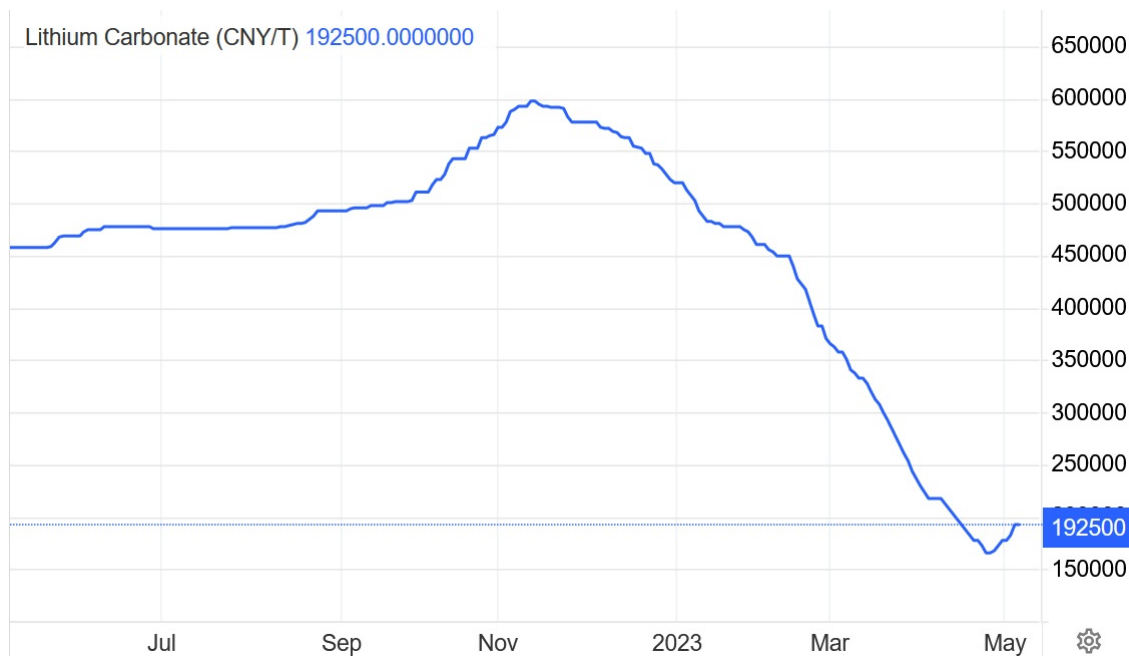


Lithium Prices Recover as China EV Sales Rebound Reigniting Investor Interest in Albemarle & Tesla

written by Matt Bohlsen | May 10, 2023

The first quarter in 2023 was a rough period for lithium stocks as the China lithium carbonate spot price crashed lower. However, the second quarter is looking a lot better.

FIGURE 1: China lithium carbonate spot prices appear to be rebounding after hitting a low in late April 2023



Source: [Trading Economics](#)

Global and China EV sales recovered

strongly in March and April 2023

March 2023 global plugin electric car sales were [over the 1 million mark](#) and were the 'second best month ever'. This was due to very strong sales in China and Europe, with the USA also contributing. It is already looking like the panic sell-off in lithium stocks has been overdone with stocks rebounding higher in the past 3 weeks.

Reports have it that Chinese lithium consumers are buying again after running down inventories in Q1/2023. Certainly, China plugin electric car sales have rebounded very strongly with over 500,000 sales in March and approximately 600,000 in April 2023. Those sales numbers are a huge increase over China's January sales which fell 8% Year-over-Year to [343,000](#) as new energy vehicle ("NEV") subsidies expired.

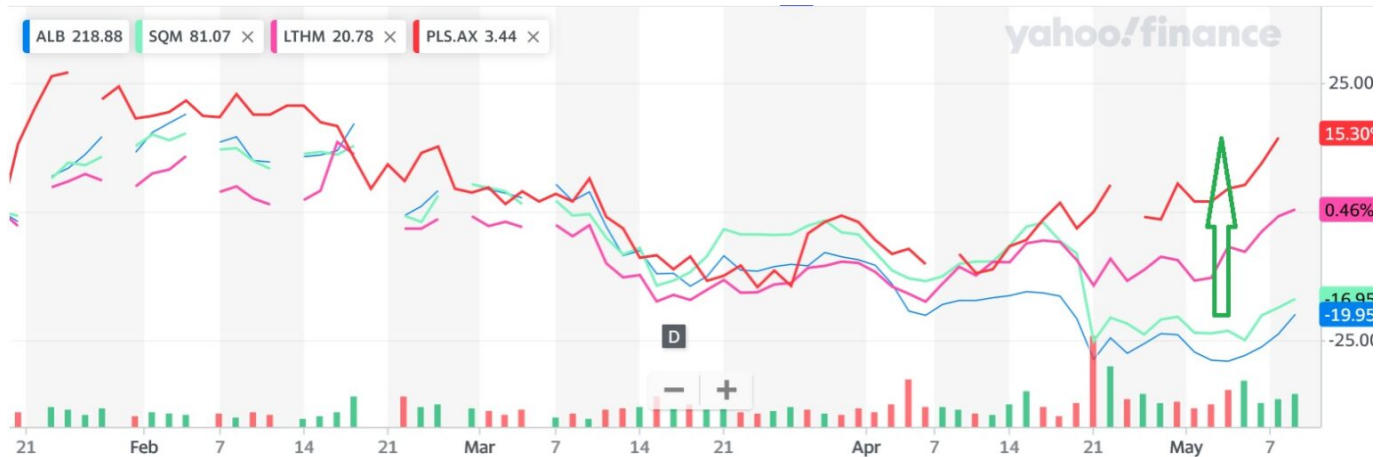
Lithium stocks rallying again

Strong EV sales in China are leading to early signs of a China lithium price recovery. Lithium contract prices remain much higher than spot prices reflecting the past lithium price rise and the strong outlook for lithium demand in 2023 and beyond.

As shown on the chart below, February, March, and April saw the leading lithium stocks (Albemarle Corporation (NYSE: ALB), Sociedad Química y Minera de Chile S.A. (NYSE: SQM), Livent Corporation (NYSE: LTHM), and Pilbara Minerals Limited (ASX: PLS)) follow spot prices lower; however, in May we can see a potential price recovery starting (green arrow in chart below).

FIGURE 2: Leading lithium stocks have been moving higher in May buoyed by improving EV sales and lithium prices (NYSE: ALB, NYSE: SQM, NYSE: LTHM,

ASX: PLS)



Source: [Yahoo Finance](https://finance.yahoo.com)

Albemarle remains very positive on the lithium market with takeover offers and expansion plans

During the lithium price collapse of early 2023, [Albemarle](https://www.albemarle.com) was moving in the opposite direction as it made several key announcements that indicated its strong belief that the lithium market would rebound. Below is a brief summary:

- March 27, 2023 – Albemarle [announced a takeover offer for Liontown Resources at a 69% premium](#) to the 30-day VWAP.
- May 3, 2023 – Albemarle [announced plans to double lithium hydroxide output in Australia](#), effectively adding 50,000 tonnes per year of lithium refining capacity at their Kemerton plant.

Furthermore, Albemarle announced on May 3, a [net sales increase of 129% for Q1/2023](#). Albemarle CEO Kent Masters [commented](#):

“Compared to last year, first quarter net sales more than doubled, adjusted diluted earnings per share more than quadrupled providing a robust start to the year. ... We see

strong sales volume growth for the rest of the year but have modified our guidance to reflect softening lithium market pricing. We remain confident in the underlying market strength of our world-class asset base and our long-term growth strategy.”

Albemarle knows the lithium market better than most, especially given it has been the industry leader for over a decade. Currently, they have numerous expansion plans globally including:

- The Salar Yield Improvement Project in Chile;
- The above-mentioned Kemerton trains III & IV lithium hydroxide production expansion in Australia;
- An under-construction lithium conversion facility in Meishan China; and,
- The Kings Mountain mine development in the USA that will eventually feed their planned new South Carolina lithium processing facility.

Added to these items is the attempted takeover of [Liontown Resources Limited](#) (ASX: LTR) for A\$2.50 or US\$1.66 per share in cash, which values Liontown at A\$5.2 billion or US\$3.4 billion on an enterprise basis, at the time of the offer.

Both Bank of America and Scotiabank have recently upgraded Albemarle. The latter assigned a [US\\$250 price target](#), which is well above the current price of US\$195 at the time of writing.

Closing remarks

Several negative events in early 2023 caused a dramatic fall in China spot lithium carbonate prices. The lithium price had increased over 10x and was due for a fall, with Q1 typically

being a weak quarter due to seasonal impacts causing lower EV sales.

Discussions about sodium-ion batteries did not help either. As it turns out, market participants are now realizing that lithium demand is still very strong, despite some short-term volatility. Sodium-ion batteries, at best, will have limited use cases in energy storage, and cheap, small EVs, mostly sold in China, due to inferior volumetric energy density.

For investors, the recent market dip in lithium stocks may prove to be a good time to go shopping. The long-term demand wave for lithium is a supercycle with 2037 demand forecast to be [35x higher](#) (according to [Trend Investing](#)) than 2020 levels.

Certainly, Albemarle, the lithium leader, remains extremely bullish on the lithium sector with a multi-billion dollar takeover offer and expansion plans.

The EV and stationary energy storage booms are here and will only grow stronger this decade. The [Tesla Inc.](#) (NASDAQ: TSLA) [Master Plan 3](#) reports that we need 240 TWh (240,000 GWh) of energy storage for the world to run on 100% renewable energy, most from lithium-ion batteries. Given global lithium-ion battery production in 2022 was only about 700 GWh you can draw your own conclusions. Albemarle and Tesla already have shown us what they think. The latter is [breaking ground on a new billion-dollar lithium refinery](#) in Texas this week.

Lithium Royalty's Lithium-focused Royalty Portfolio of Sustainable and ESG "Friendly" Projects

written by InvestorNews | May 10, 2023

In [late February](#), I opined that perhaps we had seen a near-term top for the price of lithium. Hindsight suggests that was a pretty good call. However, that was more of a short-term trading view on lithium as opposed to an overall investing view.

Generally speaking, I still believe that the overall lithium market is reasonably bullish over the next several years barring some sort of technological breakthrough that obsoletes the lithium battery.

In fact, if you believe what the [IEA published](#) on lithium (along with other critical minerals), you'd be very bullish based on the IEA view that the lithium market will see a 33% compound annual growth rate ("CAGR") for the next decade.

Another stat that puts future lithium demand into perspective is the fact that Tesla is targeting the manufacture of 20 million electric vehicles ("EVs") per year by 2030 and in order to produce that many vehicles in a year, Tesla would need more lithium than was produced in the world in 2021.

Assuming lithium prices have now stabilized or perhaps even bottomed before another move higher, the question becomes how best to play lithium going forward.

Lithium Royalty Corp. overview

One option to get more broad-based exposure to the market is the newly listed [Lithium Royalty Corp.](#) (TSX: LIRC).

Lithium Royalty is a lithium-focused royalty company with a globally diversified portfolio of 30 high-grade revenue royalties on mineral properties around the world that supply, or are expected to supply, raw materials to support the electrification of transportation and decarbonization of the global economy.

The Company's portfolio is focused on high-grade and low-cost mineral projects that are primarily located in Australia, Canada, South America, and the United States. Lithium Royalty is a signatory to the United Nations Principles for Responsible Investment.

There are two key takeaways from that corporate description.

- First off, they have focused on “friendly”, stable jurisdictions with 46% (based on acquisition costs) of their projects in North America, 62% comprise OECD nations, and no Russian, Chinese, or African asset exposure. Their non-OECD assets are primarily in Brazil and Argentina, which are both stable enough at present.
- Secondly, the integration of ESG factors and sustainable mining are important considerations in Lithium Royalty's investment analysis and royalty acquisitions. This includes a focus on the use of renewable power in extraction and processing; infrastructure benefits to remote communities; environmental and economic impact on local communities; water use; surface disruption and remediation plans as well as tailings management.

I've noted as recently as [last week](#) that I strongly believe a premium will start to be placed on sustainable miners with responsibly sourced materials and a low-carbon footprint. Lithium Royalty definitely ticks that box.

Royalty portfolio and upside potential

But ultimately it comes down to whether you can also make money while being responsible. The royalty that excites me the most at present in the Company's portfolio is one that has just transitioned from construction to production.

In all Lithium Royalty now has 3 producing royalties but their 90% interest in a 1.0% Net Smelter Royalty (NSR) in [SIGMA Lithium Corporation's](#) (NASDAQ: SGML | TSXV: SGML) Grota do Cirilo project is about to start generating returns with its inaugural shipment of approximately 15,000 tonnes of spodumene concentrate in May 2023. Sigma is now focused on ramping up to full production capacity for Phase 1 of the project, which is expected by July 2023.

Other assets currently generating income for the company are both in Australia, including [Allkem Limited's](#) (ASX: AKE | TSX: AKE) Mt. Cattlin project with a royalty of A\$1.50 per tonne of ore mined and [Core Lithium Limited's](#) (ASX: CX0) Finniss mine where the Company expects to receive its first royalty payment for its 2.5% Gross Overriding Royalty (GOR) as a result of Q1/2023 sales.

In total, Lithium Royalty has 30 royalties in its portfolio, of which 29 are summarized in the slide below. Additionally, the acquisition pipeline currently has 10 additional royalty targets with the opportunity to deploy over US\$130 million of new capital.

FIGURE 1: Lithium Royalty's Current Portfolio of Royalties

Current Royalty Portfolio

Operator	LRC Royalty (%)	Asset					
		Name	Country	Type	Product	Stage	Report
1 Allkem	AS1.5/1 Treated	Mt. Cattlin	Australia	Hard Rock	Spodumene	Production	FS
2 Core Lithium	2.50% GOR ¹	Finniss	Australia	Hard Rock	Spodumene	Production	DFS
3 Sigma Lithium	1.00% NSR ²	Grota do Cirilo	Brazil	Hard Rock	Spodumene	Construction	FS
4 Zijin Mining	1.00% GOR ³	Tres Quebradas	Argentina	Brine	Carbonate	Construction	FS
5 Ganfeng	0.50% NSR ³	Mariana	Argentina	Brine	Chloride / Carbonate	Construction	PEA
6 Sinova Global ⁴	8.00% - 4.00% GOR ⁴	Horse Creek	Canada	Silica Quartz	Silica Quartz	Construction	FS
7 Sayona Mining	2.50% - 1.50% GOR ^{5,6}	Moblan	Canada	Hard Rock	Spodumene	Development	- ⁹
8 Sayona Mining	2.00% NSR	Tansim	Canada	Hard Rock	Spodumene	Development	IGR
9 Euro Lithium	Various ⁷	Valjevo	Serbia	Clay	Carbonate / Boric Acid	Development	PEA
10 & 11 Winsome Resources	4.00% GOR ⁸ & 1.00% NSR	Cancet	Canada	Hard Rock	Spodumene	Development	IGR
12 & 13 Winsome Resources	4.00% GOR ⁸ & 2.00% NSR	Adina	Canada	Hard Rock	Spodumene	Development	IGR
14 Winsome Resources	4.00% GOR	Sirmac-Clapier	Canada	Hard Rock	Spodumene	Development	IGR
15 Grid Metals	2.00% GOR	Donner Lake	Canada	Hard Rock	Spodumene	Development	- ¹⁰
16 Grid Metals	2.00% GOR	Campus Creek	Canada	Hard Rock	Spodumene	Development	-
17 Lithium Springs	1.50% GOR	Lithium Springs	Australia	Hard Rock	Spodumene	Development	-
18 Noram Lithium	1.00% GOR	Zeus	United States	Clay	Carbonate	Development	PEA
19 Bradda Head	2.00% GOR	Basin E & W / Wikieup	United States	Clay	Hydroxide	Development	MRE
20 ACME Lithium	2.00% GOR	Shatford Lake / Cat-Euclid Lake	Canada	Hard Rock	Spodumene	Development	-
21 Red Dirt	1.00% GOR	Yinnetharra	Australia	Hard Rock	Spodumene	Development	-
22 Morella	1.50% GOR	Malina	Australia	Hard Rock	Spodumene	Development	-
23 Morella	1.25% GOR	Tabba Tabba	Australia	Hard Rock	Spodumene	Development	-
24 Morella	1.25% GOR ⁸	Mt Edon	Australia	Hard Rock	Spodumene	Development	-
25 Green Technology	1.00% GOR	Seymour Lake	Canada	Hard Rock	Spodumene	Development	MRE
26 Green Technology	1.00% GOR	Root Lake	Canada	Hard Rock	Spodumene	Development	-
27 Green Technology	1.00% GOR	Wisa Lake	Canada	Hard Rock	Spodumene	Development	-
28 Larvito	1.00% GOR	Eyre	Australia	Hard Rock	Spodumene	Development	-
29 Anso Lithium	1.25% GOR	Kaustinen / Ilmajoki	Finland	Hard Rock	Spodumene	Development	-

¹ Initially assessed at 1.18% of gross revenues. Once Core Lithium achieves certain milestones and LRC makes a contingent payment, each of which is anticipated to occur no later than June 2023, the royalty rate will increase to 2.5%.
² Altius Minerals Corporation has a 10% indirect interest in this royalty.
³ Pilot production at the Horse Creek quarry took place in the third quarter of 2021. Commercial production is anticipated to commence in 2023.
⁴ 8.0% of annual gross revenues up to \$45M and 4.0% on any portion of annual gross revenues in excess of \$45M.
⁵ 2.5% of gross revenues for the first 10 Mtpa and 1.5% of gross revenue for any tonnes of ore produced thereafter.
⁶ Royalty is payable only on production attributable to the ownership interest of the royalty payor in the relevant property, which ownership interest is less than 100%.
⁷ See detailed description in the prospectus.
⁸ Certain tenements comprising the property are assessed at 3.0% of quarterly gross revenues.
⁹ While Moblan has a historical technical report, it is currently in the process of preparing a new and updated Preliminary Feasibility Study, with a Definitive Feasibility Study to follow.
¹⁰ Grid Metals has indicated that Mineral Resources declared at Donner Lake are historical in nature and not NI 43-101 compliant. The historical resource estimate is not considered as a current Mineral Resource estimate. A qualified person has not done sufficient work to classify the historical estimate as a current Mineral Resource or Mineral Reserve.

Source: Lithium Royalty [Corporate Presentation](#)

Final thoughts

Given the Company just reorganized into the publicly traded entity we have today, my numbers could be a little off. My math suggests the Company finished 2022 with US\$35 million in cash, raised a net amount of C\$100 million as part of the go-public transaction, and acquired its 30th royalty position (not included in the above table) for US\$1.8 million. Using today's exchange rate that puts cash available to pursue additional royalties at roughly US\$108 million.

There are currently just over 55 million shares outstanding which puts Lithium Royalty's market cap at C\$818 million (US\$604 million).

Mixed Signals for the Lithium Market as China Spot Prices Decline but M&A Paints a Bullish Picture

written by Matt Bohlsen | May 10, 2023

So far in 2023, the lithium sector is a mix of good news and bad news.

The bad news relates to the China lithium carbonate spot price collapsing, [now down ~65%](#) (see chart below) from its crazy high of CNY 600,000/t (US\$87,272/t) in late 2022. Contract prices remain strong and lithium hydroxide ([~US40,000/t](#)) and spodumene ([US\\$3,810/t](#)) spot prices have been less impacted, but have still fallen about 1/3 to 1/2 from their recent highs.

The good news relates to the fact that the leading lithium companies and [most analysts](#) remain very bullish on lithium in the mid to long term. We saw this very recently with [Albemarle Corporation](#)'s (NYSE: ALB) A\$5.2 billion (US\$3.4 billion) [takeover offer](#), at a 69% premium, for [Liontown Resources Limited](#) (ASX: LTR). Little wonder investors seem confused. Is the lithium boom over, or is it just getting started?

China lithium carbonate spot price collapsing

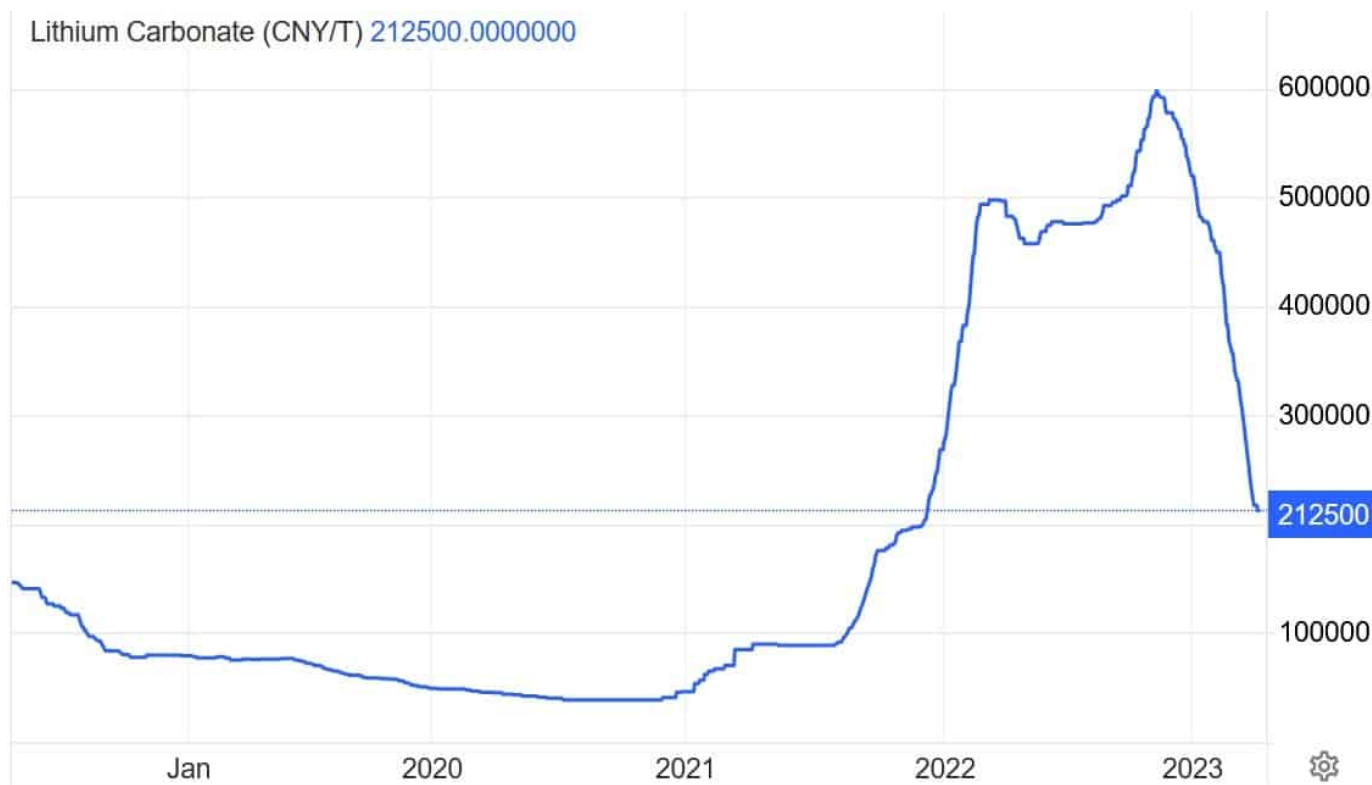
As shown in the chart below, the China lithium carbonate spot price had a meteoric rise in 2022 and is now collapsing in 2023.

The main reasons for the downturn in price are a slowdown in China's new energy vehicle ("NEV") sales growth in 2023 and the Chinese cathode and battery suppliers running down inventory thereby delaying lithium purchases in order to get a lower price. Also, liquidity in the China spot market has been rather low in Q1/2023.

China NEV sales in January 2023 saw [an 8% year-over-year \("YoY"\) fall](#), due to the China federal NEV subsidies ending, Covid-19 impacts, and the Chinese New Year falling in January. February saw China NEV sales recover and [rise by 56% YoY](#), and March saw sales [rise by 34.8% YoY](#). As a result, in Q1/2023, China saw NEV sales [rise 26.1% YoY](#) and reach a total of nearly [1.59 million](#) units. The first quarter is always the slowest month for NEV sales in China, so the seasonal slowdown from Q4/2022 to Q1/2023 was also a significant factor.

The Q1/2023 26.1% growth is not bad considering the poor January; however to keep the lithium market in balance between supply and demand, Trend Investing forecasts we need global plugin electric car growth to be at [36% YoY](#). In other words, China's NEV sales growth rate in Q1/2023 of 26.1% is lagging below the 36% global growth rate needed in 2023.

China lithium carbonate spot price – 5-year chart



Source: Trading Economics

Albemarle's A\$5.2 billion (US\$3.4 billion) takeover offer for Lontown Resources

If we are in a lithium bear market, why is the lithium leader, Albemarle, offering to buy Lontown Resources at a [69% premium](#) to its 30-day volume weighted average price ("VWAP")? And willing to outlay A\$5.2 billion (US\$3.4 billion)?

The short answer is that Albemarle sees the longer-term picture, that is lithium demand is set to [grow ~35x from 2020 to 2037](#) according to Trend Investing, or [13-42x](#) from 2020 to 2040 according to the IEA.

Also, the fact that tier 1 lithium assets are rare. Lontown Resources 100% owned Kathleen Valley Project is a tier 1 global resource, one of the top 5 largest lithium spodumene resources globally. The resource estimate is a massive [156MT @ 1.4% Li₂O](#). The project is at the advanced stage with production set to

begin in [mid-2024](#) and initially ramp up to about 600,000 tonnes per annum (“tpa”) of spodumene.

Albemarle is playing the long game and understands the lithium market better than most. They want to secure another tier 1 long-life mine in Australia just as they did when they bought Rockwood Holdings Inc. (former owner of the [Greenbushes Mine](#)) for [US\\$6.2 billion](#) in 2014. The reason then was “[to capture the upside potential from the electrification of automobiles](#) that’s likely to occur over the next several years”. The reason to buy Liontown Resources is the same today.

Lithium demand should surge in 2024 and 2025 as new EV segments hit the market

The second half of 2023 should see the Cybertruck from Tesla (Nasdaq: TSLA) finally begin production and a [rapid ramp-up in 2024](#). We will also see in 2024 a strong ramp-up in sales of other pickup trucks in the USA from Ford, GM, Ram (Stellantis), and others. With reportedly [over 1.6 million reservations](#) for Tesla Cybertruck and a battery size twice that of a Model 3 RWD, the Cybertruck alone will cause a bump in lithium demand.

Then in late 2024 or 2025, we should see Tesla potentially start production of their compact car, with plans ‘reportedly’ to produce [4 million per year](#). BYD is already producing great value compact cars (Dolphin, Seagull, etc) in China at very affordable prices [well under US\\$20,000](#). BYD plans to sell “[at least 3 million](#)” plugin electric cars in 2023. It looks like by 2025, Tesla and BYD alone could be selling 10 million electric cars per year combined, which would be almost the same as the entire market in 2022 of [10.522 million](#). That’s how fast things are changing! Global electric car sales are forecast to almost double in just 2 years from 10.5 million in 2022 to [~20 million](#) in 2024, according to Trend Investing.

The limiting factor for auto OEMs will be securing batteries and their limiting factor is lithium.

Electric pickup trucks will soon be as popular as Tesla Model 3 in the USA, after that will be millions of compact electric cars potentially in 2025



Source: [iStock](#)

Closing remarks

So far in 2023, it has been a year of contradictions in the lithium market. Collapsing China spot lithium carbonate price paints a bearish picture, yet a multi-billion dollar takeover offer at a 69% premium price paints a bullish picture.

The conclusion is rather simple. Short-term lithium price action is a result of a China Q1/2023 NEV slowdown in growth, just as a wave of new lithium supply is hitting the markets. Chinese

cathode and battery makers winding down inventory has helped them achieve lower pricing, but cannot go on too much longer. New emissions rules in China come into effect from July 1, 2023 which should boost NEV sales. Combined with strong demand from the USA boosted by the IRA incentives, and Europe embracing EVs, means that H2, 2023 should start to see some strong recovery in global EV sales and hence lithium prices. This assumes we are not in a severe global recession by then.

Looking out to the rest of the decade and it continues to look like lithium supply is the limiting factor for the EV boom, which means quality lithium miners should be the long term winners. But remember as is usual in the mining sector, expect to see large price swings up and down, even in a lithium supercycle.

Lithium Ionic Expands Holdings in Emerging Brazilian Lithium Province and Reports Promising Drill Results

written by InvestorNews | May 10, 2023

When I [first wrote](#) about [Lithium Ionic Corp.](#) (TSXV: LTH | OTCQB: LTHCF) in early December, the focus of the story was on closeology (the main project was near [Companhia Brasileira de Lítio's \(CBL\)](#) Cachoeira lithium mine and [Sigma Lithium Corporation](#) (TSXV: SGML | NASDAQ: SGML) construction-stage Grota do Cirilo project) and an active drilling program. All those

things are still true but the Company has added another key aspect to the business over the last few months – expanding its land holdings in the prolific [Araçuaí Pegmatite District](#) in Minas Gerais State, Brazil. In fact, last December this Canadian-based lithium-focused mining company boasted properties covering approximately 2,000 hectares. At least four transactions later, including one announced the day the last article was published, Lithium Ionic now has various working interests in over 14,000 hectares, a 600% increase.

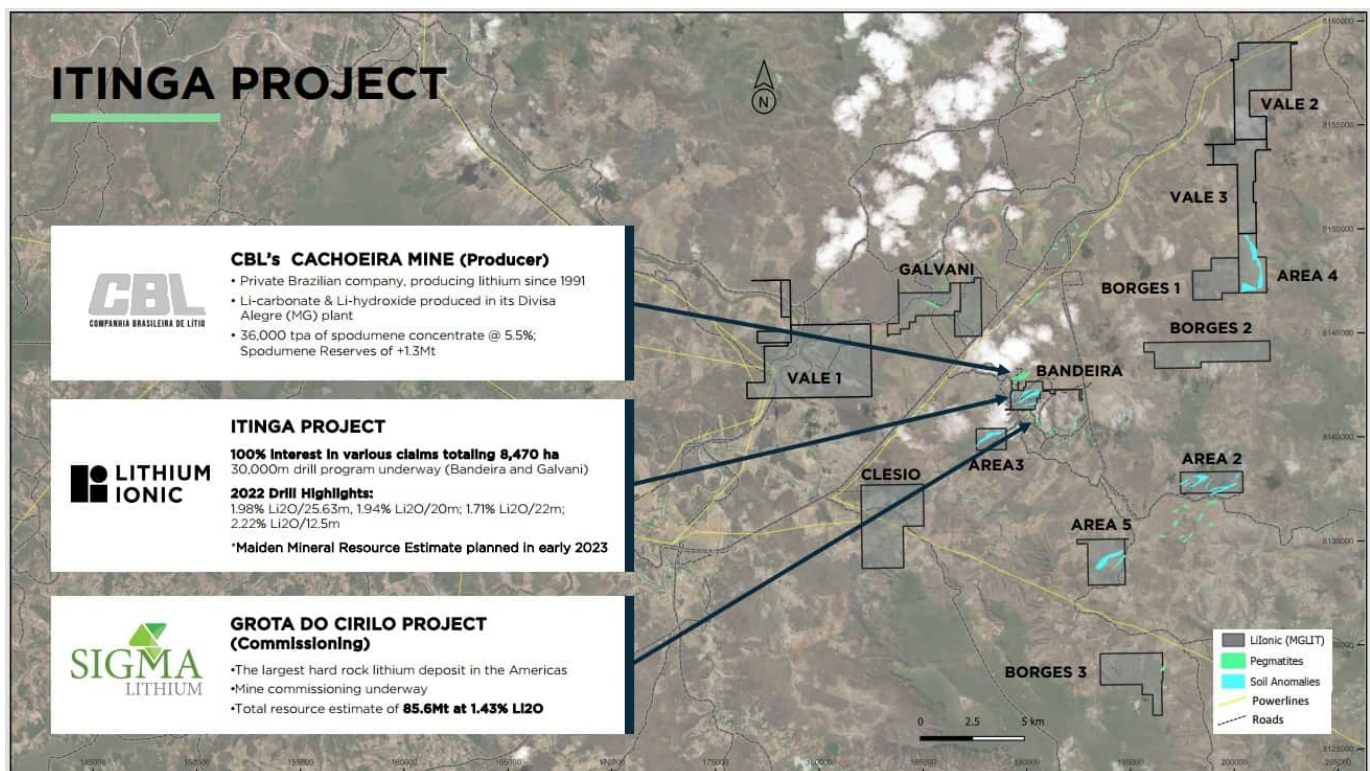
Brazil's Araçuaí Pegmatite District hosts 100% of Brazil's official lithium reserves

I will concede that simply adding a whole bunch of prospective mining claims is no guarantee of success but let's have a closer look at what the Company has picked up and the region as a whole to try and gain some perspective. The Araçuaí Pegmatite District (APD) is emerging as one of the largest lithium spodumene provinces in the world. This prolific Eastern Brazilian Pegmatite Province is known for its large and high-grade hard-rock lithium deposits. It is also considered an under-explored region that presently hosts 100% of Brazil's official lithium reserves. The area is also well positioned, hosting excellent infrastructure including highways, access to hydroelectrical grid power, water, and nearby commercial ports. Lastly, Minas Gerais state is considered Brazil's most favorable mining jurisdiction with a highly efficient and expeditious permitting process.

That's all a great starting point, but in itself isn't enough to attract more than the most speculative of investors. Fortunately, there's a lot more meat on this bone. More specifically, Lithium Ionic's most active properties within its [Itinga project](#) – Bandeira and Galvani, which were the focus of

last December's [closeology article](#), are already in the heart of this emerging lithium jurisdiction. Bandeira is situated roughly 500 meters south of CBL's producing Cachoeira lithium mine (36,000 tpa of spodumene concentrate at 5.5% Li₂O), which has been producing lithium for over 30 years. Bandeira is also approximately 700 meters north of Sigma Lithium's Barreiro lithium deposit. Galvani is located approximately 2 km west of Sigma Lithium's large Xuxa lithium deposit and 3 km northwest of CBL's lithium mining operation.

Lithium Ionic's Itinga Project (Bandeira, Galvani, Area 2-5, Borges 1-3, Clesio, and Vale 1-3), and Other Company's Regional Projects (CBL and Sigma Lithium)



Source: Lithium Ionic [Corporate Presentation](#)

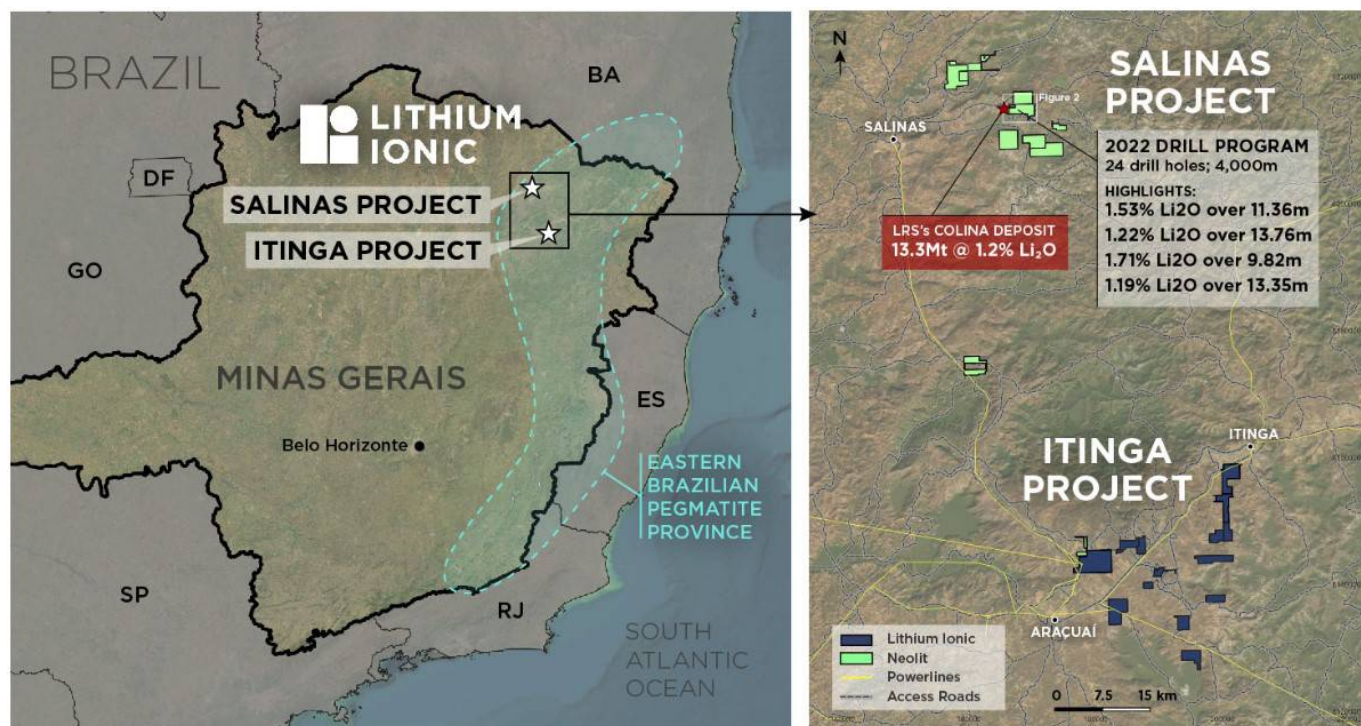
The picture above also shows most of the new acquisitions the Company has made since December including [Borges](#), [Clesio](#), and [Vale](#) and their proximity to existing known resources. However, the latest deal also has some closeology of its own and comes

with its own drilling results. On March 13th, Lithium Ionic [announced](#) that it had acquired Neolit Minerals Participações Ltda., a Brazilian company that owns a 40% interest in the Salinas Project with the right to acquire up to an 85% ownership in the Project. The Salinas Project, located approximately 100 km north of Lithium Ionic's Itinga Project, includes nine exploration tenements totaling 5,713 hectares and is located directly adjacent to Latin Resources' Colina lithium deposit, which contains an estimated 13.3Mt @ 1.2% Li₂O.

Neolit's 4,000-meter, 24-hole maiden drill program from August 2022 yielded the following highlights:

- 1.53% Li₂O over 11.36m from 43.84m (SL0E-D014)
- 1.22% Li₂O over 13.76m from 36.60m (SL0E-D015)
- 1.71% Li₂O over 9.82m from 97.70m (SL0E-D013)
- 1.19% Li₂O over 13.35m from 239.65m (SL0E-D018)

**Lithium Ionic's Recently Acquired Salanis Project:
~100 km north of the Itinga Project**



Source: Lithium Ionic March 13, 2023 [Press Release](#)

With Healthy Balance Sheet, Drill Results Continue to Flow

But let's not forget what typically gets investors in exploration companies excited – drill results. Late December Lithium Ionic [reported drilling highlights](#) of 1.71% Li₂O over 5.7m, 1.49% Li₂O over 6.7m, and 2.22% Li₂O over 3.7m, at its Bandeira Deposit.

Additional drill results from the Company's ongoing 30,000-meter drill program at Bandeira were press released on January 24th and included:

- 1.69% Li₂O over 9.6m,
- 1.27% Li₂O over 10m, and
- 1.61% Li₂O over 4.7m.

And then literally as this article was about to be posted, the

[latest drill results](#) from Bandeira came out, highlighted by:

- 1.43% Li₂O over 17.1m,
- 1.73% Li₂O over 13.6m, and
- 1.47% Li₂O over 15m.

This brings the total drilled to date to 20,000 meters and identifies the discovery of multiple thicker and higher-grade intercepts that have extended several well-mineralized pegmatite veins to over 400 metres down dip. These latest results represent the widest and strongest lithium intercepts encountered at Bandeira to date.

Upcoming Catalysts

There are plenty of catalysts going forward. Lithium Ionic entered 2023 with a strong balance sheet of approximately C\$30 million. Exploration activities are planned to continue throughout the year, including intentions to initiate a 20,000-meter drill program at the newly acquired Salinas project in the coming months.

As well, the Company has mobilized a sixth drill rig with four rigs at Bandeira and two at Galvani as it works towards completing a maiden NI 43-101 compliant mineral resource estimate by the end of June, which will form the basis for a feasibility study in the second half of the year.

And you can bet that the Company will likely continue to review prospective strategic acquisitions given how busy they've been over the last 4 months.

Lithium Ionic trades at a market cap of approximately C\$250 million.

Lithium Prices Soar as Demand Surges Amid EV Boom, But Is the Bull Run Sustainable?

written by InvestorNews | May 10, 2023

Most commodities are cyclical in nature. The ebb and flow of demand, potentially from a new application or general growth, which in turn makes the supply of that commodity scarce can cause prices to rise, sometimes dramatically. This is followed by a supply response that typically is too effective (because everyone wants to partake in the high commodity price) and eventually, the demand is outstripped by supply, commodity prices in turn fall or outright collapse and the cycle repeats.

In the case of lithium, we've been seeing demand surge as the electric vehicle (EV) revolution accelerates while the ever-increasing supply is failing to keep pace. There are lithium headlines in the news all the time now, with the likes of [General Motors Co.](#) (NYSE: GM) and [Tesla, Inc.](#) (NASDAQ: TSLA) inking supply deals with producers or the speculation of deals. It would appear we are in the heart of a bull market for lithium....or are we?

Lithium Boom – 1950s

This isn't the first lithium boom the world has seen. You may be surprised to learn that the first one began in the 1950s when the world's primary source of lithium came from North Carolina. Lithium was extracted from spodumene (hard rock) and was a key

component of the military's H-bomb program. As a reference point, by the mid-1970s U.S. lithium production was roughly 2,900 tons per year. (1 US ton = 0.97 metric tonne)

Lithium Boom – 1990s

Lithium's next rally occurred in the early 1990s when Sony first began production of the lithium-ion battery used in consumer electronics. By the end of 1991, Sony had ramped up production to 100,000 batteries a month. Enter Sociedad Química y Minera de Chile S.A., or SQM, the Chilean fertilizer and mining company which began selling lithium (from brine) in late 1996, almost immediately lithium carbonate prices fell by a third, to US\$2,000 a ton. This marked the end of the existing American lithium industry.

Current Lithium Production By Country (2021)

Rank	Country	2021 Production (tonnes)	% of Total
#1	Australia 🇦🇺	55,416	52%
#2	Chile 🇨🇱	26,000	25%
#3	China 🇨🇳	14,000	13%
#4	Argentina 🇦🇷	5,967	6%
#5	Brazil 🇧🇷	1,500	1%
#6	Zimbabwe 🇿🇼	1,200	1%
#7	Portugal 🇵🇹	900	1%
#8	United States 🇺🇸	900	1%
	Rest of World 🌐	102	0.1%
	Total	105,984	100%

Source: [World Economic Forum](#)

Lithium Boom – Today!

Fast forward to today and in November we saw lithium prices surge above US\$80,000/tonne in a sign that supply was definitely not keeping pace with the huge increase in demand sparked by EVs. You have wildly [bullish forecasts](#) suggesting supply needs to grow somewhere between 150,000 to 200,000 tonnes every single year.

For more perspective, consider that Tesla is targeting the manufacture of 20 million EVs per year by 2030. In order to produce those vehicles in a year, Tesla will need more lithium than was produced in the world last year, which could explain why the market was all excited when [Bloomberg reported](#) Tesla has been discussing a possible bid for [Sigma Lithium Corporation](#) (TSXV: SGML | NASDAQ: SGML).

And speaking of Sigma Lithium, have a look at their 2 year chart!



Source: [StockCharts.com](https://stockcharts.com)

Investors should be very happy with a 10x move in just under 2 years. There have also been some pretty good runs for some of

the Canadian hard rock lithium names. A quick look at the one-year chart for Critical Elements Lithium Corporation (TSXV: CRE | OTCQX: CRECF) and Patriot Battery Metals (TSXV: PMET | OTCQX: PMETF) and you'll see a double and another 10 bagger. It suggests that we may not be in the early innings of this game.

When all this starts to become prevalent in the news cycle, I start to get a little concerned. It's almost like fanatic optimism is a harbinger that the cycle is about to end. I know that isn't very scientific, but let's look a little closer at what I'm getting at. Capital solves problems. With the lithium price at current levels, lithium mines are some of the most profitable in the whole mining sector. One could surmise that supply might respond more rapidly than currently forecast with lots of capital being thrown at exploration and development at present. I wouldn't be surprised if Investment Bankers are cold-calling anyone involved with lithium right now to see if they would like to raise capital. On top of that, when you have the likes of Tesla, GM, etc. buying into producers it tends to stretch valuations beyond anything that would otherwise seem reasonable. M&A, especially by companies not actually in the mining business, can often be considered a sign that we are getting close to a top. Again, not scientific by any stretch of the imagination but it also typically isn't sustainable behaviour.

Is this a Market Top?

I'm not suggesting lithium is going back to US\$2,000/ton but we have seen the price retreat to just over US\$60,000/tonne largely due to the Chinese market seeing lower subsidies for electrified vehicles and weak consumer confidence. With that said, lithium is still worth eight times more than it was before 2021 and still wildly profitable for both hard rock and brine producers.

Is this a sign that the current bull run for lithium prices is over or just taking a breather before it settles into a new price range or perhaps starts to climb again? I guess it depends on your time frame. Traders may want to look at taking a little profit off the table for now, long term buy and hold investors may not even be paying attention to the day-to-day noise in the market and be comfortable holding lithium equities for the foreseeable future.

My caution to anyone wildly bullish on lithium prices and the corresponding mining companies is this – there are a lot of smart capitalists out there and if a component becomes the most expensive part of your product, a lot of effort will be spent to try and find a replacement or an alternative. I also have a nagging concern that at some point in time, the rapid adoption of EVs may overwhelm the electric grid and put a hard stop to EV growth (at least temporarily). Either of these scenarios could have a sudden and very negative impact on lithium prices but not likely in the near future. So when it comes to investing in lithium, make sure your risk tolerance matches your investment exposure.

Economy of Scale – A Misused Metric in Mining

written by Jack Lifton | May 10, 2023

I was surprised earlier this week to see an article in the Wall Street Journal in which the rule of “economy of scale” was mistakenly used with regard to the output of a mine to predict that the price of lithium would fall as mine output increased.

The author did not seem to understand, and his quoted “experts” didn’t seem to care, that mines are not organic, they don’t continuously renew their ore bodies, nor are concentrations of hard rock minerals uniform, so that such mines have limited useful lifetimes. The concentrations of the minerals first sought out for extraction are always the highest in the deposit, so that as the extraction of the ore continues lower and lower grades are encountered until it becomes uneconomical, at the price then realized for the ore, to continue “mining” it. Economic assessments of the value of the mine describe this metric as the “life of the mine.” The enormous cost of setting up a mining and beneficiating (concentrating) operation assumes that it is unlikely that some new and more economical method of beneficiation will be discovered, and be experimented upon and proven effective, during the life of a mine, so that the life of the mine could be extended economically by enabling the economically effective processing of lower grade ores. Mines are designed with “best practices” at the time of the construction. It is not assumed that new technologies will be discovered during the life of the mine that will extend its life.

Yet, on the 23rd of January, the following sentence appeared in an article about the future supply and price of lithium: “Increasing production, which typically has the effect of reducing unit costs through economies of scale, will likely be the primary source of growth in the industry this year.”

Mine production decisions will of course be dependent upon the price of the mineral being mined. Gold mines are typically opened and shut down and then reopened, for example, by the price of gold dropping to less than the cost of extracting it and then bouncing back. Note well that gold is often mined in grades of just a few parts per million, because its value is as much as \$2,000.00/oz or more than \$60/gram.

Lithium, today, is produced from two types of "deposits." One, is hard rock minerals, the best known of which is spodumene and the largest deposits of which are in Australia. The other is from brines typically found in deserts, which may range in "grade" from the 3000+ grams per ton in the vast brine deposits of Chile to, more typically, 300-1000 grams/ton in the more typical desert brines of Chile, Argentina, and Bolivia.

Most of the lithium produced today comes from spodumene mining in Australia. The golden triangle of South American nations contribute less than 40% from their brines due to the enormous costs and time required to dry and process the brine to recover the lithium.

One may ask why are brines, in particular the vast ones in Chile, which have uniform concentration not dominant in the production of lithium. The answer, always, is cost including the cost of time. The brines must be evaporated in order to bring the lithium concentration to 20,000 parts per million (2 percent), at which concentration they can be processed to selectively recover the lithium. The Wall Street Journal writer would probably ask why not just increase production to lower costs? The answer here is cost, and the cost involved is that of time. It takes 18 months for the brine to be evaporated in the sun (the amounts necessary are simply too vast, one million tons of water must be evaporated to produce 3,000 tons of lithium in Chile's Atacama Desert, for example, to even consider pumping the brines to fossil fuel heated tanks. Note, by contrast, that the production of one million tons of spodumene can recover 60,000 tons of lithium. But again that is an energy and reagent (sulphuric acid at high pressure and temperature) intensive operation, so it is very costly.

I have been told, privately, by the CEO of a large brine operation that his judgement is that lithium production may

double by 2025, but that even holding that level of production, economically, depends entirely on the market price of lithium and the price of energy, so that the very high prices of today, a response to the law of supply and demand caused by the lithium industry's inability to keep up with the surging demand for EV and stationary storage batteries, are, as always, the driver of supply. Should the price of lithium drop as precipitously as it has risen, or if the cost of energy rises too much, that part of the lithium supply dependent on high prices will close (at least in the capitalist "free market" economies).

Economy of scale does not apply here. It is an inapplicable metric in mining. Miners always want the prices of minerals to rise, not decline!

Banking on a critical minerals closeology heyday

written by InvestorNews | May 10, 2023

Regional mining plays or area plays can be quite exciting for investors if you are a participant in the early stages. Generally speaking, someone announces some exciting results and if there is any unstaked land in the regions, dozens of opportunists will stake claims in the vicinity in hopes that [closeology](#) will benefit them. The most recent example I can think of was sparked by [New Found Gold Corp.](#) (TSXV: NFG | NYSE American: NFGC) in mid-2020. They came out of the starting blocks with some incredible gold drill results in Newfoundland & Labrador. They quickly followed up with a bunch more out of this world drill holes, and all of a sudden, if you were a

Newfoundland gold play, you were along for the ride. Every time NFG posted results, almost everyone in the general vicinity got a lift to their stock price.

It's that early stage that creates the most excitement and euphoria because of all the blue sky potential. Albeit, if you bet on a player in the region that finally starts drilling their own play and results aren't spectacular, things can come crashing down in a hurry. But until that time, it's relatively easy for other players in the general vicinity to raise money and get a premium stock price on the back of the area player(s) that started it all. It can be a lot of fun (and quite lucrative) if you are early enough and disciplined enough to have tight stop loss orders or reduce exposure as the stocks jump around on news and rumors.

My introduction to this phenomenon was in the early 1990's when two distinct and separate opportunities began to take shape. One was the discovery of diamonds in the Northwest Territories. Soon everyone was staking claims and obscure places like Lac de Gras and Snap Lake became well known to a lot of investors who still may not be able to find them on a map. Around that same time was the huge nickel discovery in Voisey's Bay, Newfoundland & Labrador that spawned a frenzy that would be hard to replicate, even today. There were dozens of publicly traded junior miners, some legit and some that pushed the legal limits when it comes to disclosure. Fortunately, between the Voisey's Bay insanity and the Bre-X fiasco, reporting and legitimacy of drill results and resource estimates are something most investors don't have to worry about anymore.

I think we may be on the cusp of another regional mining play but perhaps driven by a couple of extra factors that seem to be important investing themes of late – supplying the carbon emission reduction machine and “friend-shoring” or supply chain

security. It should come as no surprise to readers that this is a recurring theme at [InvestorIntel](#). Governments are passing legislation and doling out cash to support local supply, processing and infrastructure of critical minerals, while at the same time attempting to minimize or even eliminate Chinese influence. That is a tailwind for domestic mining companies, at least for the next few years.

So what do I think could be the next big regional mining play? Drum roll please...lithium. More specifically, hard rock lithium or pegmatite in Ontario and Quebec. Obviously, lithium has been a hot place for investors for quite some time now, but the bulk of the excitement was being generated by the big brine plays, mostly in South America. There have already been several big winners there including lots of M&A resulting in a lot of money made by investors.

With that said there has already been some pretty good runs for some of the Canadian lithium names. A quick look at the one year chart for [Critical Elements Lithium Corporation](#) (TSXV: CRE | OTCQX: CRECF) and [Patriot Battery Metals Inc.](#) (TSXV: PMET | OTCQX: PMETF | ASX: PMT) and you'll see double and a 10 bagger. But I think we are still in the early innings for this part of the world. Primarily because the market is desperate for non-Chinese owned, controlled or processed lithium supply. Additionally, hardrock lithium is simple, understood, and there appears to be plenty of it not far from key EV battery manufacturing locations in Ontario, Quebec and Michigan.

Another reason I think things could get really spicy for this area play is that most of the deposits identified thus far have been close to surface. That means a little bit of capital will go a long way to generating plenty of drill results for the market to chew on. Lots of news in a relatively short period of time keeps the momentum going and draws in more investment

dollars that in turn raises the premium of almost everyone in the region (at least initially). Add the potential wildcard of a takeover by a mining major and you could see share prices kick into overdrive. And why would I suggest something like this? Mining giant Rio Tinto (NYSE: RIO) recently stated it is actively searching for lithium assets as it expects prices for the metal to remain high for a long period of time.

To me, all the pieces seem to be falling into place for the type of focused regional mining play that can result in some pretty wild stock gyrations in a relatively short period of time. You have to be wary and nimble to achieve success when participating in this type of opportunity, but the rewards can be worth it. Ontario and Quebec are emerging as top lithium areas in mining friendly jurisdictions. Now the question is whether big money will start chasing this space and reward early investors.

The ‘closeology’ textbook suggests we all enjoy a Lithium Ionic read

written by InvestorNews | May 10, 2023

Because the world isn't already confusing enough, I thought I'd share my latest trip down the rabbit hole. Today I'm writing about a lithium explorer, so one of the things I thought I'd review was the underlying commodity price. I knew it had surged to record levels recently but was taking a bit of a breather, I wanted to know if the price had come off a little or a lot. The first number I got when I googled the price of lithium was

US\$0.0007898. That seemed like a weird number so I figured I'd better see what measurement that was based on. Maybe some exchange started tracking lithium in milligrams or something. Nope, some marketing genius decided to hop on the rocketing global demand for lithium by creating a crypto coin called [lithium](#) that is part of the decentralized NFT valuation protocol. Do not be concerned, the actual commodity is still trading near all-time record highs which should be exceedingly profitable for any producer that can get it to market.

Now that we've cleared that up, let's move on to a textbook "closeology" example in the lithium world. I find closeology, or proximity to an existing discovery, is often an encouraging starting point. If for no other reason than you can potentially get a decent trade out of it. A great example was the Newfoundland gold rush of 2021 that was sparked by New Found Gold Corp.'s (TSXV: NFG | NYSE-A: NFGC) incredible drill results that lead to a pretty good rally in virtually every gold explorer that declared they had mining claims in Newfoundland. Unfortunately, since then, gold stocks have been abandoned (until the last week or two), and if you didn't start matching New Found Gold's results it turned into a double whammy. However, today's example won't be for lack of trying as the company has a well-stocked treasury and 5 drills turning, looking for one of the hottest commodities on the planet right now.

That company is [Lithium Ionic Corp.](#) (TSXV: LTH | OTCQB: LTHCF), a Canadian-based lithium-focused mining company with properties covering ~2,000 hectares located in the prolific Aracuai lithium province in Minas Gerais State, Brazil, which boasts excellent infrastructure, including highways, access to hydroelectrical grid power, water, and nearby commercial ports. They have a vision to develop a commercial grade lithium operation economically and responsibly. To do that they have assembled an

experienced team with a track record in lithium mining, geology, and capital markets that is ideally suited to execute on a disciplined development plan.

Lithium Ionic is actively drilling two prospects, its Galvani claims, as well as Bandeira (formerly Area 1) of its [Itinga claims](#). When it comes to close, I'll let the following picture do the talking.



Source: Lithium Ionic [Corporate Presentation](#)

Bandeira is located south of the operating CBL Lithium Mine and directly north of SIGMA Lithium Corporation's (NASDAQ: SGML | TSXV: SGML) Barreiro project. The Galvani property is located less than 4 kilometres from Sigma Lithium's Xuxa deposit. Another picture will give you an example of the Araçuaí Pegmatite District (APD), where more than a hundred pegmatitic occurrences are known and holds the biggest lithium reserves of Brazil.

PROLIFIC LITHIUM DISTRICT



CBL MINE (Producer)

Private company, producing lithium since 1993
Produces both Li-carbonate and Li-hydroxide in its chemical plant in Divisa Alegre (MG)
36,000 tpy of SPO concentrate @ 5.5%; Spodumene Reserves of +1.3Mt
33.3% owned by Brazilian private equity firm, Ore Investment



ITINGA PROJECT, Bandeira + Areas 2-5 (Exploration)

100% interest in +1,300 hectares
30,000m drilling program underway (focus on Bandeira)

GALVANI CLAIMS

Claims acquired in Sept. 2022; drill program underway
Highlights: 1.98% Li2O/25.63m, 1.94% Li2O/20m; 1.71% Li2O/22m; 2.22% Li2O/12.5m



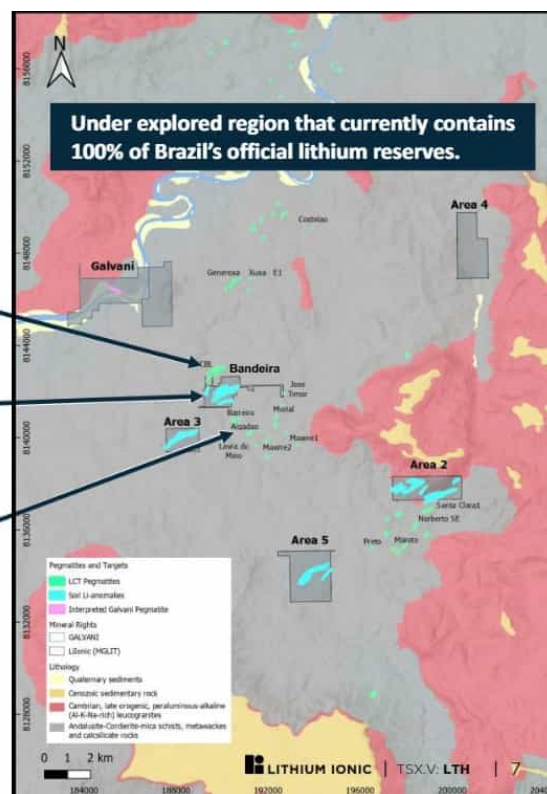
GROTA DO CIRILO PROJECT (Under Construction)

The largest hard rock lithium deposit in the Americas
Project under construction; production slated in late 2022
NI 43-101 resource estimate of 52Mt
Phased development: initially 33,000 tpy LCE as SPO concentrate; eventually expected to produce 531,000 tpy LCE from 2 deposits



SALINAS PROJECTS (Exploration)

Bananal Valley: 1,250 ha; Salinas South: 4,088 ha
Drilling initiated in early 2022
(~60kms North of Galvani)



Source: Lithium Ionic [Corporate Presentation](#)

The reason I'm fixating on closeology is actually more to do with Sigma Lithium than CBL. The reason being, Sigma now hosts the largest hard rock lithium deposit in the Americas, with proven and probable mineral reserves of 54.8 Mt of lithium spodumene at 1.44% lithium oxide. And they've done this very quickly, going from less than US\$1.50/share in June, 2020 to over US\$35/share currently. That's a market cap of US\$3.5 billion. It's not hard to imagine that if Lithium Ionic can start putting up some significant resource numbers that the market will take notice. Especially those who may have missed out on the tremendous run that Sigma has had.

The question becomes, how can Lithium Ionic get there from here. The Company has roughly C\$35 million in working capital, is in the midst of a 30,000 meter drill program with 5 drills operating along with additional regional exploration work ongoing. They expect to produce an inaugural mineral resource estimate in Q1 2023 with drilling updates coming out every 6-8

weeks. And thus far those updates have been solid with the results [announced in early November](#) that included 1.98% Li2O over 25.63 meters representing the strongest grades in the Galvani area encountered since the Company began drilling earlier this year. In the same press release, Lithium Ionic reported values of 1.99% Li2O over 6.75m, 1.56% Li2O over 3.90m and 1.44% Li2O over 8.33m all located within 50 meters from surface at its Bandeira project.

You can see the potential is there, although Lithium Ionic is not exactly a hidden gem with a current market cap of roughly C\$216 million. However, what I find interesting is that the Company [raised C\\$25 million](#) in October of this year at C\$1.60/share and the stock has traded above that level since the start of November. Additionally, they didn't have to add warrants to this issue to push it out the door, which tends to be a very positive sign of strong support for the stock. Sigma has shown that the sky's the limit, but you'll need a lot more than closeology to get there.

American OEM automotive industry's big problem with lithium

written by Jack Lifton | May 10, 2023

... and why Elon Musk is wrong.

There isn't enough lithium mined, and there can never be enough lithium mined and processed into end-user forms economically, to replace the use of fossil-fueled internal combustion engines in the powertrain systems of the current one and one-half billion personal and mass transportation vehicles with electric motors powered by rechargeable lithium-ion type storage batteries.

I think that most of the managers of the global OEM automotive, aerospace, and shipbuilding industries know this, but they are powerless in the face of the demands of politicians who have given in to the greens who are unaware of the limitations of physical natural resource production and processing for non fuel minerals, and who rely on the advice of narrowly and poorly educated and just plain dumb "experts" who have credentials but no experience of business operations, real-world economics or even rudimentary geology. The more often these experts repeat such mantras as "settled science" (to prove that climate change is caused by or can be remedied by human activity) or proclaim the unlimited resources of "earth abundant minerals" (to prove that non-fuel natural resources are unlimited) the more destructive their ignorance impacts our cheap energy based (which they neither see nor understand) standard of living and quality of life.

In order to preserve their industry and their high paying jobs long enough until they can safely retire, the current top managers of the global OEM automotive industry have accepted the economic power and poison of the green energy "transition" in making their decisions rather than the free marketplace.

It is typically stated that a modern internal combustion engine powered vehicle has over 6,000 components and that an EV, an electric powered vehicle, is "much" simpler. In fact, the much simpler vehicle still has some 4,000 parts.

Henry Ford pioneered the vertical integration of his eponymous car company in the teens of the last century to avoid being controlled by the natural resource “trusts” (monopolies) of his time. By the early 1920’s the Ford Motor Company manufactured internally all of its necessary component parts except for tires (Ford was a personal and lifelong friend of Harvey Firestone) and produced all of its own needs for electricity.

As the decline of the auto-industrial age proceeded after the oil price shocks of the 1970s the OEMs shed their then advanced vertical integration (almost always in order to raise money to cover losses and declining margins) and adopted just-in-time delivery of necessary parts from the then reborn and expanding external supply base. Rising American labor costs in the 1980s created a mass exodus of OEM automotive suppliers to Mexico and Asia. Shortly thereafter that Asian vehicle makers entered the US markets and rapidly learned enough to destroy the postwar global dominance of the OEM American car industry. Chrysler needed rescuing first, then GM. Ford survived the downsizing better than the others, but like them had to withdraw from the global markets of the heyday of the globalization of the pre-war (WW2) era.

Now, in 2022, the OEM American car and truck assemblers – for that is the correct term for a company that imports all of its components and assembles them into a vehicle – are being told that they must reduce and eliminate the use of imported components and find or develop domestic or friendly nation sources to redevelop domestic vertically integrated manufacturing.

At the same time, they are being told by the government that they must convert all power trains to electric drive fueled by rechargeable storage batteries.

The answer, of course, is to rebuild domestic factories to once again produce the 4000 components per vehicle they will need for EVs. There will be components which are common to both fossil-fueled and electric powertrains and vehicles, but such electromechanical marvels as modern multi-speed transmissions as well as efficient gasoline and diesel fueled internal combustion engines will cease to receive attention and the skills to build them will wither away.

The key component to be researched and manufactured domestically now has become the lithium-ion battery to be used to power the battery electric vehicles to be built. No such mass production industry for this type of component has ever been successfully built or operated by a domestic American company. The supply chain for manufacturing lithium ion batteries for vehicle powertrains does not exist today in the USA.

Let me explain how the contemporary (legacy) global OEM automotive industry finds and chooses among its parts suppliers, so you can understand the dilemma that the contemporary geopolitics of globalization has caused, in particular, in the United States and Europe.

The outside OEM automotive suppliers, of course, must have experience in building and successfully selling the components for the same or same type of use. This is not taken for granted just because of the size or reputation of the seller. All production parts accepted for use by the domestic American OEM automotive industry must undergo the PPAP (production part approval process) and the suppliers must pass a financial due diligence.

PPAP involves real time passing of the test of operating under real-world conditions for at least three years in general and for the life of the part's warranty. For a lithium-ion

powertrain battery, this means today's operation with no more than the stated degradation of capacity for up to 8 years.

Upon passing the PPAP, the due diligence requires that the component meet the following requirements:

- On-time delivery, to specification, in the volumes agreed, and at the agreed price,
- Just-in-time delivery to agreed locations, no matter the weather conditions,
- All parts must meet agreed customer specifications within a narrow quality range, and
- Prices are agreed for the life of a vehicle model

It has been the practice of the OEM automotive industry to make the direct supplier of the component or subassembly, the Tier One supplier, responsible for the all of its (sub) suppliers to meet their PPAP requirements, even if it is the assembler who PPAPs the mechanical and electrical quality of the sub-tier supplier.

Very recently, for the first time in 25 years, the OEM domestic American automotive assemblers have begun to look at the entire supply chains for critical (without them the vehicle cannot be sold) components.

In the last year, General Motors and Ford have announced "agreements" with domestic, non producing, semi-finished raw material suppliers, of lithium and the rare earths, to provide them with raw materials (lithium) and critical component parts (rare earth permanent magnets), which the companies will somehow get processed into the forms necessary to produce rechargeable storage batteries and electric motors from a currently non-existent domestic American manufacturing base.

Tens of billions of dollars have already been allocated by the

domestic American OEM automotive industry to build 7 battery “gigafactories” and several EV platform (the battery plus the electric motor) factories. Among the domestic OEM assemblers nearly 100 billion dollars has also been allocated to the construction of dedicated and multi-functional BEV plants.

The OEM automotive assemblers have [bet the farm](#) that they can become domestic vertically integrated manufacturers of battery powered electric cars and trucks.

Yet, as of today, not one gram of ESG lithium or rare earths is produced in the United States or Canada.

Look at the following chart:



This chart from the IEAE tells you that there is no possibility of producing enough lithium to manufacture the batteries that would be required by the currently planned demand after this year.

I think that the ignorance, by politicians and journalists, of the steps universally and necessarily required in the operations of any and all global original equipment manufacturing business is due to intellectual laziness, intelligence limitations and the rapidly declining coverage and quality of American “education” at all levels. The attempt to eliminate selection by merit, rather than expand it, and replace it with superficial characteristics as the criteria for education has rapidly eroded the ability to select those best qualified for specialized education and training and given over world leadership in science and engineering to Asian nations.

I repeat that the success of a transformation of the fuel for vehicular transportation from liquid fossil fuels to electricity stored on board in rechargeable batteries depends entirely on

the supply of the element lithium.

And that energy and resource illiteracy and innumeracy among our managerial and credentialed classes are the only reason that the domestic American OEM automotive assembly industry has blindly bet the farm on a green fetish pursued by some of the dumbest (or most corrupt, or both) politicians in the history of our Republic.

The BEV revolution will not engender a second Auto-Industrial age in America. It will, in fact, end the dominance of that industry, and ensure that BEVs survive only as luxury vehicles to be driven between enclaves with charging facilities.

Elon Musk tweeted two weeks ago that Tesla may have to get into the lithium mining business. He said that although there is lithium everywhere and lots of it, the mining industry is very slow to bring it to market.

Elon Musk is a brilliant businessman and an even more brilliant financier, but he is a mineral economics moron.

I invite readers to please challenge my assumptions and conclusions with data, logic, experience, and educationally based counterarguments.

Betting the farm on lithium in the short term and the long

term.

written by Jack Lifton | May 10, 2023

Politics Before Economics: The Coming Train Wreck of Peak Lithium, Mandated EVs, and Alternate Electricity Generation

This is the best time ever to invest in lithium mining and processing because the legacy global OEM automotive industry as well as dozens of newcomers, including TESLA, have bet their continued and future existence not on the market but on the politically mandated ultimate replacement of internal combustion engine power trains by rechargeable battery fueled electric ones. This powertrain replacement is to be 100% dependent on lithium-ion batteries to store the electricity (i.e., fuel) to supply the electric motors that will replace fossil fuel using internal combustion engines. These EV batteries are, for their operation, 100% dependent on the chemical element, lithium.

At the same time, the politicians have also decreed that the generation of relatively inexpensive electricity, which today is mostly done by the use of the fossil fuels, coal, oil, and natural gas (with the balance, more than 20%, coming from nuclear) shall be completely replaced by alternate forms of electricity generation dependent upon the wind and the sun with their excess outputs stored until needed in lithium ion batteries. Wind and solar are, at best, intermittent, and they are therefore not remotely reliable or dependable. They exist only because of government subsidies and, worse, mandates. Alternate energy generation being intermittent must be smoothed out (continuously maintained) ideally (in the Green Dream) by backup batteries. This would ultimately require enormous quantities of lithium, more than for EVs, for the gigantic

smoothing and backup systems that would be necessary.

From the perspective of the supply of the key critical battery metal, lithium, these two goals, electrification of mobility and stationary storage of electric power for grid smoothing are competitive with each other for lithium, and this competition shows the complete ignorance of politicians and manufacturers of the fact that the overall demand for lithium from the two mandated uses cannot possibly be supplied from currently existing, planned, or known accessible sources.

A recent article in the Wall Street Journal states that “mining is like anything else. Eventually high prices stimulate more production. But the slow real-world expansion capabilities of mining explain the IMF’s forecast that mineral inflation would last “roughly a decade” until supply catches up.”

This is utter nonsense.

Mining any natural resource is entirely dependent on the physical accessibility of the resource, the grade (concentration) of the desired mineral, the ability of deployable technology to extract the desired mineral, the economics of the processing of the mineral concentrate to a usable form, and that the total costs incurred by the entire supply chain can be borne by the selling price for the end user products enabled or manufactured from that resource.

Supply of anything cannot “catch up” to demand if that supply is limited by a maximum price limit for the demanded form and for the accessibility, grade, and applicable process technology for the “deposit.”

The highest grade accessible and processable deposits of lithium from brine and from hard rock minerals are, respectively, in Chile, Argentina, and Australia. These deposits are already

mined at scale and represent the lowest cost of production today. So, since the highest grade, accessible, physically and technologically, deposits are in production why can't they just ramp up and supply any amounts of lithium needed? Those writers who are ignorant of geology, mineral economics, and geopolitics, and who are not aware of the limitations of contemporary known deposits of natural resources, think that lithium production is organic, i.e., that to get more lithium you simply do more mining. But, in fact, all mineral deposits decline in grade and fall below economic grades after a time. The period during which the mine is projected to be profitable is called, for that reason, the life of the mine.

In 2007 the global production of lithium, measured as metal, was 16,000 tons. In 2021 that figure was 86,000 tons, a 5.5X increase. Yet at the beginning of 2022, the price of metallic lithium, \$60,000 a ton in January 2021 had reached \$360,000 a ton! I note that lithium metal is now more expensive than silver.

Why?

The demand for lithium today just for batteries is 60% of global lithium production, and new battery factories are coming online and being planned and under construction daily. The total demand for lithium for all of these factories by 2025 is calculated to be 2.5 times total global lithium production in 2021. By 2030 that figure would be 5 to 10 times the total global 2021 output of lithium.

It is likely that the lithium supply is already in deficit due to existing battery factories buying for inventory and traders buying for speculation.

The legacy OEM car/truck makers have almost all allocated essentially all of their R&D capital and their new manufacturing

construction to EVs. The better managed ones realizing that the total conversion of their outputs solely to EVs cannot be supported anytime soon, if ever, by the lithium supply chain and that the cost of such vehicles is already prohibitive in the mass market are hedging their bets by continuing to plan for a mixed output of EV and fossil fueled powertrains indefinitely.

Mis-allocations of capital in the most capital intensive industry on earth, the OEM automotive industry, cannot be reversed rapidly, and the damage to competitive advantage from losing the lead in internal combustion engine and transmission development could be fatal. This misallocation is not confined to the assembly operations of the global legacy OEMs. It could also be fatal to suppliers of ICE specific components.

There are today some 1.5 billion ICEs in use globally, and the number is growing. Imagine that each of them will use on average 4 kg of lithium, measured as metal, for a 50 kWh lithium-ion battery. A Tesla Model 3 uses 6-8 kg for a 100 kWh battery. So to replace just today's powertrains would require 6 billion kg of lithium, or 6 million tons of lithium, or 36 million tons of LCE (lithium carbonate equivalent). This is more than 70 years total global 2021 lithium production with nothing left over for the stationary storage market for grid smoothing of wind and solar generation. Neither conversion will ever happen, because it is beyond the capability and capacity of our current know-how in mining, refining, and fabricating the end-use raw materials.

The looming and fatal to the green revolution lithium supply deficit has spawned an enormous price increase for the metal and its compounds, which has reversed the steady decline in the costs of lithium-ion batteries.

But is it too late to stop the attempted suicide of the global OEM automotive and electric energy generating industries?

Cars and trucks running on high priced electricity generated by increasingly expensive wind and solar systems backed up by hugely expensive stationary storage battery parks will not have large enough markets to be self sustainable or reasonably priced.

Lithium mining and processing will boom until no one can afford the vehicles or the electricity. At some point before that occurs the decarbonization of Western society will reverse and steel, aluminum, oil and gas will return to their central place in our world of cheap energy. Until then look for lithium, the rare earths, copper, and uranium to enter a long Super Cycle.

Betting the farm on lithium in the short term and the long term.