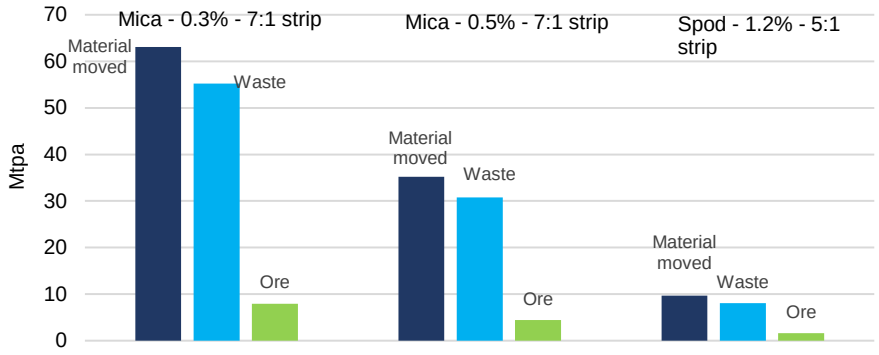
While relatively common, these lower grade deposits have historically been overlooked given the inferior economics vs spodumene, and more challenging mineral processing. At present, there is only limited production from lithium micas, centred in the Jiangxi province of China, which predominantly consist of lepidolite and muscovite. Such operations often rely on the production and sale of by-products (i.e., rubidium) to offset higher production costs.

Lithium micas vs spodumene – an economic comparison

Unlike spodumene-dominant deposits, successful processing of lithium micas can vary considerably and depends on the primary lithium mineral in the deposit (i.e., most hard rock deposits will host various lithium minerals). As noted above, lithium micas typically feature significantly lower in-situ grades, have higher waste:ore ratios, and often contain higher levels of impurities.

Lepidolite deposits in China often have low grades (0.3-0.5% Li_2O) and high strip ratios (7-15:1), meaning significantly higher material movements to extract the same lithium units (Figure 35).

Figure 35: Illustrative comparison of material movement/processing capacity requirements for lithium micas vs spodumene to produce same lithium units



Source: Canaccord Genuity estimates

In Figure 36, we illustrate the challenges associated with production of lithium chemicals from low grade micas. Low in-situ grades and higher waste:ore ratios result in significantly higher material movements, with up to 3x the volume of concentrate required to produce the same volume of refined chemicals. We also highlight potential issues with waste storage/disposal.

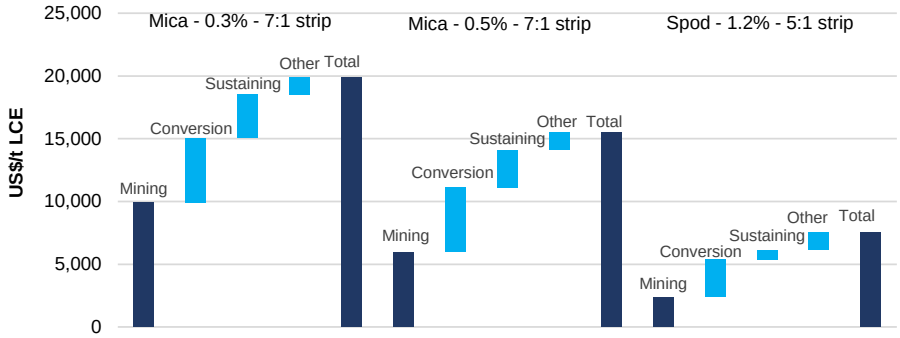
Figure 36: Illustration of mining/processing requirements between low grade micas vs spodumene

Mica operation - Low grade		Mica operation - Average grade		Spodumene operation		
Material moved (kt)	**63,129**	**Material moved (kt)**	**35172**	**Material moved**	**9655**	
Waste Mined (kt)	55,238	Waste Mined (kt)	30776	Waste Mined	8046	*Higher strip ratio requires significantly higher material movements for concentrate feed rates*
Mined/prossesed (kt)	**7,891**	**Mined/prossesed (kt)**	**4,397**	**Mined/prossesed (kt)**	**1,609**	
Strip	**7**	Strip	**7**	Strip	**5**	
Grade (Li2O)	**0.30%**	Grade (Li2O)	**0.50%**	Grade (Li2O)	**1.20%**	*Lower grades typically lead to lower recoveries*
Recoveries into conc	65%	Recoveries into conc	70%	Recoveries into conc	75%	
Li2O recovered	15.39	Li2O recovered	15.39	Li2O recovered	14.48	
LCE	37.5	LCE	37.5	LCE	35.3	
Mica Concentrate	**616**	**Mica Concentrate**	**506**	**SC Concentrate**	**241**	*Lower head grade can see up to 3x the volume required for the same volume of end product with significant volumes of wasre material*
Conc Grade (Li2O)	2.5%	Conc Grade (Li2O)	3.0%	Conc Grade (Li2O)	6.0%	
Converter feed (kt)	**616**	Converter feed (kt)	**506**	Converter feed (kt)	**241**	
Converter Recovery	80%	Converter Recovery	80%	Converter Recovery	85%	
LCE production (kt)	**30.0**	**LCE production (kt)**	**30.0**	**LCE production (kt)**	**30.0**	

Source: Canaccord Genuity estimates

Figure 37 illustrates the cost differential between a low-grade mica feed vs a typical spodumene deposit. In addition to considerably higher operating costs, we note the likelihood of significant higher energy consumption for conversion to chemicals given lower concentrate grades (i.e., ~3% Li_2O vs spodumene 6% Li_2O). Using these input assumptions, we estimate costs for low grade micas could be up to US$20,000/t LCE produced, vs an integrated spodumene operation at ~US$7,500/t (Figure 37).

Figure 37: Illustrative comparison of operating cost breakdown of integrated mica conversion vs spodumene



Source: Canaccord Genuity estimates

Lithium micas will play a role in future market supply, but the usual caveats apply

While our research suggests inferior economics to conventional spodumene resources, our views on market pricing (see The case for higher long-term pricing) means that we now see improved economics for these types of deposits. However, unproven mineral processing techniques, capital investment requirements and permitting/approvals means that we don't expect a material contribution to overall lithium market supply from micas until the late 2020s.

Moreover, the inclusion of high-cost production into future market supply has implications for the industry cost curve and through lifting industry marginal costs and support for long term pricing (see Higher prices incentivise "marginal" Resources).

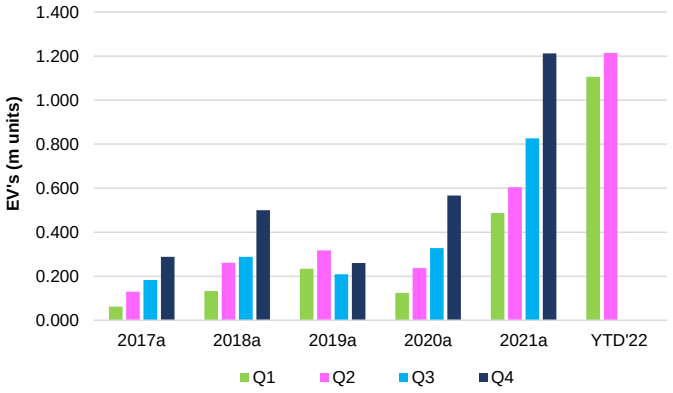
Demand – long term trends intact, but some short-term risks evident

1H'22 EV sales of ~4.0m units (July 2022 – major markets only) imply an annualised run rate of 8.1m units (2021 6.2m units); however, the EV market has historically been weighted 40:60 to 2H. Taking this into account implies a run rate of ~10.1m units. This puts our revised 8.7m unit forecast within the range of expectations. However, we note the continued Chinese COVID-related shutdowns and a slowing of growth in Europe.

We highlight that Chinese EV sales exceeded 500k units in June 2022 and >450kt units in July 2022, which combined with potential post lockdown stimulus and possible extensions to Chinese government EV subsidies (previously expected to roll off in 2022) could see China again deliver a stronger 2H vs 1H (Figure 38).

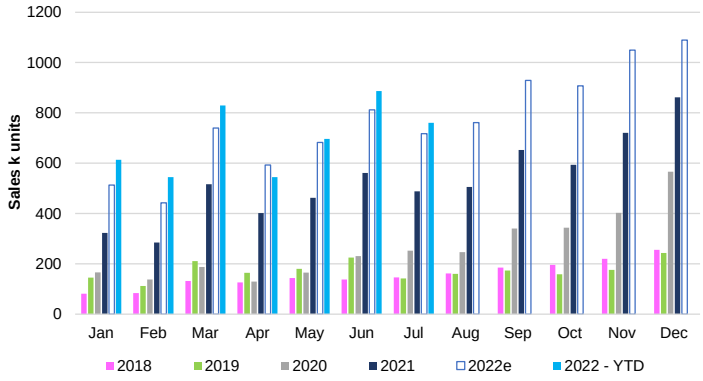
However, we believe the risks of further COVID lockdowns, continued supply chain disruptions and broader global macro uncertainty/slower global growth could present headwinds to global sales over 2022-24.

Figure 38: China quarterly EV sales (2017-YTD 2022) - sales display distinct yearly trends with sales typically stronger in 2H vs 1H



Source: RhoMotion, EV-Volumes, Canaccord Genuity

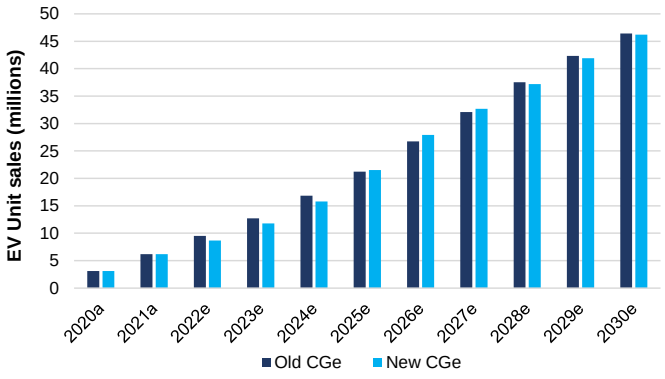
Figure 39: Global EV sales YTD 2022 – on track to deliver strong YoY growth but some risks evident



Source: RhoMotion, EV-volumes, Canaccord Genuity estimates

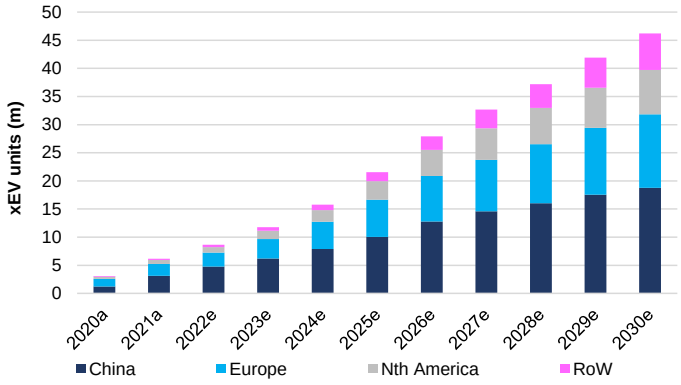
We have lowered our 2022E-24E EV sales growth assumptions by an average of 7% to account for the current macro risks (Figure 40). This may prove conservative, with third-party market forecasts calling for 10.1m units in 2022 (i.e., Bloomberg New Energy Finance), with implied 1H/2H weighting supporting this forecast. Longer term, we forecast sales to accelerate from 2025, with global deliveries achieving 46m units (implied EV penetration rate ~50%) by 2030.

Figure 40: CGe EV sales forecasts softer growth in near term on macro risks; longer-term trajectory remains unchanged



Source: Rho Motion, Canaccord Genuity estimates

Figure 41: EV sales forecasts by region – China to maintain dominant market share but rapid growth expected in Europe and North America from mid-decade

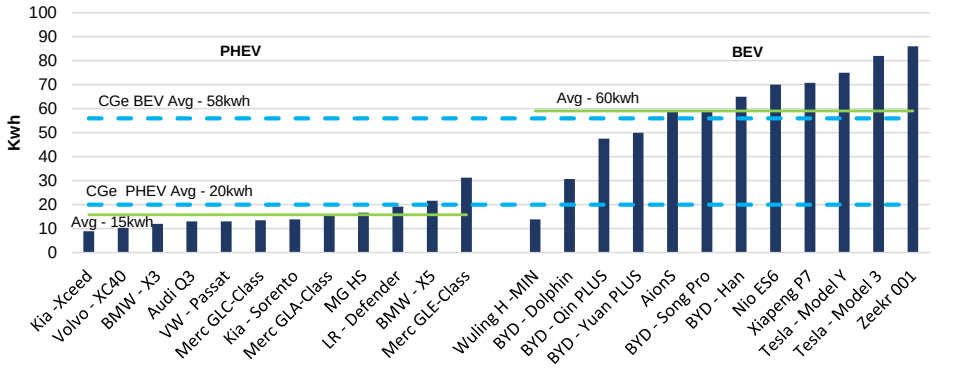


Source: Rho Motion, Canaccord Genuity estimates

Demand upside – EV batteries are getting larger

Despite our lower EV sales expectations through 2024E, our near-term lithium demand estimates remain mostly unchanged due to revisions to our modelled average battery size. As shown in Figure 42, our revised *average* EV battery size assumptions increase to 53kWh by 2030E; but with growth in battery EV (BEV) sales dramatically outpacing plug-in hybrid EV (PHEV) models and average battery sizes for the world's best-selling BEVs currently at ~60kWh, these forecasts are likely conservative, in our view.

Figure 42: Are we too conservative on average EV battery sizes? Battery size of top 12 most popular BEVs and PHEVs YTD 2022

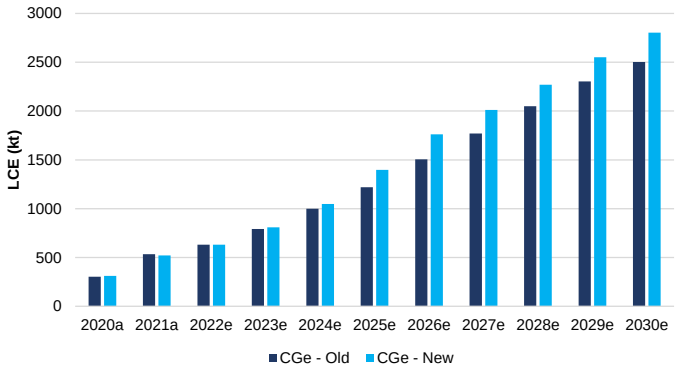


Source: Rho Motion, Canaccord Genuity estimates

Over the longer term, we model annual demand growth at ~21% out to 2030E, where we forecast overall LCE demand of 2.8Mt LCE (+340% growth vs 2022E).

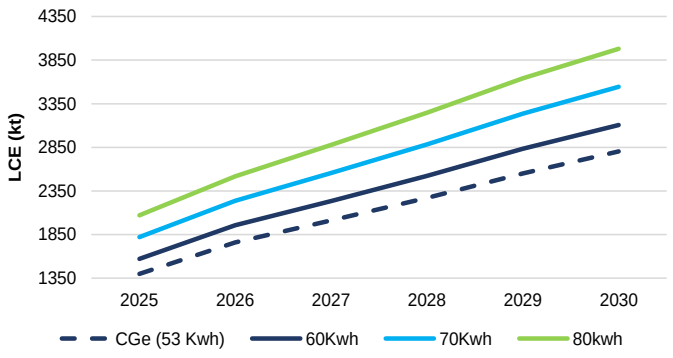
Figure 44 outlines our estimated demand sensitivity to assumed average EV battery sizes, with a 13% increase in average battery size (all else being equal) to 60kWh resulting in 2030 demand increasing by 10% to 3.1Mt LCE, and at 80kWh, +42% to 4Mt LCE.

Figure 43: Old vs new CGe demand projections – revisions to battery size assumptions offset slower EV sales 2022-24; demand expectations upgraded from 2025



Source: Company reports, Canaccord Genuity estimates

Figure 44: CGe demand forecast sensitivity to average EV battery size – LCE demand highly sensitive to EV battery size assumptions



Source: Canaccord Genuity estimates

Strong demand growth based on increasing EV adoption is consensus… but is there a better forward-looking indicator of demand?

Our lithium demand forecasts are based on EV sales growth over time for each major jurisdiction, which is generally the industry standard for forecasting. Historically this approach was used as the EV market was relatively small and it allowed for growth rates to be applied based on research on penetration rates, surveys on customer adoption and forward statements by OEMs/governments. Energy storage demand was also relatively small and hence could also be tracked effectively.

The issue with this forecasting methodology is that it was largely backwards looking and required multiple assumptions on assumptions (sales by region, battery sizes, lithium consumption, etc.). While functional (and potentially very detailed), it was (and remains) bound by human ideals on system limitations (aiming for annualised % growth rates, penetration rates or what "feels" right). With the rapid growth of EV sales, companies, regional market expansion and storage usage there are now many moving parts to supply/demand analysis.

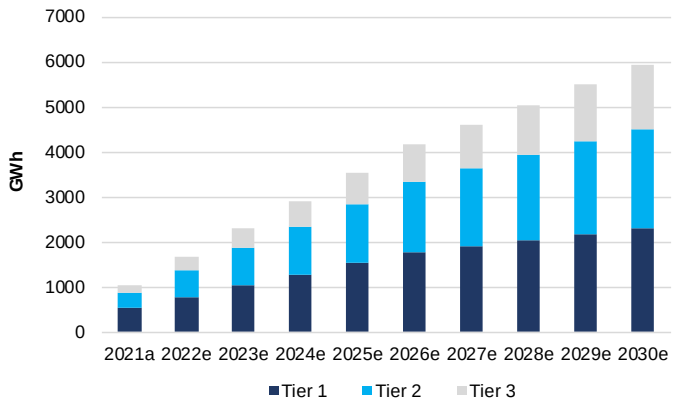
Giga-demand

As a single point of demand, battery "gigafactories" represent an interesting alternative indicator for lithium demand. Essentially, without these battery factories, EVs can't be built and eventually sold. In our view, this could represent a simpler approach to forecasting demand, as it removes several assumptions (battery size, energy storage deployment, EV sales) and relies on several assumptions based on announced capacity, industry utilisation and lithium consumption.

Figure 45 and Figure 46 illustrate the increase in planned battery manufacturing capacity out to 2030 based on third party assessment (*Benchmark Mineral Intelligence*) of industry announcements. This data suggests battery manufacturing capacity is to increase by >280% from ~1,600GWh to ~6,300GWh by 2030.

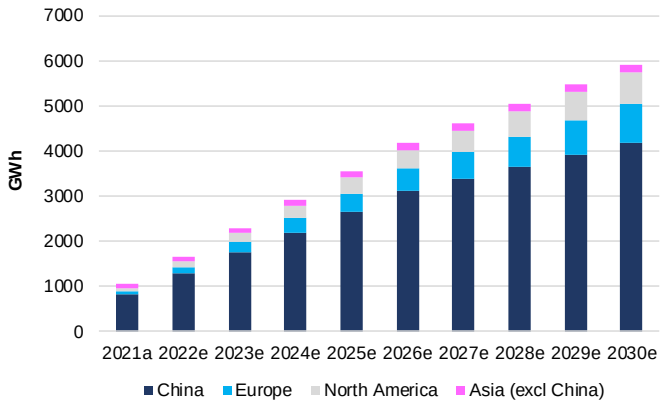
China is expected to retain market dominance with a global market share of ~70% out to 2030, while we also highlight the growth in planned capacity in the EU (+500% growth to 961GWh in 2030) and North America (490% growth to 2030 to 759GWh).

Figure 45: Planned LiB manufacturing capacity*



*Tier 1: Qualified to supply more than 1 multinational OEM/EV producer outside China >5 GWh of annual cumulative capacity; Tier 2: Not yet qualified to supply multinational OEMs/EV manufacturers + Qualified to supply domestic Chinese EV manufacturers; Tier 3: Not yet qualified to supply EV end markets Annual cumulative capacity
Source: Benchmark Mineral Intelligence, Canaccord Genuity estimates

Figure 46: Planned LiB manufacturing capacity by region

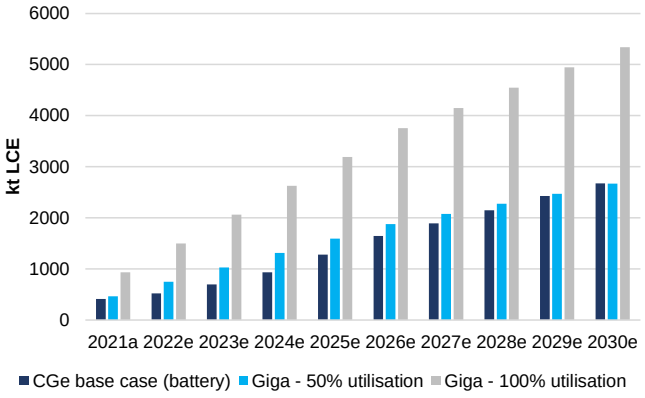


Source: Benchmark Mineral Intelligence, Canaccord Genuity estimates

When we look at the planned roll out of battery gigafactories and estimated lithium consumption, we believe there could be a problem with our (and the market's) lithium demand forecasts. ***If battery gigafactory capacity is an indicator of potential lithium demand, we could be underestimating lithium demand by a significant margin.*** *At 100% utilisation and lithium consumption of 0.9kg/kWh it implies demand of 5.4Mt LCE in 2030, some 2.6Mt above our forecasts.*

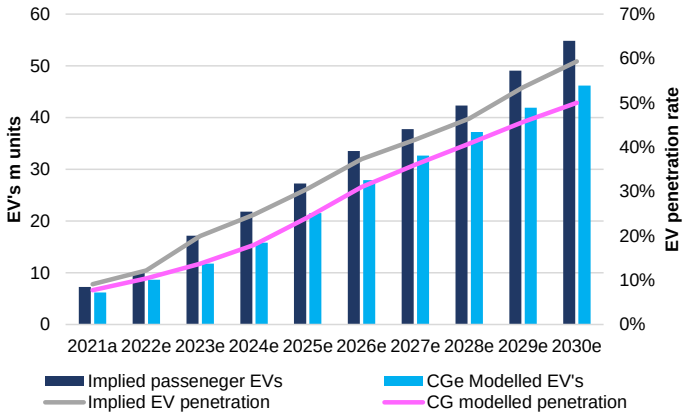
However, assuming every battery plant comes to market at planned production rates and on schedule would be making the same mistake as assuming every potential mine and project makes it into production. As such, we have estimated implied lithium demand based on planned gigafactory capacity adjusted for utilisation/scrap rates (we assume average utilisation of 50% out to 2030). Using a utilisation-adjusted estimate implies 2030 LCE demand of >3.5Mt LCE, which represents +1Mt of cumulative additional demand out to 2030 over our base case.

Figure 47: Implied LCE demand based on gigafactory capacity* vs CGe base case



*Based on assumed utilisation rate/scrap rate
Source: Benchmark Mineral Intelligence, Canaccord Genuity estimates

Figure 48: Implied EV production based on gigafactory capacity exceeds our base case EV sales forecasts^



^Based on assumed 0.9kg LCE/kWh
Source: Benchmark Mineral Intelligence, Canaccord Genuity estimates

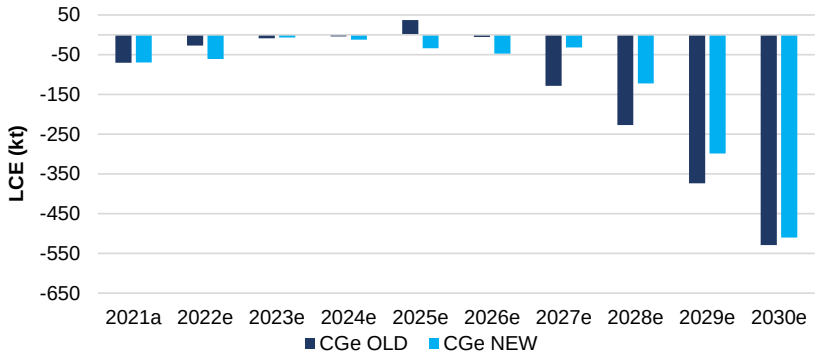
This giga-demand scenario assumes no change to our energy storage assumptions (2% and 5% of CGe battery demand by 2025 and 2030 respectively) and to calculate an implied penetration rate assumes an average EV battery size of 53kWh. This would imply global EV sales growth of ~430% out to 2030, and 2025/30 EV penetration rates of 31% and 59%, respectively (vs CGe 24% and 50%).

Market balance – we think the market remains in deficit

Our revised SxD modelling sees our base case market balance forecasts *mostly* unchanged, with average annual supply/demand growth largely evenly matched through to 2028E (~24% p.a.).

We now model a larger market deficit in 2022, with modest market deficits in 2023-24 reflecting some risk on near-term EV sales due to Chinese COVID policies/ lockdowns and global growth concerns. However, with such closely balanced markets, there is potential to move either way with delayed projects (less supply – bigger deficit) or, conversely, weaker demand (market surplus) impacting the balance.

Figure 49: CGe old vs new market balance forecasts



Source: Company reports, Canaccord Genuity estimates

The most material revisions to our prior forecasts are from mid-decade, where prior expectations for a slight surplus in 2025 has reversed to a minor deficit. Smaller deficits are now forecast for 2026-28, with higher pricing expectations incentivising new projects and capacity expansions (albeit on delayed ramp-up timeframes – see Figures 28-29). We continue to forecast large deficits from 2028.

Figure 50: Lithium SxD model summary

		2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e
Supply											
Brines	**kt LCE**	**207**	**276**	**349**	**468**	**605**	**734**	**804**	**892**	**941**	**966**
Existing brine supply	kt LCE	207	276	276	276	276	276	276	276	276	276
Brownfield expansions	kt LCE			53	131	166	201	211	256	284	309
Greenfield brine prod'n	kt LCE			21	62	164	258	318	361	381	381
Effective converter capacity	**kt LCE**	**244**	**296**	**454**	**569**	**759**	**979**	**1176**	**1255**	**1311**	**1327**
China	kt LCE	245	278	376	450	537	642	755	783	783	783
Ex-China	kt LCE		18	78	120	222	337	421	472	528	544
Total market supply	**kt LCE**	**451**	**572**	**803**	**1037**	**1364**	**1713**	**1979**	**2147**	**2252**	**2293**
YoY change	%	30%	27%	40%	29%	32%	26%	16%	8%	5%	2%
Demand											
Industrial use	kt LCE	107	109	111	113	115	118	120	122	125	127
Batteries - EV's	kt LCE	293	415	573	786	1094	1431	1679	1910	2149	2357
Batteries - other (inc WIP)	kt LCE	121	108	126	150	188	212	212	236	276	319
Total batteries	kt LCE	414	524	699	936	1282	1643	1891	2147	2426	2676
Total demand	**kt LCE**	**521**	**632**	**810**	**1049**	**1398**	**1761**	**2011**	**2269**	**2551**	**2803**
YOY change	%	67%	21%	28%	30%	33%	26%	14%	13%	12%	10%
Market surplus/(deficit)	**kt LCE**	**-70**	**-61**	**-7**	**-12**	**-34**	**-47**	**-32**	**-122**	**-298**	**-510**
%		-13%	-10%	-1%	-1%	-2%	-3%	-2%	-5%	-12%	-18%

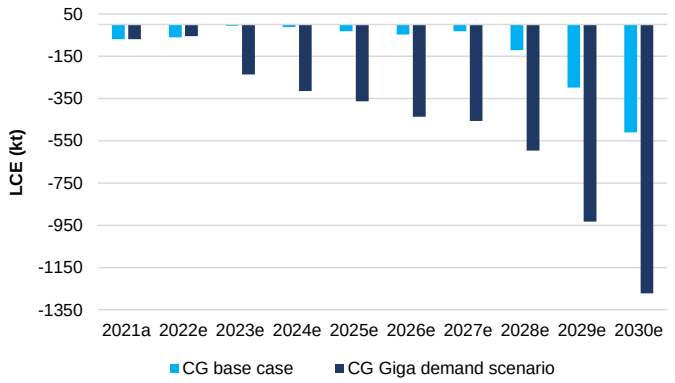
Source: Company reports, Canaccord Genuity estimates

What happens under our giga-demand scenario?

Large and sustained market deficits, on our estimates (Figure 51). While this might be considered bullish, **we are not proponents of the "large deficits into perpetuity"** view. Such a demand case is theoretical, as *actual* demand (i.e., EV sales) will be limited by available lithium (and other battery raw materials) supply.

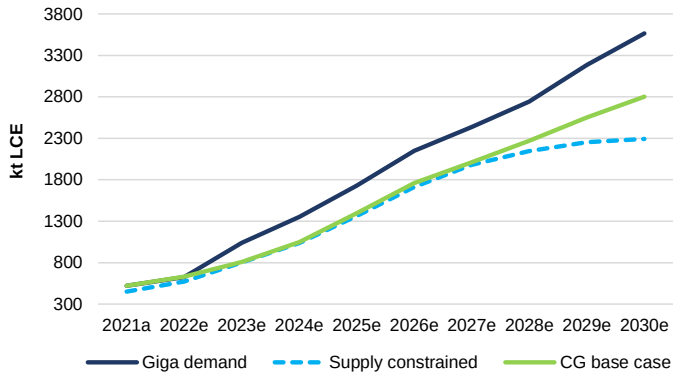
Such a "supply-constrained" demand scenario (based on our modelled supply forecasts) is illustrated in Figure 52.

Figure 51: Our market balance forecasts under giga-demand scenario



Source: Company reports, Canaccord Genuity estimates

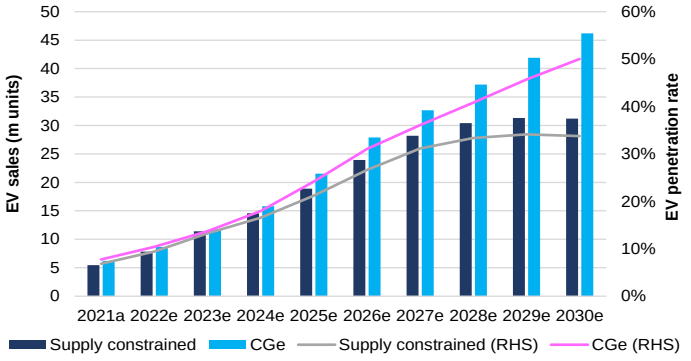
Figure 52: Our supply constrained demand vs giga-demand forecasts vs CGe base case



Source: Company reports, Canaccord Genuity estimates

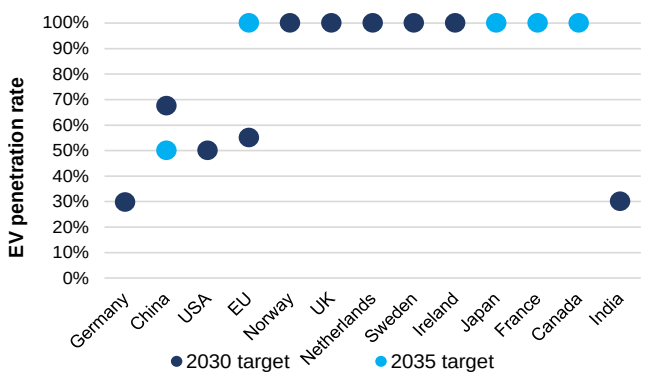
Taking this supply-constrained demand, and assuming an average EV battery size of 53kWh, this would see a dramatically different EV adoption curve vs our base case (assuming no change to our ESS growth assumptions), and well below stated OEM and country mandated electrification targets.

Figure 53: Supply constrained EV sales vs CGe base case – the potential for undersupply could constrain EV sales/ actual lithium demand



Source: Company reports, Canaccord Genuity estimates

Figure 54: Selected country electrification targets



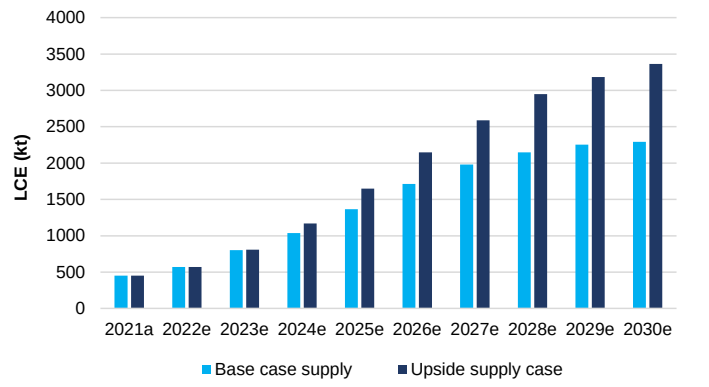
Source: Company reports

What if we said more supply = more demand?

We have reflected on this upside case demand scenario (as evidenced by battery factory plans, country and OEM electrification targets) and believe that any supply that is delivered to the market *will be consumed*. With adequate (and timely) lithium supply to likely act as a constraint on more bullish demand expectations, we present an alternative viewpoint on the lithium market **whereby more supply could actually be the key to higher demand over the longer term**.

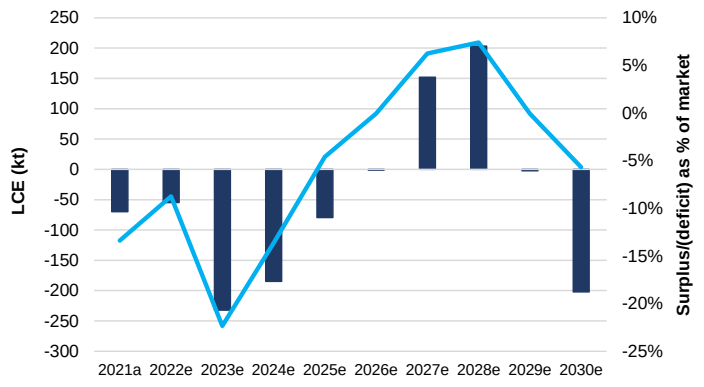
Under this scenario, a greater lithium supply response serves to support our giga-demand case, in turn leading to more sustainable pricing outcomes through lower cost batteries (thereby avoiding the potential for demand destruction), and more rapid EV adoption. Figure 55 illustrates our base case supply forecasts vs a super supply scenario where **ALL** *possible* projects in our database are brought into production (which includes *a cumulative 3.2Mt LCE of unspecified/assumed new capacity!)*.

Figure 55: Super supply vs base case supply forecasts



Source: Company reports, Canaccord Genuity estimates

Figure 56: Market balance forecasts under giga-demand/ super supply scenario



Source: Company reports, Canaccord Genuity estimates

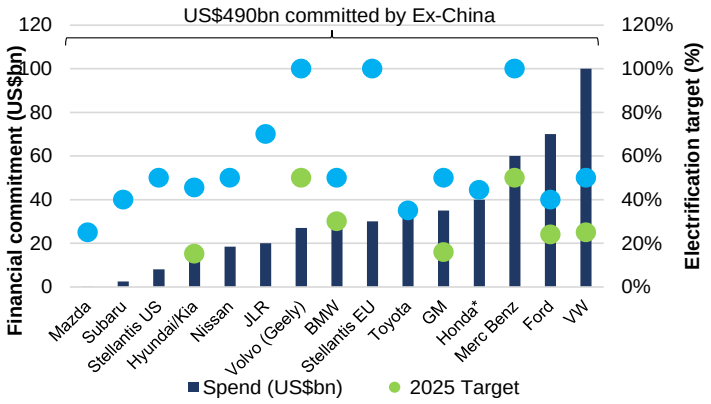
Overlaying this onto our giga-demand scenario (Figure 56), our market balances would result in significant deficits to 2025 and surpluses through 2027-28, but perhaps represent a more sustainable overall supply/demand balance out to 2030 (average 5% deficit). In our "supply = demand" scenario, this would mean that excess demand over 2023-25 would essentially be deferred until supply became available, reversing market surpluses through 2027/28.

However, we note that even under a super supply scenario, 100% utilisation of planned battery factory capacity would still result in material deficits. This underscores our long-term investment case for the lithium sector and the necessity for higher pricing to incentivise a supply response.

Planned investment downstream supports our giga-demand scenario, but what about upstream?

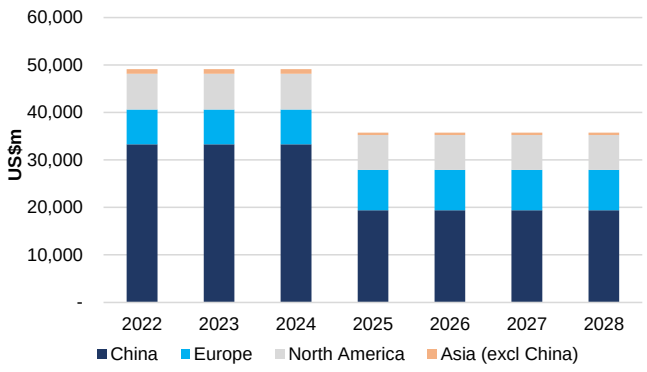
As at July 2022, announced investments by ex-China auto OEM's into electrification total >US$490bn (Figure 57), which compares to an implied capital investment of US$350bn in delivering planned gigafactory capacity out to 2030 (based on third party assessed average capital intensity of ~US$79m/GWh).

Figure 57: Announced investment into electrification by ex-China auto OEMs



Source: Company reports

Figure 58: Implied capital spend on battery factories – assumes two-year build lead time

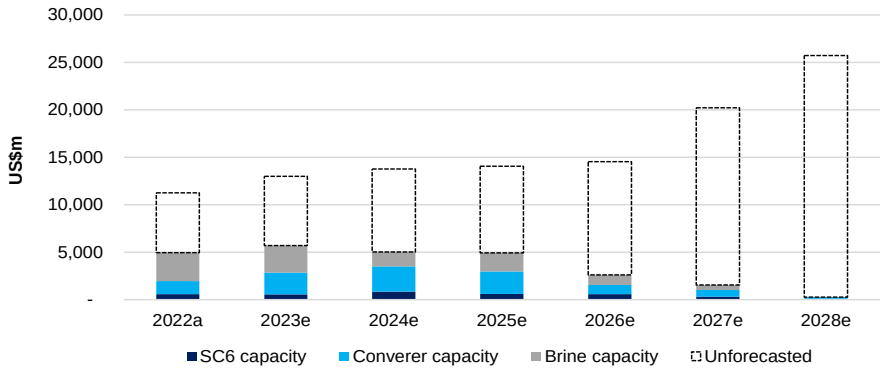


Source: Canaccord Genuity estimates, Benchmark Mineral Intelligence

This level of investment provides support for an upside case for lithium demand, but to date, **we do not believe this is being matched by investment in lithium supply**. As we point out earlier in this report (Figure 30), average capital intensities for new lithium supply have risen by 50% since 2018 to US$21,000/t LCE (noting that this estimate ignores the current inflationary climate).

On our base case forecasts, this implies a required capital investment in new upstream lithium chemical supply of US$48bn (unadjusted for inflation) to meet our 2030 demand forecast. Under our giga-demand scenario, this would increase to >US$100bn (Figure 59). If we take the view that capital investment is the key to ultimately unlocking higher demand, then **lithium prices will need to remain high enough to incentivise this scale of capital investment**.

Figure 59: Investment required to solve forecasted market deficits under giga-demand scenario



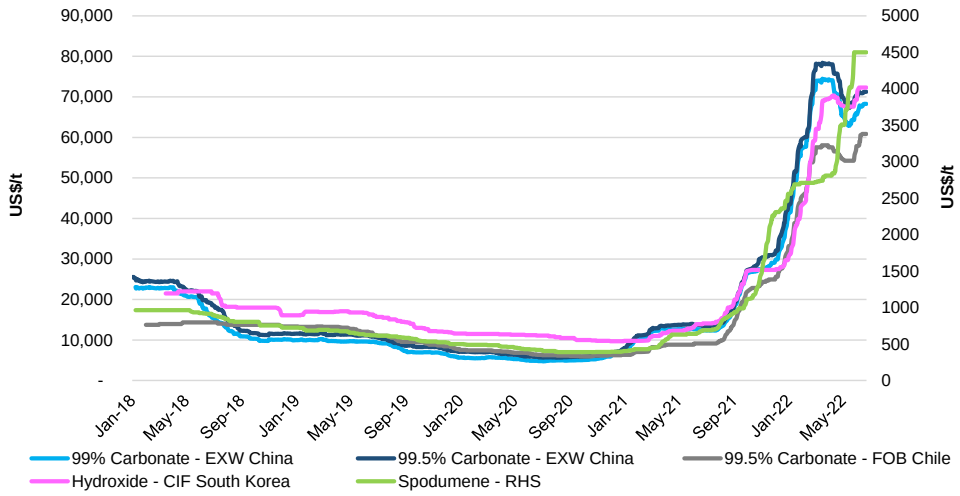
Source: Canaccord Genuity estimates

Upgrading lithium price forecasts – short term mark to market, long term up on need for higher incentive price

Current pricing suggests market tension remains

Since our last sector report (Lithium | 1H'22 higher for longer), lithium product pricing has surpassed our prior expectations to new all-time highs, with chemicals currently 30% above our prior peak pricing and concentrate up 35%. Industry feedback continues to indicate buyers within the supply chain are struggling to source sufficient material to satisfy forward orders (which, for now, remain strong).

Figure 60: Lithium price performance 2018-22



Source: Asian Metal

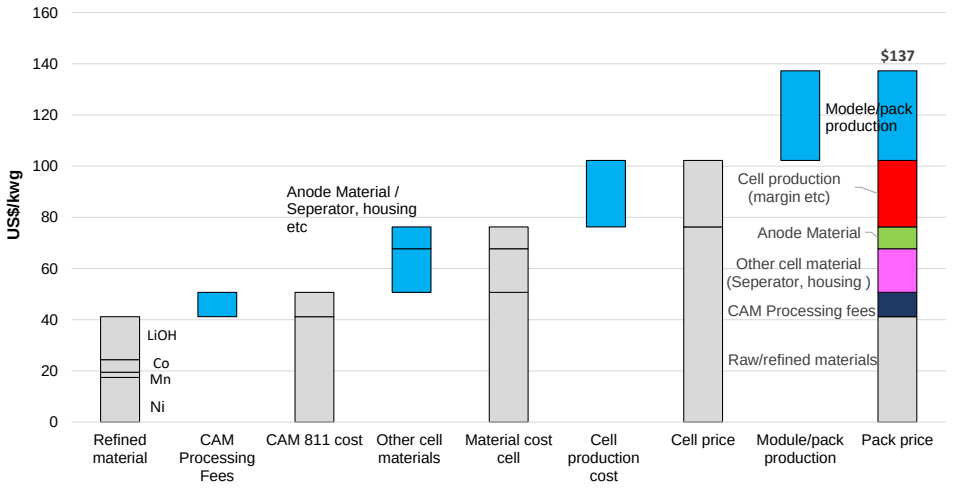
Are current prices sustainable?

In our view, no. However, this doesn't necessarily rule out the potential for prices to achieve new highs in the near term (ongoing raw material shortages vs strong demand), or at least remain at elevated levels. In our view, sustained peak pricing will continue to incentivise new capacity (as reflected in our SxD modelling), while also impacting battery costs and EV prices.

Higher battery raw material costs have already begun to flow through to EV sticker prices (i.e., Tesla China raised Model 3/Y prices by ~5% in March 2022, equates to ~US$2,500 increase; Ford, VW, BYD and Xpeng all lifting prices by ~US$1,000-2,000). Sustained extreme pricing could lead to demand destruction or, in the longer term, substitution risk from emerging battery technologies for certain applications (i.e., sodium ion batteries).

Figure 61 breaks down the composition of battery pack costs, with raw materials using CGe price estimates (LiOH-US$22,500/t, Ni-US$20,000/t, Co-US$45,000/t, Mn-US$7,500/t) currently comprising ~30% of overall pack costs. This highlights that even with high pricing, there are still improvements in the industrialisation of the battery supply chain which could drive down pack costs.

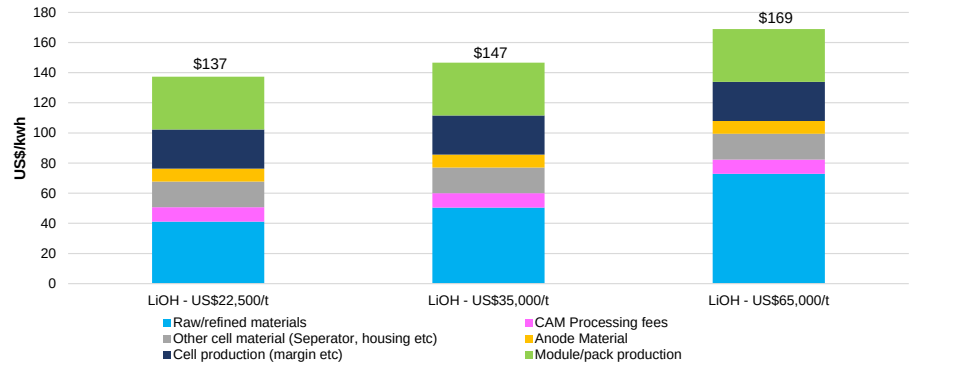
Figure 61: NCM811 battery pack cost breakdown



Source: Canaccord Genuity estimates, Roland Berger

Figure 62 illustrates the sensitivity of pack costs to various lithium pricing assumptions. In our example, a 188% increase LiOH prices from US$22,5000/t to US$65,000/t (assuming everything else remains unchanged) would result in a 23% increase in pack costs to US$169/kWh, with the differential equating to a ~US$2,400 increase for a 75kWh battery (which coincidentally is in line with several EV price hikes announced so far in 2022).

Figure 62: Sensitivity to battery pack costs at different Lithium prices (all other things being equal)



Source: Roland Berger, Canaccord Genuity estimates

CG lithium price deck revisions

We upgrade our 2022E pricing to reflect ongoing market tightness but, as new projects come into production in late 2022 and into 2023, we continue to expect prices to correct.

However, lithium demand indicators have so far displayed relatively inelastic characteristics (annualised YTD data implying ~50% YoY EV sales growth vs LC prices +150% YoY). We believe this could see "**higher lows**" through 2023-27 despite our forecasts for a market mostly in balance, as forward demand and the need for higher incentive prices provide pricing support.

We also lift our long-term prices to reflect market deficits and the need for higher pricing to offset rising capital intensities and incentivise the scale of capital investment required to deliver a sufficient supply response.

Figure 63: CGe lithium price deck revisions

	2021a	2022e	MarQ'22a	JunQ'22a	SepQ'22e	DecQ'22e	2023e	2024e	2025e	2026e	2027e	Long term
NEW SC6 (US$/t FOB)	968	4,288	2,900	5,000	5,000	4,250	2,938	2,250	2,250	2,250	1,500	1,500
OLD SC6 (US$/t FOB)	968	3,425	2,900	3,700	3,600	3,000	1,963	1,025	750	1,000	1,000	1,000
chg	*0%*	*25%*	*0%*	*35%*	*39%*	*42%*	*50%*	*120%*	*200%*	*125%*	*50%*	*50%*
NEW Li2CO3 min 99.5% Li (US$/t China EXW)	16,365	64,323	58,051	62,242	72,000	65,000	43,375	36,000	31,000	31,000	22,500	22,500
OLD Li2CO3 min 99.5% Li (US$/t China EXW)	16,365	51,125	58,051	54,000	53,000	45,000	31,250	17,875	15,000	17,500	17,500	17,500
chg	*0%*	*26%*	*0%*	*15%*	*36%*	*44%*	*39%*	*101%*	*107%*	*77%*	*29%*	*29%*
NEW Li2CO3 min 99% Li (US$/t China EXW)	15,268	61,265	55,432	58,628	69,000	62,000	40,375	33,000	29,000	29,000	20,500	20,500
OLD Li2CO3 min 99% Li (US$/t China EXW)	15,268	50,375	55,432	53,500	52,500	43,500	29,875	17,125	14,250	16,750	16,750	16,750
chg	*0%*	*22%*	*0%*	*10%*	*31%*	*43%*	*35%*	*93%*	*104%*	*73%*	*22%*	*22%*
NEW Li2CO3 min 99% Li (US$/t FOB SthAm)	13,761	59,227	50,147	56,762	65,000	65,000	45,625	35,000	30,000	30,000	22,500	22,500
OLD Li2CO3 min 99% Li (US$/t FOB SthAm)	13,761	43,125	50,147	45,000	43,000	42,000	30,000	17,375	14,000	17,500	17,500	17,500
chg	*0%*	*37%*	*0%*	*26%*	*51%*	*55%*	*52%*	*101%*	*114%*	*71%*	*29%*	*29%*
NEW LiOH min 57% Li (US$/t China EXW)	14,505	61,096	49,171	60,214	70,000	65,000	45,000	37,500	32,500	32,500	22,500	22,500
OLD LiOH min 57% Li (US$/t China EXW)	14,505	40,250	49,171	41,500	40,000	37,000	29,250	16,813	14,250	17,500	17,500	17,500
chg	*0%*	*52%*	*0%*	*45%*	*75%*	*76%*	*54%*	*123%*	*128%*	*86%*	*29%*	*29%*
NEW LiOH min 57% Li (US$/t Asia CIF)	17,260	64,444	53,234	69,544	70,000	65,000	45,000	37,500	32,500	32,500	22,500	22,500
OLD LiOH min 57% Li (US$/t Asia CIF)	17,260	38,750	53,234	40,000	38,500	35,500	28,250	17,750	15,000	17,500	17,500	17,500
chg	*0%*	*66%*	*0%*	*74%*	*82%*	*83%*	*59%*	*111%*	*117%*	*86%*	*29%*	*29%*

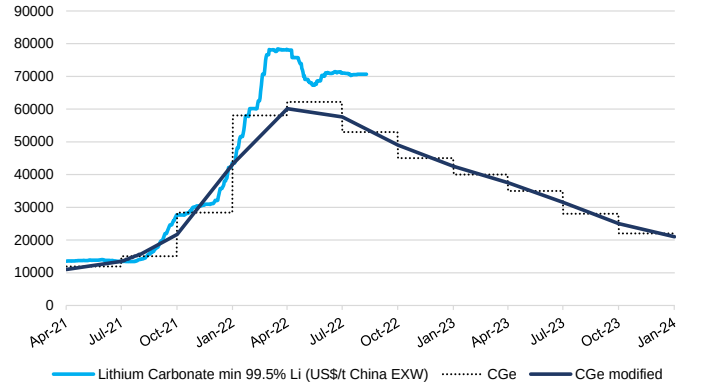
Source: Asian Metal, Canaccord Genuity estimates

Lithium chemicals

Our 2022E/23E lithium carbonate prices have risen by an average of 33% for China EXW (min 99.5% Li), with prices having exceeded our prior peak pricing scenario (Figure 64). While we have adjusted our near-term pricing upwards, we note the potential for prices to move higher in 2H'22 before additional supply hits the market in 2023.

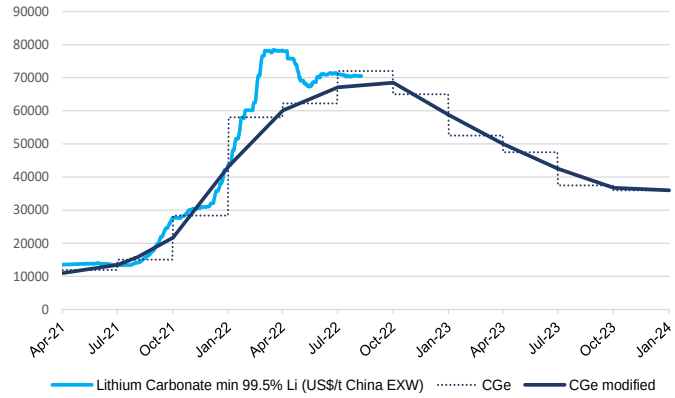
Through 2024-26, we now forecast "higher lows" to reflect demand growth and supply risks as numerous greenfield projects enter commissioning and ramp up. We now forecast the LiOH:LC premium to return from 2024/25 as demand for LiOH accelerates due to increases in EV sales in Europe/North America (higher market share vs China for nickel-based cathode chemistries which preferentially use LiOH).

Figure 64: Lithium carbonate China EXW pricing vs previous CGe forecasts



Source: Asian Metal, Canaccord Genuity estimates

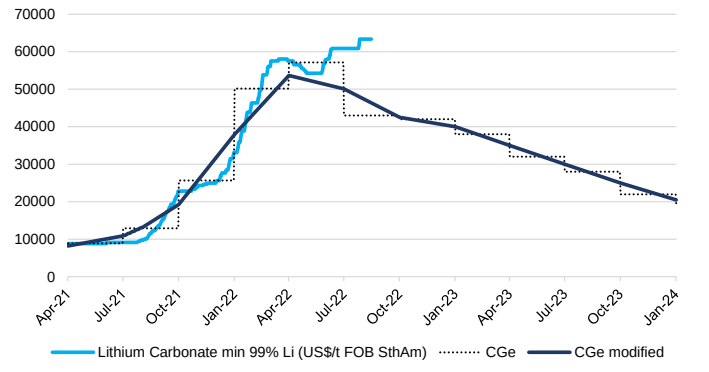
Figure 65: Lithium carbonate China EXW pricing and updated CGe forecasts



Source: Asian Metal, Canaccord Genuity estimates

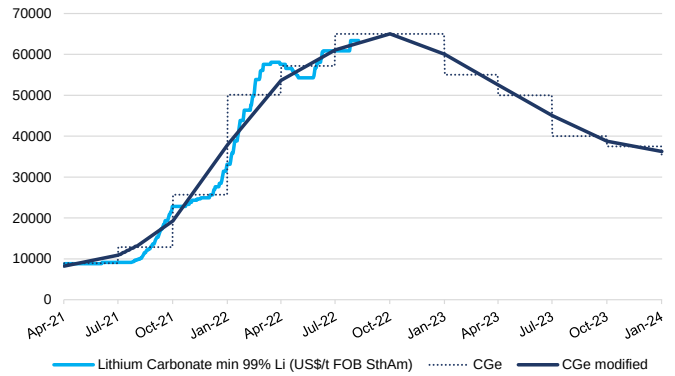
Material increases in forecast FOB Chile pricing (average +45% vs prior CGe) reflect the move away from fixed price contracts to index linked variable prices, closing the lag with China markets (Figure 67).

Figure 66: South American lithium carbonate pricing and previous CGe forecasts



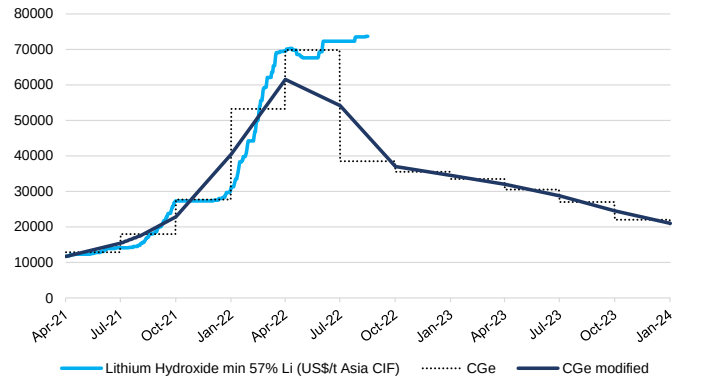
Source: Asian Metal, Canaccord Genuity estimates

Figure 67: South American lithium carbonate pricing and updated CGe forecasts



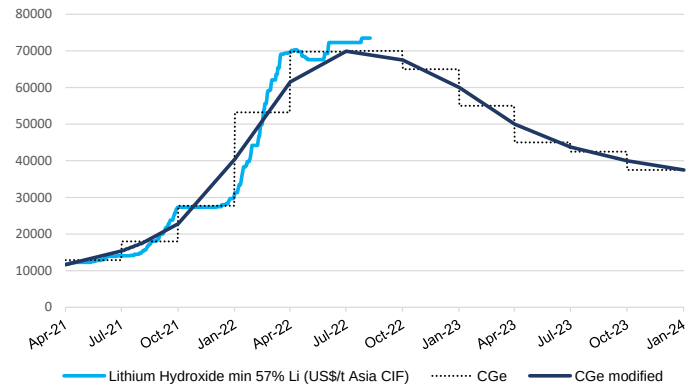
Source: Asian Metal, Canaccord Genuity estimates

Figure 68: South Asia lithium hydroxide pricing and previous CGe forecasts



Source: Asian Metal, Canaccord Genuity estimates

Figure 69: South Asia lithium hydroxide pricing and updated CGe forecasts

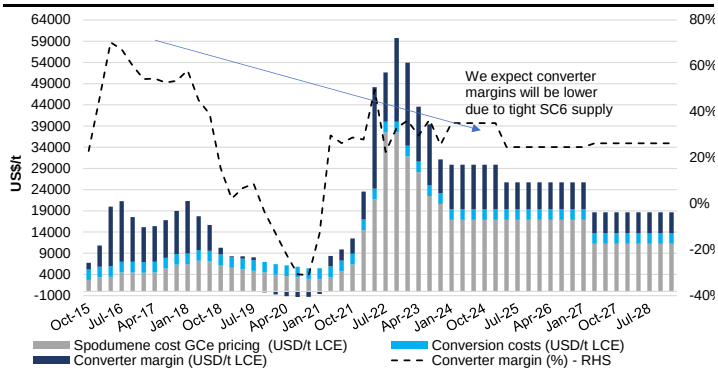


Source: Asian Metal, Canaccord Genuity estimates

Spodumene concentrate

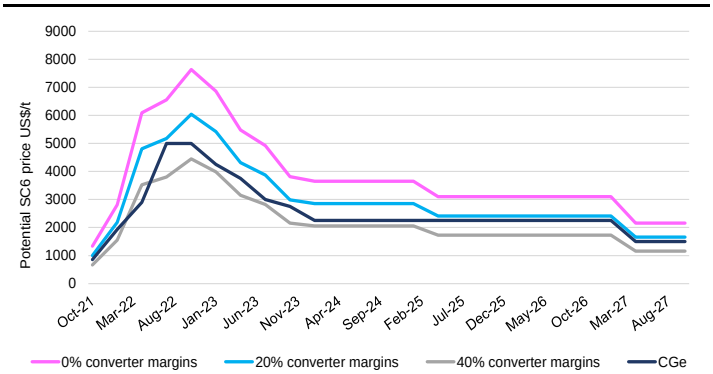
Our spodumene pricing model remains based on assumed converter margins, which we continue to model at ~30% (Figure 70). Upgrades to 2022/23 pricing by 25% and 50% respectively vs prior CGe reflect higher Chinese chemical prices.

Figure 70: Converter margins unlikely to peak as high as the 2017 price excursion due to a lack of available SC6. In our view, the power ultimately captured by SC6 producers



Source: Asian Metal, Canaccord Genuity estimates

Figure 71: Implied SC6 prices on various converter margin scenarios

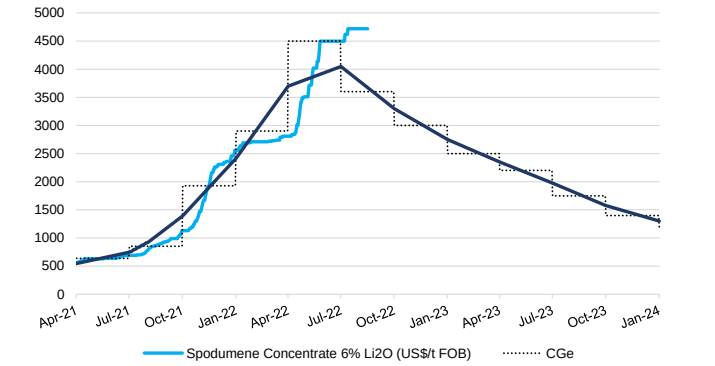


Source: Asian Metal, Canaccord Genuity estimates

We now model prices to peak at US$5,000/t in mid-2022 (Figure 73), ahead of new concentrate production entering the market in late 2022/23 (Wodgina, Pilbara expansion, Finniss, Sigma), alleviating tight supply of concentrate feedstocks. Our long-term prices have increased to US$1,500/t to reflect increases to long-term chemical price forecasts (SC6 prices have averaged ~7% of prevailing China chemical prices since 2019).

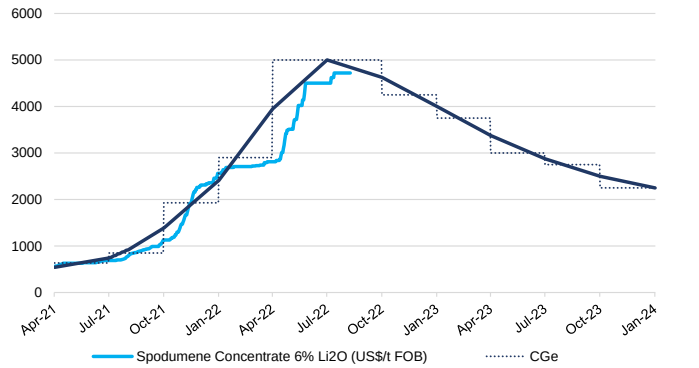
We note the potential impact of new integrated projects (i.e., Kwinana, Kemerton, Mt Holland) and internalised supply (i.e., Wodgina > Albemarle China conversion, Goulamina > Ganfeng) on concentrate supply to independent converters from 2024/25, which could see upside to our forecasts.

Figure 72: Spodumene pricing and previous CGe forecasts



Source: Asian Metal, Canaccord Genuity estimates

Figure 73: Spodumene pricing and updated CGe forecasts



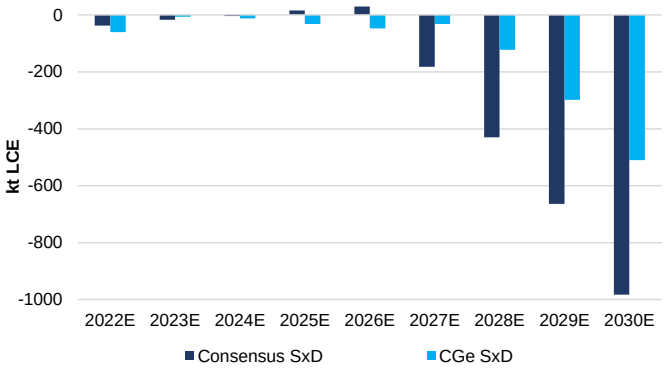
Source: Asian Metal, Canaccord Genuity estimates

The case for higher long-term pricing

Market consensus for long-term lithium pricing remains too low to elicit a significant supply response, in our view (Figure 75). We base this on updates to our incentive pricing model, marginal cost analysis and forecasts for large market deficits by late decade.

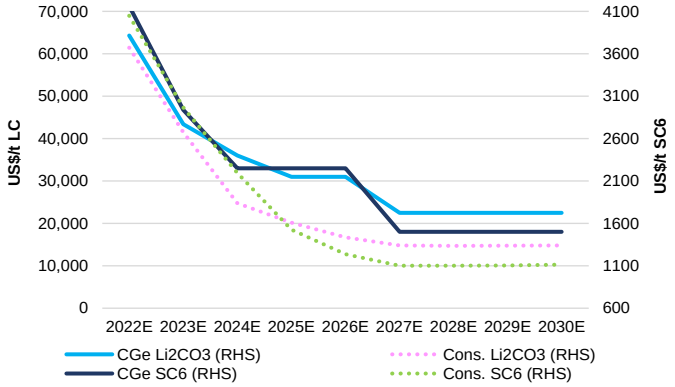
Our updated market balance forecasts sit below consensus (Figure 70), and we highlight an apparent disconnect between these forecasts and long-term consensus pricing (i.e., large market deficits vs pricing in backwardation?). Our updated long-term pricing sits materially above consensus forecasts, and as we outline below, this may ultimately be judged as too conservative.

Figure 74: Consensus LCE market balance vs CGe



Source: Visible Alpha, Company reports, Canaccord Genuity estimates

Figure 75: Consensus LC/SC6 prices vs CGe



Source: Visible Alpha, Canaccord Genuity estimates

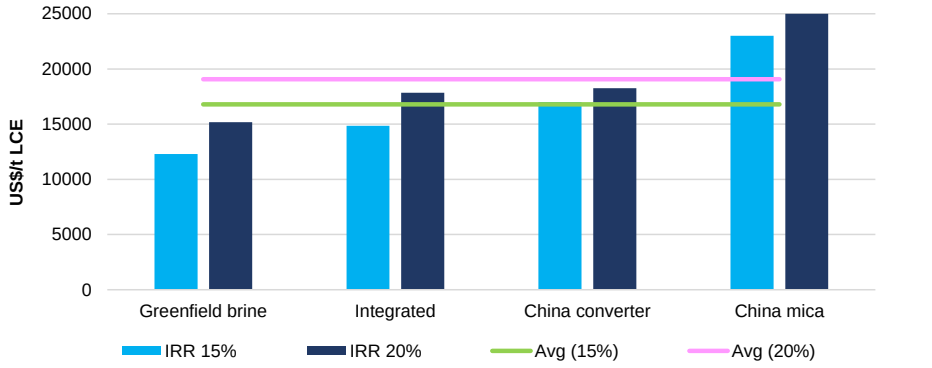
Incentive pricing – lithium projects are getting more expensive to build, so long-term prices have to come up to deliver minimum IRRs

We have updated our incentive pricing model, and as shown in Figure 76, estimate an average ~US$16,000/t LCE is now required to deliver a 15% IRR for new lithium projects, increasing to ~US$18,500/t for an IRR of 20%.

This analysis excludes brownfield expansion projects (typically much lower capital intensity), but we believe a higher return for investment in new capacity is required given increasing capital costs (average capital intensities +15% 2018-21) and the proportion of greenfield developments expected to comprise new capacity (CGe 57% by 2030E) and their higher levels of ramp-up risk.

With inflationary pressures lifting project development and operating costs (CGe average industry capital intensities have increased by ~50% from 2018 to 2021) and noting the scale of investment required for supply to meet demand by 2030 (CGe >US$48bn), we think LT price assumptions will have to rise significantly to provide adequate returns.

Figure 76: Estimated LCE price needs to deliver 15/20% IRR

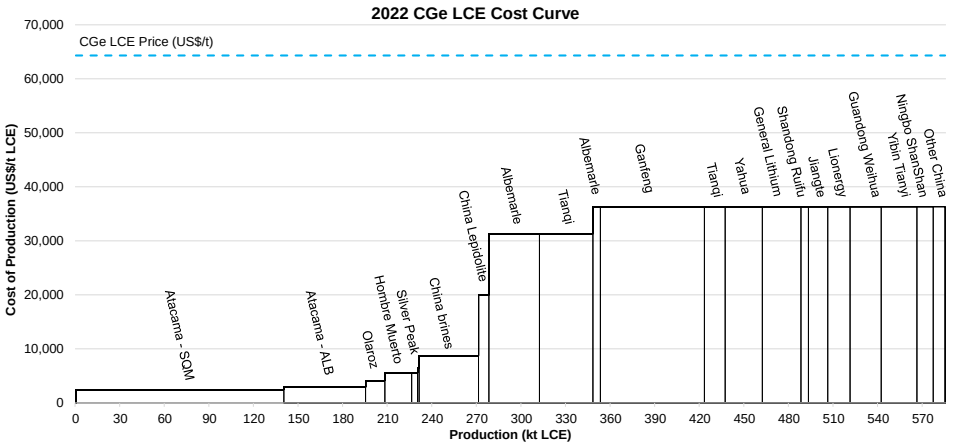


Source: Canaccord Genuity estimates

Marginal cost analysis – the possibility of higher lithium prices for longer means the shape of the cost curve changes

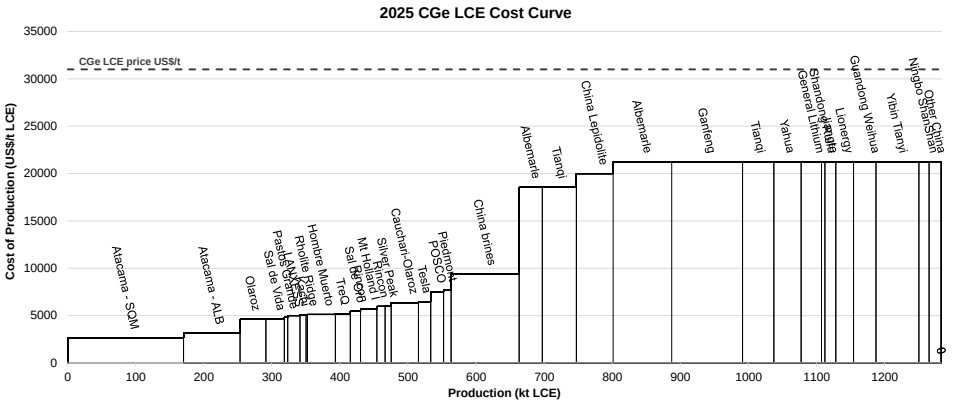
We have updated our industry cost curves (see below), incorporating the impact of cost inflation and higher lithium prices (i.e., SC6 feedstock). We believe the market is underestimating the impact of higher lithium feedstock on the global LCE cost curve, with flow through impacting industry marginal costs and long-term pricing expectations.

Figure 77: 2022E LCE cash cost curve



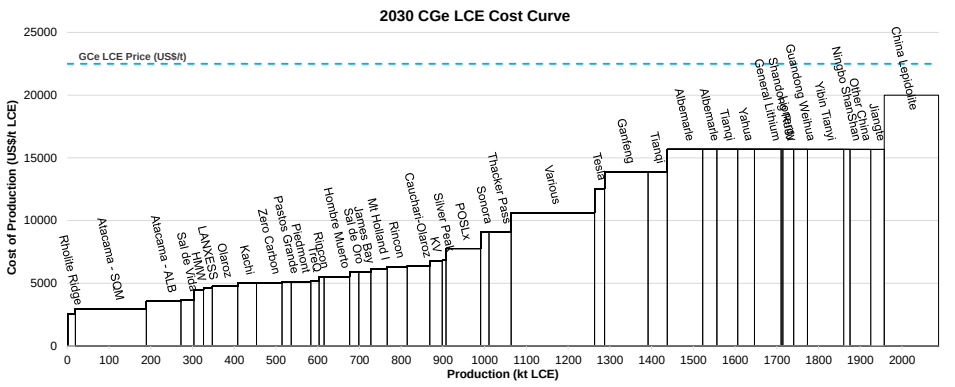
Source: Canaccord Genuity estimates

Figure 78: 2025E LCE cash cost curve



Source: Canaccord Genuity estimates

Figure 79: 2030E LCE cash cost curve



Source: Canaccord Genuity estimates

From a marginal cost perspective, we see higher lithium product prices impacting the cost curve (and long-term pricing) in three major ways:

1. **Spodumene prices are the key determinant of costs for independent converters**: Lithium supply from converted spodumene is a major component of our modelled supply, with independent converters (i.e., China) representing an average of 55% of estimated overall hard rock supply, and an average of 32% of overall LCE supply out to 2030.

   In our view, many lithium cost curves incorrectly estimate costs for hard rock-derived lithium chemical supply. Simply taking spodumene concentrate production costs and converting into US$/t LCE (i.e., US$/t SC6 x ~8 + conversions costs) fails to consider the difference in cost bases for independent converters and integrated operations (Figure 80).

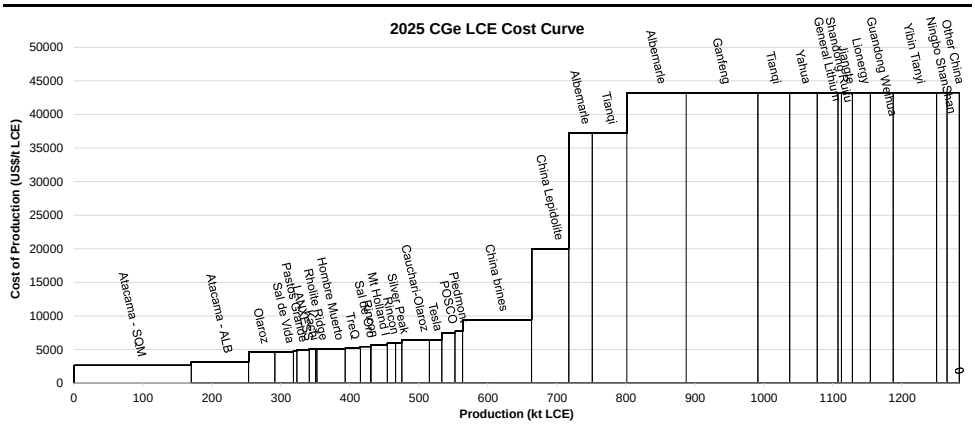
   This has a major influence on where hard rock derived lithium chemical supply from non-integrated converters would otherwise sit on the cost curve. This is illustrated in Figure 81, where we estimate lithium chemical production costs for independent converters at ~US$43,000/t.

Figure 80: Comparison of LCE costs for independent vs integrated hard rock lithium supply

		Independent converter (ie. China)				Integrated converter			
SC6 price/prod'n cost*	US$/t	1,000	1,500	2,500	5,000	450	450	450	450
Li2O:Li2CO3	x	8	8	8	8	8	8	8	8
Conc costs	US$/t LCE	8,000	12,000	20,000	40,000	3,600	3,600	3,600	3,600
Conversion costs	US$/t LCE	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Other costs^	US$/t LCE	300	300	300	300	300	300	300	300
Total costs to converter	**US$/t LCE**	**11,300**	**15,300**	**23,300**	**43,300**	**6,900**	**6,900**	**6,900**	**6,900**
Li2CO3 price#	US$/t LCE	12,500	18,750	31,250	62,500	12,500	18,750	31,250	62,500
Operating margin	US$/t LCE	1,200	3,450	7,950	19,200	5,600	11,850	24,350	55,600
Operating margin	**%**	**10%**	**18%**	**25%**	**31%**	**45%**	**63%**	**78%**	**89%**

*FOB Australia; ^Landed China transport costs; #Example China EXW price
Source: Canaccord Genuity estimates

Figure 81: Indicative 2025E cash cost curve assuming US$5,000/t SC6

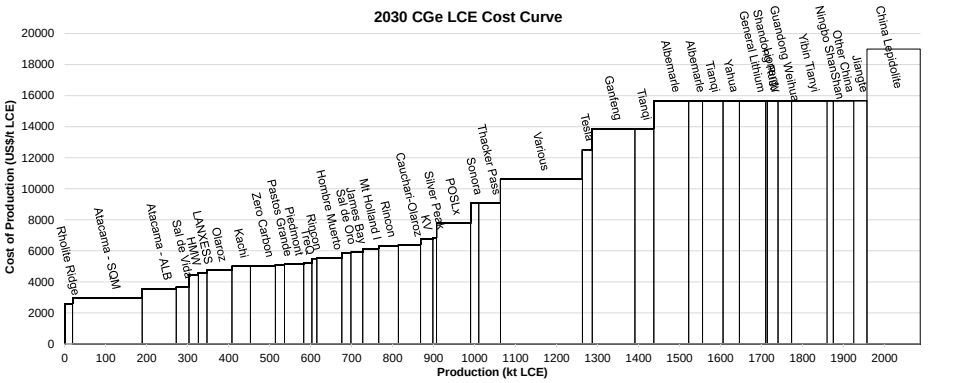


Source: Canaccord Genuity estimates

2. **Higher prices incentivise "marginal" resources**: Earlier in this report, we analysed the economics of lithium chemical production based on low-grade lithium micas, with estimated production costs of US$15,000-20,000/t LCE (depending on ore feed grade). In our view, supply from these resources now forms the industry's *new* marginal cost supply.

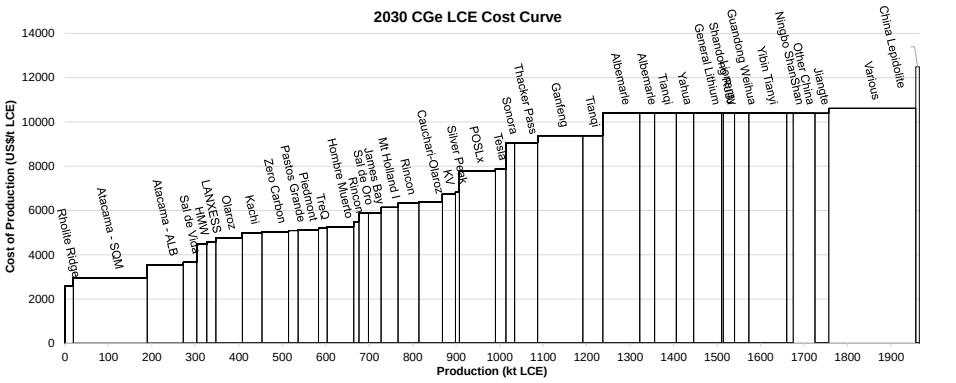
In a scenario of sustained higher pricing, these resources would likely be incentivised into production (Figure 82). Conversely, a lower price scenario would render these deposits uneconomic, where independent hard rock conversion would replace it as the marginal cost supply.

Figure 82: 2025 LCE cost curve on CGe base case pricing – higher pricing incentivises development of low-grade resources, lifting industry marginal cost to ~US$20,000/t



Source: Canaccord Genuity estimates

Figure 83: Illustrative 2025 LCE cost curve @ US$12,000/t LC and US$960/t SC6 – lower pricing renders Chinese micas uneconomic and removes significant *potential* supply from the market



Source: Canaccord Genuity estimates

3. **High pricing results in higher government royalty costs - including royalties provides a more accurate cash production cost, in our view:** Lithium chemical production from Albemarle/SQM's brine operations in the Atacama in Chile are widely accepted as among the lowest cost lithium chemical production in the world (cash costs ~US$2,500-3,500/t). These low costs can be attributable to high levels of brine lithium concentration (~2.5x vs average Argentinian brines), scale (the Atacama is expected to produce ~31% of global LCE production in 2022), and potash production cost offsets. However, we think much of the cost curve analysis in the market fails to consider the impact of government royalties.

   In 2018, SQM and Albemarle reached an agreement with Chilean State Government agency CORFO (holder of lithium rights in the Atacama) for higher lease/royalty payments. The new rates are based on a sliding scale depending on lithium export prices, which sees rates up to 40% levied on prices >US$10,000/t (Figure 84). With FOB Chile prices rising rapidly as major South American exporters adjust supply contracts to index-linked variable pricing structures away from long term fixed price arrangements, we highlight a dramatic increase in royalty payments and total production cash costs (Figure 85).

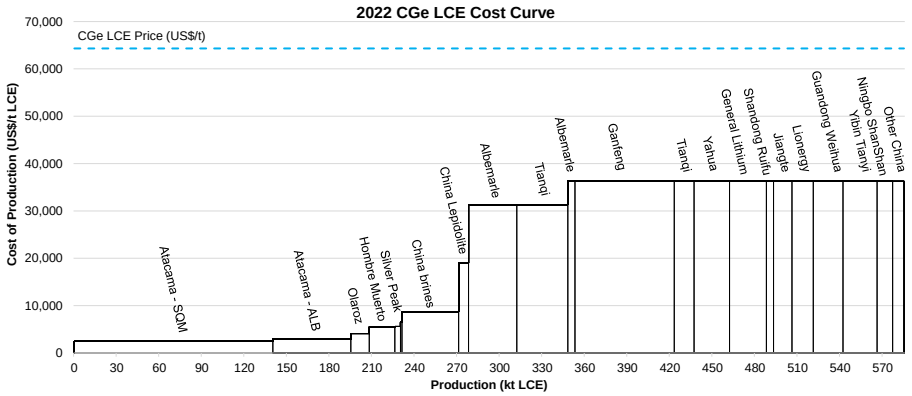
Figure 84: CORFO Atacama royalty payment sensitivity

LC export price	US$/t		20,000	30,000	40,000	50,000	60,000	70,000
Applicable CORFO royalty								
<US$4,000		7%	280	280	280	280	280	280
US$5,000-6,000		10%	200	200	200	200	200	200
US$7,000-10,000		25%	1,000	1,000	1,000	1,000	1,000	1,000
>US$10,000		40%	4,000	8,000	12,000	16,000	20,000	24,000
Total CORFO payment	**US$/t**		**5,480**	**9,480**	**13,480**	**17,480**	**21,480**	**25,480**
Avg production cash cost	US$/t		3,000	3,000	3,000	3,000	3,000	3,000
Total production costs	**US$/t**		**8,480**	**12,480**	**16,480**	**20,480**	**24,480**	**28,480**

Source: Canaccord Genuity estimates

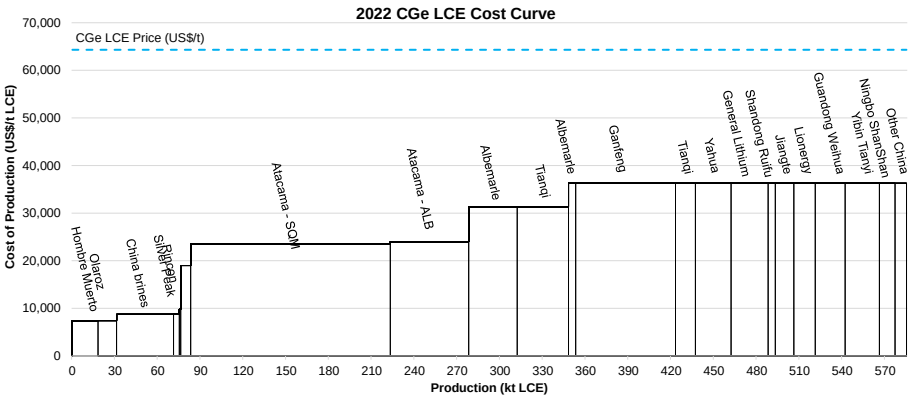
Figures 85 and 86 below illustrate the difference between our estimated 2022 cost curves when incorporating government royalties and other duties (i.e., Chile, Argentina; note royalties on concentrate exports captured in SC6 export prices) to our modelled production cash costs. ***We highlight that including royalties sees total Atacama cash costs increase to an estimated >US$20,000/t***.

Figure 85: CGe 2022 global LCE cash cost curve excluding royalties



Source: Canaccord Genuity estimates

Figure 86: CGe 2022 global cash cost curve adjusted for government royalties



Source: Canaccord Genuity estimates

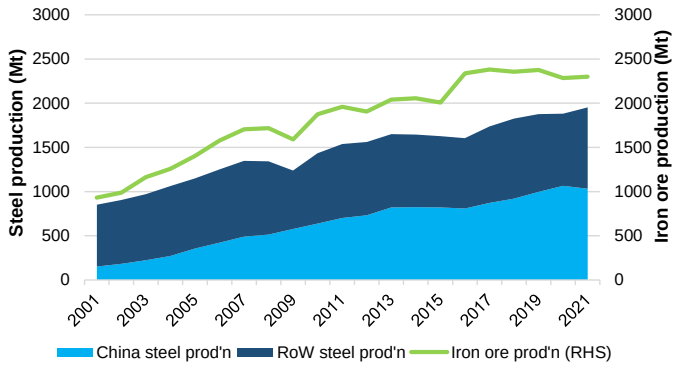
Can we use iron ore as a precedent for how we should think about lithium pricing in the long term?

In our view, the lithium market is undergoing an arguably unprecedented (through the lens of lithium as a commodity) period of transformation as significant structural changes to demand growth (CGe 2022E-30E CAGR >20%; beyond 2030E ??) clash with the typical challenges of mining/resource extraction (capital intensity, development lead times, soft issues inc. permitting/approvals).

On the basis the lithium market achieves a level of "market maturity" late this decade, we may look for precedents in other commodity markets to determine possible LT pricing outcomes. In our analysis of historical market cycles for other metal markets, we find the most analogous example in iron ore.

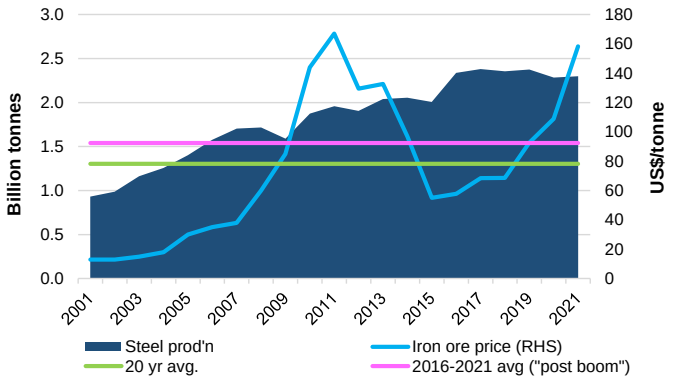
Prior to the industrialisation of China in the early 2000s, iron ore prices ranged between US$15-20/t. From 2001-13, Chinese steel production increased by 442% to ~820Mt, with subsequent growth seeing global steel output total ~2Bt in 2021. Demand for iron ore followed suit, with global iron ore production tripling to ~3bn tonnes by 2014 and iron ore prices increasing 637% to 2013.

Figure 87: Global steel vs iron ore production – 2000-21



Source: World Steel Assoc, Bloomberg

Figure 88: Global steel production (i.e. iron ore demand) vs iron ore price – 2001-21



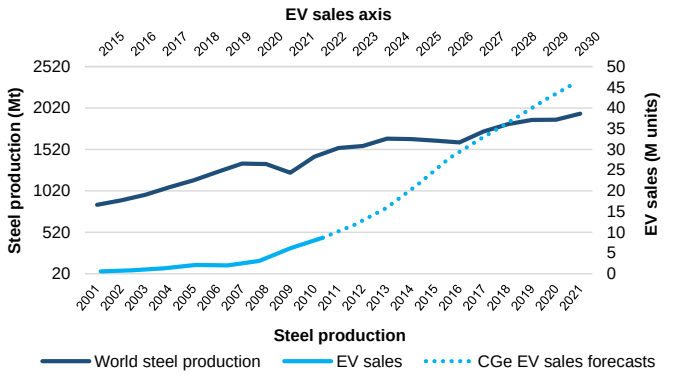
Source: World Steel Assoc, Bloomberg, FactSet, Canaccord Genuity estimates

Over the last 20 years iron ore prices have averaged US$78/t, and since 2016 have averaged US$92/t (albeit with a fair degree of volatility driven by investment cycles and supply side shocks). This new "normal" represents between 4-5x the "pre-boom" average.

Through this, we surmise that major structural changes in market dynamics (i.e., iron ore – China industrialisation/massive increase in steel production; lithium – electrification of transport/energy storage) have been shown to lead to a "reset" of the historical relationship between pricing and supply/demand.

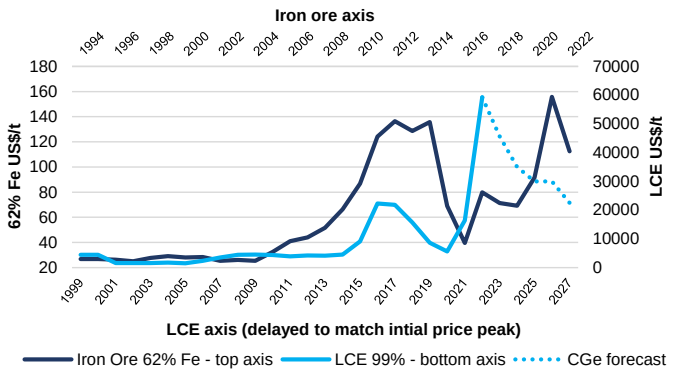
Using the 4-5x increase in pre-boom iron ore prices to post boom (mature market?) levels as a precedent would support our view of a reset of the historical relationships between SxD and pricing for lithium, with potential for long-term prices to "settle" at a level well above historical averages (and in line with our revised long-term assumptions).

Figure 89: ***Global steel production vs EV sales***



Source: World Steel Assoc, RhoMotion, Bloomberg, Canaccord Genuity estimates

Figure 90: Long run pricing - iron ore vs lithium (adjusted)



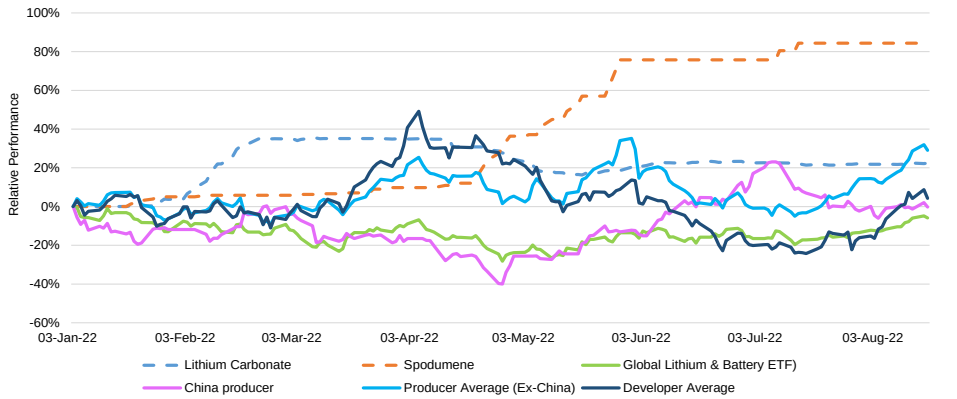
Source: FactSet, Asian Metal, Canaccord Genuity estimates

Lithium equities

Lithium equities (ex-China) have traded up by an average of 12% YTD 2022, having been down 12% just one month ago. The months of June and July saw considerable weakness across both producers and developers, which we attribute to a significant shift in investor sentiment owing to expectations of higher interest rates and slower global growth/recession fears.

Despite macro headwinds, the ongoing strength in lithium prices and a recent return to risk-on sentiment by investors has seen a significant recovery in some lithium equity prices to near recent peaks (Figure 91).

Figure 91: YTD 2022 lithium equities vs lithium prices

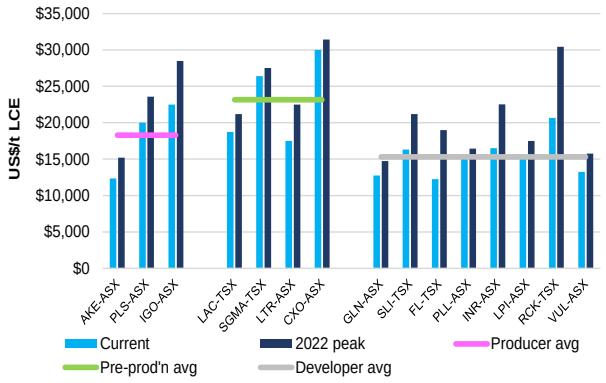


Source: FactSet

While we acknowledge that new supply entering the market in 2023 could see lithium prices pull back from highs, we highlight that at their 2022 peaks, equities were pricing in levels well below spot (Figure 92).

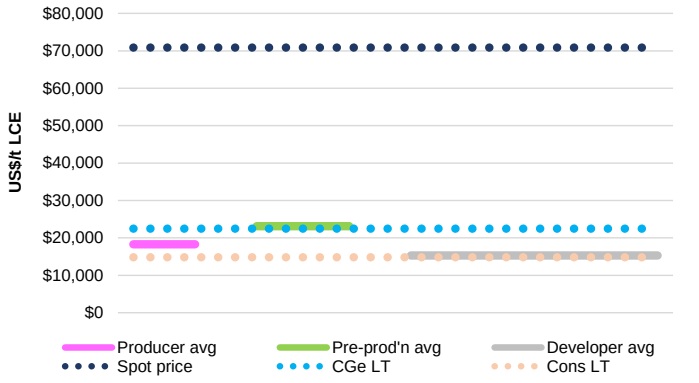
While average implied prices have increased over the last month, they still sit well below current prices and at levels (coincidentally?) in line with long-term consensus (Figure 93).

Figure 92: Implied lithium prices – current/2022 peak



Source: FactSet, Canaccord Genuity estimates

Figure 93: Peer group average implied prices vs "spot"/CGe long term/consensus long term



Source: FactSet, Asian Metal, Canaccord Genuity estimates

CG global sector coverage

Figure 94 details our valuation and target price changes for our global lithium sector coverage resulting from updated lithium pricing, and revisions to our various project modelling assumptions, including:

- updated capex/opex estimates to account for industry cost inflation;
- revised project timelines; and
- updated project financing assumptions.

For our covered producers, we have also reduced our EV/EBITDA multiple in our blended target price methodology (50:50 blend $NPV_{10\%}$ + five-year forward average from 13x to 8x to reflect the peak pricing multiple, and for our developers we have increased our risk weightings and discount rates to 10% to better reflect financing/timeline/ramp-up risk.

Overall, our target prices have increased by +23% for producers, +32% advanced developers and +1% for developers.

Top picks – we like producers over developers, with some exceptions

We expect industry cost inflation and equity valuations/equity market volatility to impact project financing plans, and in turn potentially affect development project timelines (for unfunded projects). For projects with funding secured (i.e., Goulamina, Kathleen Valley, Finnis, Grota do Cirilo and Cauchari), we note the potential for capex revisions and commissioning/ramp-up risk as the more advanced projects move through construction into production.

Conversely, we see covered lithium producers as remaining in pricing/consensus upgrade cycles, with production history pointing to lower operating risks. As such, our current preference is for producers over developers (with some exceptions).

Our top picks include:

- AKE-ASX: Sector-leading long-term production growth and product diversification; consensus estimate upgrade risk.
- PLS-ASX: Volume growth, earnings/cash flow leverage to pricing upside.
- SGMA-TSXV: Fully funded near-term producer, with substantial medium-term production growth (Phase 2, Phase 3) and incremental exploration upside risk.
- LLL-ASX: Top tier spodumene development project in joint venture with Ganfeng; significantly undervalued vs peers.

Figure 94: CG global lithium coverage - summary of target price and rating changes

Ticker	Name	New Rating	Old Rating	Exchange	Analyst	Lithium type	Price	Market cap ($m)	Old TP	New TP	Chg (%)	NAVS	P/NAV
IGO	IGO Limited	HOLD ↓	BUY	ASX	TH	Integrated	A$12.07	9,140	A$11.00	A$13.25	20%	A$10.00	1.21x
PLS	Pilbara Minerals	BUY	BUY	ASX	TH	SC	A$3.06	9,109	A$3.60	A$4.50	25%	A$3.62	0.85x
AKE	Allkem Limited	BUY	BUY	ASX	RS	Integrated	A$12.16	7,754	A$17.10	A$21.30	25%	A$21.41	0.57x
LAC	Lithium Americas	SPEC BUY	SPEC BUY	TSX	KL	Brine	C$38.94	5,230	C$49.00	C$50.50	3%	C$66.00	0.59x
LTR	Liontown Resources	SPEC BUY	SPEC BUY	ASX	RS	SC	A$1.71	3,745	A$2.30	A$2.30	0%	A$2.30	0.74x
SGML	Sigma Lithium	SPEC BUY	SPEC BUY	TSXV	KL	SC	C$27.20	2,738	C$31.00	C$45.00	45%	C$34.00	0.80x
CXO	Core Lithium	HOLD ↓	BUY	ASX	TH	SC	A$1.40	2,423	A$1.00	A$1.50	50%	A$0.93	1.50x
LKE	Lake Resources	SPEC BUY	SPEC BUY	ASX	RS	Brine	A$1.19	1,654	A$1.65	A$1.65	0%	A$1.65	0.72x
PLL	Piedmont Lithium	SPEC BUY	SPEC BUY	ASX	RS	Integrated	A$0.91	1,645	A$1.70	A$2.05	21%	A$2.05	0.44x
INR	Ioneer Ltd	HOLD	HOLD	ASX	TH	Integrated	A$0.69	1,459	A$0.85	A$0.75	-12%	A$0.75	0.91x
SLI	Standard Lithium	SPEC BUY	SPEC BUY	TSXV	KL	Brine	C$8.32	1,371	C$14.00	C$15.00	7%	C$15.00	0.55x
VUL	Vulcan Energy	SPEC BUY	SPEC BUY	ASX	TH	Brine	A$8.03	1,151	A$23.00	A$19.00	-17%	A$19.00	0.42x
FL	Frontier Lithium	SPEC BUY	SPEC BUY	TSXV	KL	Integrated	C$2.40	509	C$4.00	C$4.75	19%	C$4.75	0.51x
LLL	Leo Lithium	SPEC BUY	SPEC BUY	ASX	RS	SC	A$0.55	653	A$1.00	A$1.90	90%	A$1.90	0.29x
GLN	Galan Lithium Ltd	SPEC BUY	SPEC BUY	ASX	RS	Brine	A$1.28	390	A$3.40	A$3.40	0%	A$3.40	0.38x
RCK	Rock Tech Lithium	SPEC BUY	SPEC BUY	TSXV	KL	SC	C$3.51	264	C$7.00	C$4.50	-36%	C$4.50	0.78x
LPI	Lithium Power Int	SPEC BUY	SPEC BUY	ASX	RS	Brine	A$0.60	209	A$1.20	A$1.45	21%	A$1.45	0.41x
PSC	Prospect Resources	HOLD ↓	SPEC BUY	ASX	TH	SC	A$0.11	49	A$0.11	A$0.11	0%	A$0.11	0.95x
ALL	Atlantic Lithium	R	R	AIM	AB	SC	R	R	R	R	R	R	R

Source: FactSet (prices as at 18 August 2022), Canaccord Genuity estimates; RS – Reg Spencer, TH – Tim Hoff, KL – Katie Lachapelle, AB – Alex Bedwany

Estimate revisions

Figure 95 outlines our estimate revisions for producers/advanced developers on our updated lithium pricing assumptions.

LAC-TSX, PLS-ASX and AKE-ASX are standouts on FY23E earnings upgrades, with PLS and IGO expected to see EBITDA towards A$2bn in FY23E.

Figure 95: CG lithium producer estimate revisions

		FY22E			FY23E			FY24E		
EBITDA CHANGES		New	Previous	Chg (%)	New	Previous	Chg (%)	New	Previous	Chg (%)
IGO	A$M	717	717	0%	2410	2140	13%	1838	1278	44%
PLS	A$M	947	835	13%	2264	1453	56%	1890	896	111%
AKE	US$M	521	521	0%	1163	943	23%	1497	845	77%
CXO	A$M	-9	-4	125%	26	94	-72%	268	188	43%
LAC	US$M	-126	-173	-27%	263	31	748%	312	79	295%
SGML	C$M	-35	-30	17%	575	546	5%	689	500	38%

		FY22E			FY23E			FY24E		
NPAT CHANGES		New	Previous	Δ	New	Previous	Δ	New	Previous	Δ
IGO	A$M	331	331	0%	1517	1325	14%	1093	700	56%
PLS	A$M	884	775	14%	1565	995	57%	1326	615	116%
AKE	US$M	299	42	612%	772	618	25%	996	535	86%
CXO	A$M	-9	-4	125%	22	88	-76%	232	167	39%
LAC	US$M	-130	-178	-27%	258	26	892%	304	71	328%
SGML	C$M	-48	-32	50%	399	379	5%	520	366	42%

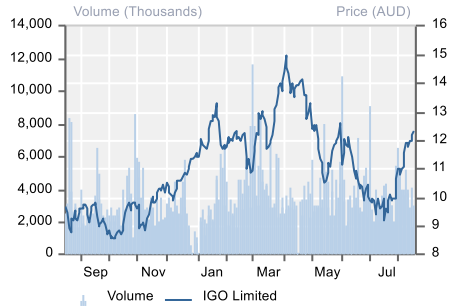
		FY22E			FY23E			FY24E		
FCF CHANGES		New	Previous	Δ	New	Previous	Δ	New	Previous	Δ
IGO	A$M	-937	-937	0%	1519	1328	14%	1064	665	60%
PLS	A$M	529	586	-10%	1106	545	103%	939	239	293%
AKE	US$M	385	385	0%	401	236	70%	695	297	134%
CXO	A$M	-78	-69	13%	-65	-23	181%	133	-212	-162%
LAC	US$M	-62	-43	-44%	258	34	659%	154	-79	295%
SGML	C$M	-132	-147	-10%	345	328	5%	530	405	31%

Source: Canaccord Genuity estimates

Company updates

Listed in order of market capitalisation.

Figure 97: IGO-ASX



Source: FactSet

IGO Ltd (IGO-ASX: A$12.07, mkt cap A$9.14bn | HOLD (from Buy) | TP A$13.25 (from A$11.00) | Timothy Hoff)

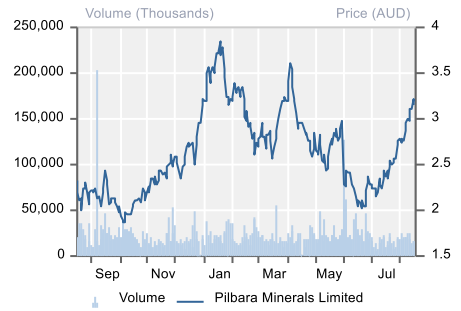
We have updated our model, taking into account the new pricing scenarios, updates following the investor day and site visits to Greenbushes and Kwinana. Our FY23E EBITDA has only lifted 13% due to the lagged impact of pricing that IGO receives, however our FY24E EBITDA has lifted 44% to A$1.84bn. As with much of our coverage universe, we have lifted risking on assets that are expanding or building operations (Greenbushes, Kwinana and Odysseus) and have reduced our multiple from 10x to 6x. We had been running a lower multiple for IGO (10x vs 12-13x for peers) due to the non-controlling nature of the TLEA JV. As we have reduced all multiples across the sector, this has resulted in some compression in the differential vs peers which we now have trading on 7.5x.

The recent site visit that was held to the Greenbushes and Kwinana assets was an excellent chance to see how the operations function. Greenbushes is an impressive asset of global significance; it was interesting to see DMS and flotation products being combined post processing. This helps in moisture management and while other operations we have observed a what appears to be a cleaner DMS product it likely reflects the high-grade nature of the ore. The plant appears much more complex than other spodumene processing plants we had visited but with its historical operational knowledge, it appears to be running well. Management highlighted that while the orebody was broad and contiguous, there were multiple ore zones within the deposit that are treated differently. There are currently no fleet management systems in place and we would imagine that planned upgrades would assist in plant optimisation. Water was another interesting issue for the site with all process water required to come from rainfall. This is closely and actively managed, however, it might be the first site we have seen that operates in this manner.

Our recent Kwinana site visit highlights the difficulty in ramping up a new process in a Greenfields jurisdiction (considering no other operational plants in Australia). The plant was not operational while we were there; management highlighted issues with product quality (managing magnetic material has been a priority) and back-end finalisation of product (crystallisation, drying, bagging). Ultimately, the Company is confident the asset can ramp up (who knows what a McNulty curve is?) and we remain cautious on ramp up and Stage 2 capex given changes to Stage 1.

Our price target has increased by 20% to $13.25 but with the stock trading at 0.91x P/NAV we downgrade to a HOLD rating (from Buy).

Figure 96: PLS-ASX



Source: FactSet

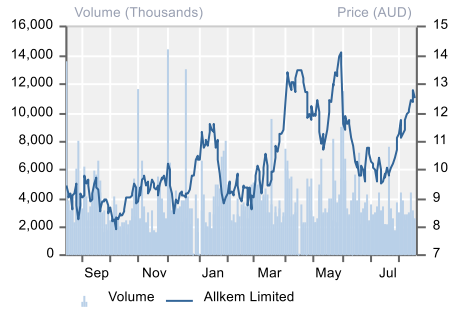
Pilbara Minerals Ltd (PLS-ASX: A$3.06, mkt cap A$9.11bn | BUY (unchanged) | TP A$4.50 (from A$3.70), | Timothy Hoff)

We have updated our model for our price forecasts as well as recent news flow from PLS. This includes additional capital for the P680 and P1000 expansions, as well as increasing our discount rate to 10% (previously 8%) and risking the expansion of Pilgangoora and POSCO downstream JV. We have taken a more conservative view on modelling the business as well as its projected EBITDA multiple which we have lowered to 7.5x (consistent across all operated producing lithium businesses). Our asset valuation for Pilgangoora has lifted 49% to A$11,605m and our five-year EBITDA profile has lifted 97% to A$1.95bn.

Our recent site visit to the Pilgangoora operation was an interesting comparison to just over a year ago during the investor day. The mining operations were progressing well at Central pit which previously had not had an adequate level of stripping. The Southern (AJM's old asset) pit is progressing through transitional material, and we would expect an improvement in ore presentation, processing and recoveries over time. PLS intends to progressively move away from its contractor model and highlighted the benefits of a consolidated ore crushing and ore sorting facility to replace the current contracted crusher. Management highlighted the amount of inbound interest for product and outlined its customers growth plans which would require much more than PLS is expecting to produce.

If pricing remains stable over the next 12 months, we see considerable upside risk and believe PLS will likely benefit given its leverage to the lithium market. Our price target has lifted 25% to A$4.50 and we maintain our BUY rating.

Figure 98: AKE-ASX



Source: FactSet

Allkem Ltd (AKE-ASX: A$12.16, mkt cap A$7.75bn | BUY (unchanged) | TP A$21.30 (from A$17.10) | Reg Spencer)

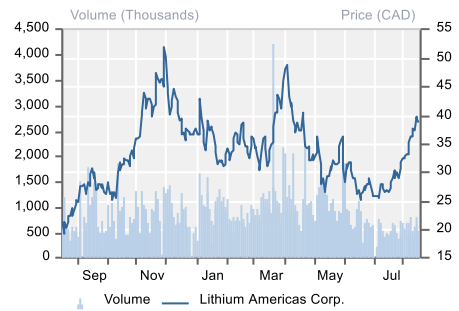
We have made material upgrades to our EBITDA forecasts (Figure 95) based on our revised price deck, with FY23E and FY24E estimates increasing by 23% and 77%, respectively. Positive valuation impacts (50:50 blend of risked NPV10% and 8x five-year average EBITDA) are partially offset by project model revisions, including increased capex/opex (industry cost inflation) and timeline revisions.

We continue to see AKE as being well funded to deliver growth plans (CGe cumulative FY23E-25E EBITDA US$4.6bn against capex of US$1.3bn). However, revisions to modelled project timelines (Sal de Vida and James Bay pushed out by 3-6 months to end-2023 and DecQ'24, respectively) sees our modelled 2025 LCE production estimates lowered from 105kt to 90kt. Our longer-term modelling continues to see AKE achieve LCE capacity of ~150kt LCE by 2030 (vs implied AKE targets of >200kt).

As noted in JunQ'22 report, we expect continued strength in SC6 prices into the SepQ, while chemical prices are likely to be impacted by product mix and timing issues associated with Olaroz II ramp-up and inventory build at Naraha. Potential near-term catalysts include studies on downstream conversion at James Bay (CGe 40ktpa from mid-2027) and delivery/successful ramp-up of nearer-term growth projects in Naraha LiOH and SdV.

Our price target has increased by 25% to A$21.30 (from A$17.10) and we maintain our BUY rating.

Figure 99: LAC-TSX



Source: FactSet

Lithium Americas Corp (LAC-TSX: C$38.94, mkt cap C$5.23bn | SPEC BUY (unchanged) | TP C$50.50 (from C$49.00) | Katie Lachapelle)

Lithium Americas continues to advance construction at its flagship Cauchari-Olaroz project with >90% of work completed on site. While capex estimates were revised earlier this year (+16%), a substantial portion of this capex has already been spent (88% as of 30 June) which suggests that further cost revisions, if any, should not be material. Commissioning will continue throughout the second half of 2022; we currently forecast 25kt of lithium carbonate production in 2023 as the project ramps-up. As a reminder, a portion of the purification process to produce battery-quality has been deferred to early 2023. As a result, the company will produce only technical grade lithium carbonate upon first production.

At Thacker Pass, the ROD appeal process is still ongoing but is expected to be finalised in Q3 2022. After the ruling is received, we believe the company will be in a better positioned to finalise funding and a strategic partner for the project. This ruling could also trigger a decision on the ATVM loan program application, which, if approved, would fund a significant portion of Thacker Pass' capital cost (50-60%). A final Feasibility Study is underway; our most recent Thacker Pass forecasts are detailed here.

We also expect LAC to make a decision on whether they will pursue a potential separation of its US business (Thacker Pass) in the next 12 months. In our view, this could help improve LAC's financial flexibility and strategic optionality given a growing emphasis on localising supply chains in today's geopolitical environment. A division of the projects could also help accelerate LAC's search for the right strategic partner and bring about potential M&A in Argentina.

In addition to incorporating our new lithium price deck, we have taken the opportunity to update our estimates for each of LAC's projects and incorporate sectoral cost inflation. At Cauchari-Olaroz, we've assumed elevated operating costs during the first year of production as CO ramps up and have incorporated additional cost inflation into our opex estimates (+10%). At Thacker Pass and Pastos Grandes we have incorporated similar cost increases of +10% and +20%, respectively. These cost increases have been more than offset by our higher price deck; as a result, our NAV has increased to C$66.00/share. With Cauchari-Olaroz nearing production, we have decided to update our target price methodology to be consistent with our producer peer group coverage (and other near-term producers SGML/COX). Accordingly, our target price is now based on an equal weighting of 8x five-year forward average EBITDA and 1.0x NAV, measured as at 1 July 2023. This results in a revised target price of C$50.50 (up from $49.00). We maintain our SPECULATIVE BUY rating.

Figure 100: LTR-ASX

Source: FactSet

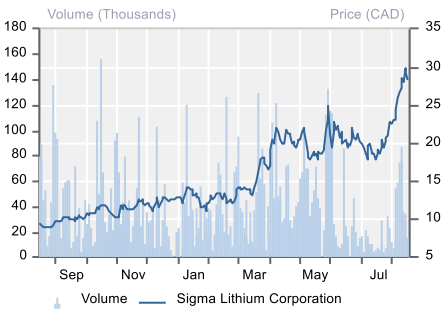
Liontown Resources Ltd (LTR-ASX: A$1.71, mkt cap A$3.75bn | SPEC BUY (unchanged) | TP A$2.30 (unchanged) | Reg Spencer)

LTR recently announced an FID for its 500-800ktpa Kathleen Valley project, following the finalisation of its offtake agreements (LG Energy Solutions, Tesla, and Ford Motor Co. covering 90% of Stage 1 production) and associated A$300m debt financing with Ford (see Ford comes to Liontown… and brings its cheque book).

The secured loan facility now sees the project fully funded (cash reserves of ~A$460m), with LTR recently updating project capex to A$545m (vs 2021 DFS estimate of A$473m). We now conservatively model total Stage 1 capex of A$605m (including working cap), push out our modelled production start date six months to SepQ'24, and lift our modelled cash costs by 25% to average US$428/t SC6 on a LOM basis. Other revisions include increased capex for downstream (+10% to A$2.3bn), NPV discount rate increased to 10%, and inclusion of the Ford loan into our NAV. These changes mostly offset the benefit of our upgraded lithium price deck with our target price unchanged at A$2.30. We maintain our SPECULATIVE BUY rating.

We look to exploration results at Buldania, further studies on downstream conversion (Scoping Study completed in December 2021 – see Kathleen Valley DFS recap), and updates on construction/development progress as the next potential catalysts.

Figure 106: SGML-TSXV



Source: FactSet

Sigma Lithium Corp (SGML-TSXV: C$27.20, mkt cap C$2.74bn | SPEC BUY (unchanged) | TP C$45.00 (from C$31.00) | Katie Lachapelle)

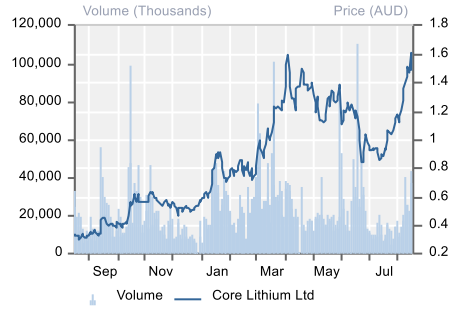
Over the last 12 months, Sigma Lithium has executed on several important project milestones. These include the release of a final Feasibility Study for Phase 1 and a Pre-Feasibility Study for Phase 2 of their flagship Grota do Cirilo project, which included updated economics for the combined Phase 1 and Phase 2 operations. Sigma also recently announced the addition of a brand new resource, adding new high-grade tonnage for future Phase 3 production. The new resource will form the basis of a Phase 3 PEA, expected in Q3 2022.

On site, construction continues to progress on schedule and on budget. The company is targeting Phase 1 commissioning before year-end with first production expected later this year or early next. We continue to believe that Sigma is uniquely positioned as one of few developers who can actually produce in the next 12 months and capitalise on current high prices, underpinned by strong demand.

In addition to incorporating our new lithium price deck, we have taken the opportunity to incorporate sectoral cost inflation into our capex and opex estimates as well as a higher discount rate. For Phase 1, we have increased capex 10% above management's guidance of $131.6M to account for potential cost overruns during construction. A larger increase of 20% has also been applied to Phase 2 capex and LOM operating costs. As a result of these changes, our NAVPS has increased to $34.83 from $31.13. Sigma remains extremely well positioned to benefit from near-term SC price highs, which more than offset our more conservative operating forecasts going forward. We forecast an EBITDA margin of ~75-80% at US$2,000/t concentrate and average annual EBITDA of ~$650 million over the next five years.

With Grota do Cirilo nearing production, we have updated our target price methodology to be consistent with our producer peer group coverage (and other near-term producers LAC/COX). Accordingly, our target price is now based on an equal weighting of 8x five-year forward average EBITDA and 1.0x NAV, measured as at 1 July 2023. This results in a revised target price of C$45.00 (up from C$31.00) and we maintain our SPECULATIVE BUY rating.

Figure 105: CXO-ASX



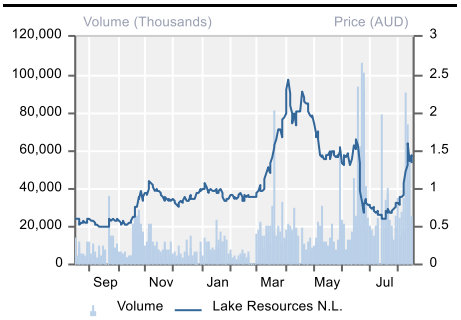
Source: FactSet

Core Lithium Ltd (CXO-ASX: A$1.40, mkt cap A$2.42bn | HOLD (from Spec Buy) | TP A$1.50 (from A$1.00) | Tim Hoff)

Core remains on track to progress the Finniss Lithium project in Northern Territory, Australia, to commissioning in 2H'22. The company recently updated the market on progress at site which included a lifting of mining rates following a delay due to wet weather, handing over construction activities to Primero following completion of earth works and the arrival of the crushing contractor. CXO noted higher fuel costs but to date maintains budget estimates. We sit 30% higher than CXO estimates and factor no revenue until the MarQ'23 as a matter of conservatism (we also assume commercial production is only achieved in JunQ'23).

We have updated our model for prices and costs leading to a 50% increase in our NAV for Finniss. However, we have reduced our EBITDA multiple from 12 to 7.5 and increased our discount rate to 10% (prev. 8%). We have also risked the asset at 90% on account of it coming into the final stretch of construction (a higher risk period). We believe we have factored for any potential delay and that CXO can survive any revenue gap comfortably. There is also the potential for CXO to deliver DSO material to the market. This would lessen any impacts and likely be a low cost, high margin operation in the current market. Our price target increases to A$1.50 (from A$1.00), but we downgrade the stock to a HOLD (from Speculative Buy) on valuation (1.0x P/NAV) and look for pullbacks as potential opportunities to enter the stock.

Figure 101: LKE-ASX



Source: FactSet

Lake Resources (LKE-ASX: A$1.19, mkt cap A$1.65bn | SPEC BUY (unchanged) | A$1.65 (unchanged) | Reg Spencer)

LKE has delivered upon several important milestones YTD'22, including signing offtake MoU's with Japanese trading firm Hanwa Co. (see Offtake MoU signed with Hanwa Co.) and Ford Motor Co. (Offtake MoU with Ford Motor Company) covering 50ktpa (100% of planned capacity at flagship Kachi project in Argentina), and appointment of joint debt co-ordinators (UK/Canadian Export Credit Agencies have previously indicated potential debt support of up to 70% project development costs).

At the project level, the Lilac Solutions-designed on-site DLE demonstration plant is now under construction (albeit delayed against original timelines), with lithium carbonate production expected to provide confirmation of process design and provide samples for offtake discussions. A DFS for the Kachi project (targeting 50ktpa LC via DLE) is planned for completion in 2H'22. LKE finished the JunQ'22 with cash of A$173m.

We have revised our modelled development scenario for Kachi, which sees capex increased by 8% to US$1.06bn, commissioning of the initial modules (25ktpa, increasing to 50ktpa LCE) pushed back to year-end 2025, and cash production costs increased by 12% to US$5,000/t (avg LOM). These revisions and increased risking (timeline, capex/opex, financing risk) offset our upgraded lithium pricing assumptions, with our target price (risked NPV10%) remaining unchanged at A$1.65 and we maintain our SPECULATIVE BUY rating.

Potential upcoming share price catalysts include demonstration plant production/ performance results (i.e., de-risking DLE process), DFS results, and firming up offtake/financing.

Figure 108: PLL-ASX

Source: FactSet

Piedmont Lithium Inc (PLL-ASX: A$0.91, mkt cap A$1.65bn | SPEC BUY (unchanged) | TP A$2.05 (from A$1.70) | Reg Spencer)

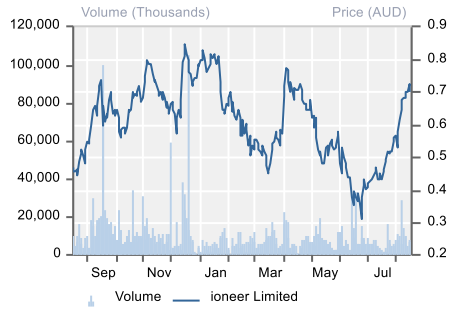
We outlined a pivot in PLL's project development plans in Strategic offtakes support second LiOH converter and cash flow potential in 2023. This sees development of the planned ~US$1bn, integrated 30ktpa LiOH Carolina project deferred (CGe 2027) in favour of construction of a separate converter fed via concentrate offtakes from the restart of the NAL operation (Abitibi Hub) in Quebec (PLL 25%, SYA-ASX 75%) and the Ewoyya project (PLL earning 50%, operated by ALLA-AIM) in Ghana.

PLL and SYA recently announced a FID for NAL, with restart capex estimated at C$91m, and first production in Q1'23. The project is expected to produce 160ktpa SC6, with PLL's offtake rights covering greater of 50% of output or 113ktpa at a ceiling price of US$900/t (vs "spot" prices of ~US$5,000/t). ***As such, the sale of NAL concentrate under the offtake could see material pre-tax cash flow for PLL in 2023 of US$106m (CGe price deck), up to US$206m at "spot" prices***. PLL had cash of US$140m as at June 2022.

Near-term potential catalysts for PLL include an update on site location and potential partnership for LHP2, DFS and financing for the Ewoyya JV (2H'22), and commissioning/first production at NAL. Revised lithium pricing assumptions are mostly offset by ~20% increases to development capex assumptions for LHP2 and Carolina, increased cash cost estimates, increased risk weightings for Carolina and LHP2 (i.e., increased financing risk) and NPV discount rate to 10% (from 9%).

Our price target increases by 21% to A$2.05 (from A$1.70) and we maintain our SPECULATIVE BUY rating.

Figure 102: INR-ASX



Source: FactSet

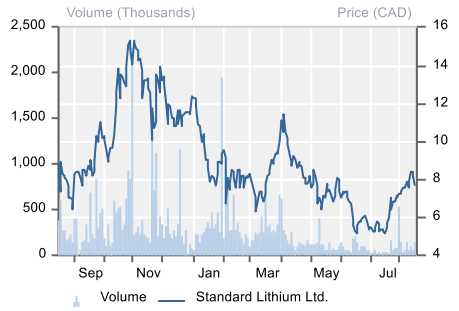
ioneer Ltd (INR-ASX: A$0.69, mkt cap A$1.46bn | HOLD (unchanged) | TP A$0.75 (from A$0.85) | Timothy Hoff)

INR continues to make positive progress, signing an offtake agreement with Prime Planet Energy & Solutions (JV of Toyota and Panasonic) for 4ktpa of lithium carbonate. It submitted its revised Plan of Operations to the Bureau of Land Management (BLM) in early July and expects to receive a NOI soon, which will trigger the NEPA process. We would expect the DOE financing to follow the NOI (and be contingent on a positive Record of Decision), which may serve as a catalyst for the company.

We have updated our model for new pricing, however we have also assumed general inflation on plant capex and operational costs. We have also delayed the operation to account for the delays in submitting to the BLM and have increased our discount rate to 10% (previously 8%) to bring INR in line with our coverage. We have also risked the project to 75% of NAV to reflect the current market environment.

We note that A$0.31/share of our valuation consists of capital commitments from Sibanye Stillwater and so draw a clear line under the stock on valuation support. Our price target has fallen 12% to A$0.75 (from A$0.85) on account of our changes and we maintain a HOLD on valuation.

Figure 103: SLI-TSXV



Source: FactSet

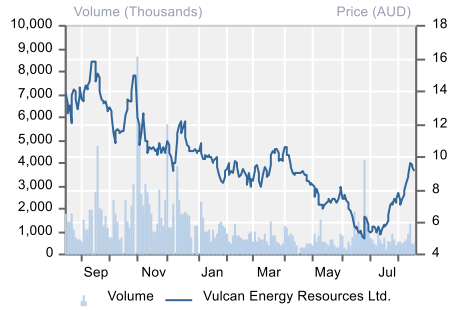
Standard Lithium Ltd (SLI-TSXV: C$8.32, mkt cap C$1.37bn | SPEC BUY (unchanged) | TP C$15.00 (from C$14.00) | Katie Lachapelle)

Standard Lithium continues to advance its flagship South Arkansas (Lanxess) project toward a construction decision. When we visited the project in March, we were encouraged by the progress made on site and saw DLE technology that we viewed as viable and near ready to advance to commercial scale, as well as evidence of an amicable relationship with Lanxess, Koch and the local community.

The company plans to release a final Feasibility Study for the South Arkansas project by year end 2022. The completion of the DFS will trigger a final investment decision from Lanxess and advance the project toward a construction decision in the first half of 2023. In February 2022, SLI and LANXESS reached an agreement through which Standard Lithium will now hold, at a minimum, a 51% majority equity stake in the South Arkansas project (vs the 30% previously proposed) and control all development of the Project leading up to the completion of the DFS. After the DFS is completed, LANXESS will decide whether or not they would like to participate in the JV as a 30% to 49% partner.

In addition to incorporating our new lithium price deck and a higher discount rate (+1.5%) we have taken the opportunity to incorporate sectoral cost inflation into our capex and opex estimates. For Phase 1 we have increased capex by 20% above management's guidance of US$250 million. A similar 20% increase has been applied to Phase 2 and Phase 3 of the project, as well as our modelled operating costs which we're based on the PEA. Furthermore, due to the increase in projected capex and SLI's recent share price performance, we now forecast a more dilutive equity raise to help fund SLI's portion of the capital cost (CGe US$160m raise at the current share price). These model updates largely offset our higher lithium price deck. As a result, our NAVPS has only increased by 7% and we are increasing our target price to C$15.00 (from C$14.00). Our target price remains based on 1.0x NAV. We maintain our SPECULATIVE BUY rating.

Figure 104: VUL-ASX



Source: FactSet

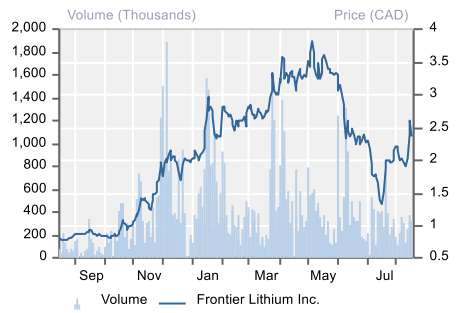
Vulcan Energy Resources Ltd (VUL-ASX: A$8.03, mkt cap A$1.15bn | SPEC BUY (unchanged) | TP A$19.00 (from A$23.00) | Tim Hoff)

Vulcan continues to make steady progress towards commissioning its demonstration plant in 2H'22. Recent activity has included gaining approval from several local councils for 3D seismic surveying to begin (see Community support building), signing an agreement with Enel green Power to explore the development of geothermal lithium production in Italy and Stellantis making a A$76m strategic investment in VUL (see Stellantis steps up for equity).

In line with our overall view of the market, we have lifted our discount rate to 10% (previously 9%) and dropped our risking from 60% to 50% for the lithium and energy projects. This was not due to a perceived direct increased risk of the development but to reflect current market dynamics on asset valuations.

Our price target is 18% lower, moving to A$19.00 (from A$23.00); however, we believe there is potentially still significant risk-adjusted upside to the business, with factors such as capex and cost increases now more than factored in. The stock is currently trading at 0.46 P/NAV and we maintain a SPECUALTIVE BUY rating.

Figure 107: FL-TSXV



Source: FactSet

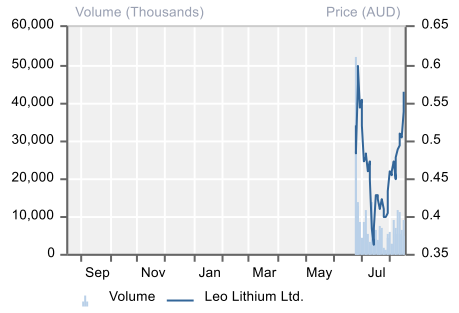
Frontier Lithium Inc. (FL-TSXV: C$2.40, mkt cap C$509m | SPEC BUY (unchanged) | TP C$4.75 (from C$4.00) | Katie Lachapelle)

Since we initiated coverage in February, Frontier announced a substantial resource update at its flagship PAK Lithium Project in northern Ontario. The project is now host to a total M&I+I mineral resource of ~42Mt grading 1.54% Li_2O, which ranks among the largest in North America and the highest grade among peers.

Throughout the remainder of 2022, drilling will continue at the Spark deposit, which currently hosts a resource of 32.5Mt grading 1.38% Li_2O and remains open along strike and down dip. Recent drill results from the Phase XI and Phase XII drill programs demonstrated grades in line with the current mineral resource and highlighted the potential for the deposit to extend at least 80m to the West (where the deposit still remains open). The company now has two drill rigs mobilized on site and plans to drill another ~15,000m this year, consisting mostly of infill drilling at Spark. A Pre-Feasibility Study for the project is expected later this year, which is expected to include an updated mineral resource and increased mine life based on the drilling completed to date. As a reminder, the PEA assumed the processing of only 23Mt of material, well below the current mineral resource of 42Mt.

In addition to incorporating our new lithium price deck, we have taken the opportunity to incorporate sectoral cost inflation into our capex estimate. Our capex estimate of C$1.055bn is now 20% above the 2020 PEA forecast of C$879 million (opex was already inflated 20%). We've also decided to include an in-situ valuation ($242 million, based on US$250/t LCE) for the additional Spark resources that are currently not included in our mine plan. As a result of these changes, we are increasing our target price to C$4.75 (from C$4.00) and maintain our SPECULATIVE BUY rating. Our target price remains based on 1.0x NAV, now at an 11% discount rate (9.5% previously), as we've decided to risk unfinanced and unpermitted projects more heavily in the current environment.

Figure 109: LLL-ASX



Source: FactSet

Canaccord Genuity received a fee for its role as Joint Lead Manager to Leo Lithium's $100m Initial Public Offer at $0.70 on 29 April 2022.

Leo Lithium Ltd. (LLL-ASX: A$0.55 mkt cap A$653m | SPEC BUY (unchanged) | TP A$1.90 (from A$1.00) | Reg Spencer)

Leo Lithium was spun out of Firefinch (FFX-ASX | Under Review | Paul Howard) to house its interests in the advanced Goulamina lithium project, in JV with Ganfeng (see our recent initiation Li-ion King).

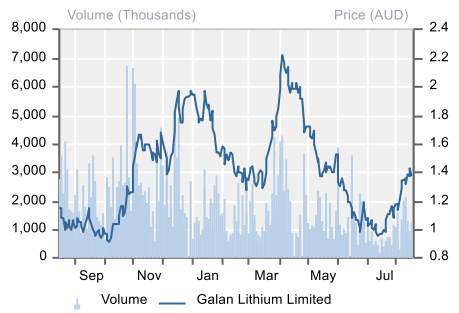
Goulamina is one of the world's largest hard rock lithium resources (109Mt at 1.45% Li_2O, ranked #8 globally), with an updated DFS in late 2021 outlining a >20-year, ~800ktpa (via staged development) spodumene project, with low cash costs and capital intensity (Stage 1 capex US$255m). Construction is scheduled to commence in mid-2022.

Ganfeng's US$130m equity earn-in and US$40m project loan see the project mostly funded and we expect any funding shortfall (CGe capex US$275m + US$80m for Stage 2) to be adequately covered by the JV partners (LLL has a strong cash position of A$86m) and potential extension of Ganfeng loan/third party debt.

Once in production, we estimate Goulamina is capable of generating annual EBITDA of US$380m over years 1-4 (100% basis), increasing to US$500m once the Stage 2 expansion is completed from 2026 (assuming US$1,000/t SC6 LT). At US$3,500/t, annual EBITDA would increase to US$1.2bn (LLL 45% attributable net of Mali GFCI).

Our valuation/target price (NPV10%) increases by 90% to A$1.90 (from A$1.00) on revised spodumene pricing assumptions. We maintain our SPECULATIVE BUY rating.

Figure 110: GLN-ASX



Source: FactSet

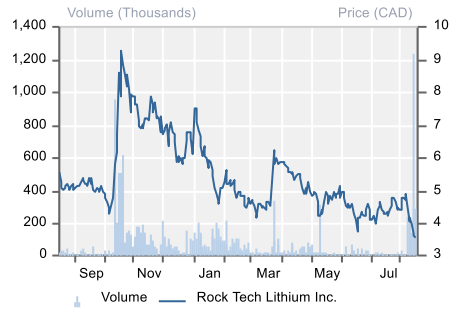
Galan lithium Ltd. (GLN-ASX: A$1.28, mkt cap A$390m | SPEC BUY (unchanged) | TP A$3.40 (unchanged) | Reg Spencer)

Over the last several months, GLN has announced several updates at its 100%-owned Hombre Muerto West (HMW) lithium brine project in Argentina, including the results from initial brine flow testing and successful completion of a deep exploration hole at its Pato Pila licence. Pilot plant construction is also progressing well with the main pond now complete, while results from extensional drilling appear to confirm and extend resource potential (currently 2.2Mt LCE at 946 Li mg/l), providing scope for potential increases in capacity.

Looking into 2H'22 we expect results from long term hydraulic pumping test work at HMW, along with an updated mineral resource (SepQ'22). Permitting discussions (for the potential for initial lithium chloride concentrate production) are also ongoing, with finalisation to pave the way for a final development strategy for HMW and Candelas (to be outlined in the DFS DecQ'22/early 2023).

In addition to incorporating our updated price deck through our model, we have increased our capital and operating costs by an average of 20% at both HMW and Candelas to better reflect the current inflationary environment. We have also reduced our risk weighting to 50% at HMW (previously 60%) and 30% at Candelas (previously 35%) on account of funding risks. Overall, our target price has remained unchanged A$3.40 and we maintain our SPECULATIVE BUY rating.

Figure 111: RCK-TSXV



Source: FactSet

Rock Tech Lithium Inc (RCK-TSXV: C$3.51, mkt cap C$264m | SPEC BUY (unchanged) | TP C$4.50 (from C$7.00) | Katie Lachapelle)

RCK is developing its 100%-owned Georgia Lake spodumene project in northern Ontario with the goal of becoming a fully integrated producer of battery-grade lithium hydroxide. By building its own conversion plant in Europe, the company's goal is to position itself as one of the first lithium hydroxide suppliers outside of China.

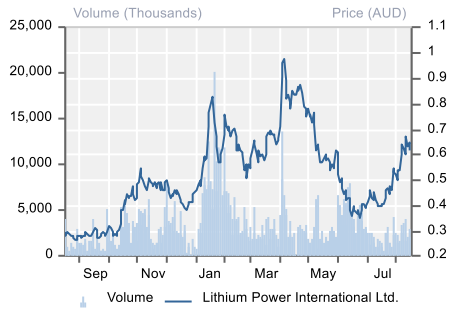
Earlier this year, the company signed a letter of intent with Bilfinger SE for the engineering, procurement and construction management of its first planned converter in Guben, Germany. The permitting process for this converter is underway and is expected to be completed by Q1 2023, with construction starting shortly thereafter. We view this timeline as ambitious, as the project remains yet to be financed. As a result, we've conservatively delayed construction to 2025 – this should allow the company time to finance the project and advance Georgia Lake and/or secure additional feedstock for its converter. Assay results from an ongoing drill program at Georgia Lake were recently released, which we expect to be incorporated into a Pre-Feasibility Study for the project. The company is currently targeting Q2 2023 for the start of construction on site, with first production in 2024. We model first production in 2026 because the project has yet to be permitted and this process will likely delay a construction decision.

In August 2022, RCK announced its intention to raise US$50 million via a marketed offering. The offering was subsequently decreased to ~US$30 million, with each unit priced at C$3.50 per unit. Each unit comprised one common share and one-half of one common share purchase warrant (exercise price C$4.50). The proceeds will be used to finance the development of the proposed LiOH converter in Germany and ongoing exploration at Georgia Lake.

In addition to incorporating our new lithium price deck, we have delayed our project timelines (as detailed above) and have incorporated sectoral cost inflation into our capex and opex estimates (+10% and +20%, respectively). Our operating cost estimates have also been impacted by a higher assumed purchase price for spodumene concentrate, as the company will need to source third-party feedstock to meet their projected 24ktpa LiOH capacity.

Given the substantial pull-back in the company's stock price, we also now raise equity at a lower price to help finance the upfront capex of the first converter. These changes result in a decline in our NAVPS estimate to C$4.51. As a result, we are reducing our target price to C$4.50 (from C$7.00). Our target remains based on 1.0x NAV, now measured as of 1 July 2023 and we maintain our SPECULATIVE BUY rating.

Figure 112: LPI-ASX



Source: FactSet

Lithium Power International (LPI-ASX: A$0.60, mkt cap A$209m | SPEC BUY (unchanged) | TP A$1.45 (from A$1.20) | Reg Spencer)

LPI recently announced that it would consolidate ownership of the Maricunga brine project in Chile through a scrip based merger with its JV partners MSB SpA and Bearing Lithium (see Moving to full ownership at Maricunga), with LPI set to move to 100% ownership post completion. In our view, this should simplify financing of the project (January 2022 updated DFS – US$626m capex, 15ktpa LC over 20 years, cash costs of US$3,718/t), with LPI expected to move to an FID in 2H'22.

We have revised a number of our model assumptions, including increased capex (+10% vs DFS) and cash costs (+14%), as well as pushing out modelled commissioning to Q4'24. These revisions partially offset the impact of higher lithium pricing assumptions, with our target price (risked NPV10%) increasing to A$1.45 (from A$1.20). We maintain our SPECULATIVE BUY rating.

Near-term potential catalysts include completion of the merger (September 2022), financing (which may include moving the current financing and offtake MoU with Mitsui to binding status) and FID by year-end 2022.

Figure 113: PSC-ASX

Source: FactSet

Canaccord Genuity, and its associates, holds >1% of the issued share capital of PSC.AU.

Prospect Resources Ltd (PSC-ASX: A$0.11, mkt cap A$49m | HOLD (from Speculative Buy) | TP A$0.11 (unchanged) | Timothy Hoff)

PSC is now trading ex-distribution of A$466m in cash from its A$528m sale of the Arcadia lithium project. Shareholders received an unfranked dividend of A$0.79/share and following the approval of a capital reduction, an additional A$0.17/share. This leaves the business with approximately A$34m in cash available for PSC to explore additional opportunities in the mining and materials space.

Following the cash distribution to shareholders, we value PSC based on its cash position of A$34m (7cps) and a nominal A$20m (4cps) valuation for exploration potential at its current claims. However, with the stock currently trading at our A$0.11 price target (1.0x P/NAV) we downgrade to a HOLD rating (from Speculative Buy) on valuation. We continue to monitor the company which is actively seeing to acquire an asset and is planning to explore the prospective Step Aside prospect.

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Investment Recommendation

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Date and time of production: August 21, 2022, 07:52 ET

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Speculative Buy	160	16.86%	38.12%
	949*	100.0%	

*Total includes stocks that are Under Review

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