Welcome to The Lithium Turning Point: From Investment To Profit
Lithium has already been the hottest metal of 2016, beating out every other commodity, including gold and oil. It can’t replace oil—that’s not what this is about. This is an entirely different beast—and it’s driven by a voracious demand for all things electric—mainstream electric vehicles, battery gigafactories, powerwalls, and massive power storage solutions, not to mention our every-day consumer goods for which demand appears infinite. Our future is supercharged, and lithium is supercharging it.

For investors and potential investors, there’s a reason we’re bringing you this special report right now. Timing is everything in the world of investing—and we are now at that critical juncture, the moment when pure-play lithium investment starts to turn into pure-play profit.

For the most part, our assessment is that this is a game for junior pure-play miners, developers and explorers. That’s because the lithium playing field is quite unique. Until now, it’s been controlled—for all intents and purposes—by an oligopoly of three major lithium suppliers. The sudden onslaught of electric vehicles, the successful push to bring them into the mainstream, and the simultaneous push to bring massive battery gigafactories online means that the three traditional suppliers won’t be able to meet spiking demand.

The juniors have been very quick on the uptake here—predicting the looming supply gap and scooping up acreage in known reserve areas to bring new lithium supply online in time to reap the benefits of the boom.

Never before have the fundamentals for a commodity been so clear and present. In this special report, we will take you through all the fundamentals, offering you the rational expectations for pricing and supply and demand. We’ll also map global lithium supply and reserves for you, and highlight the hot spots. We’ll take you through the drivers of this boom, from legal intervention to natural market forces. Finally, we’ll highlight what to look for as you determine whether to jump in on lithium while stocks are still cheap.

Enjoy the report!

*James Stafford, Oilprice.com*
Atomic Number 3

Derived from *lithos*—the Greek word for “stone”—lithium, or atomic number 3, is the lightest known metal in the world. It was arguably discovered by a Brazilian naturalist in the 1790s on the Swedish isle of Uto, in the form of the mineral petalite. Actual lithium was then partly isolated by Swedish chemist Johan August Arfvedson in 1817. It wasn’t isolated in full until 1855 by British chemist Augustus Matthiessen and German chemist Robert Bunsen.

But it was only in 1980 that the lithium-cobalt-oxide battery was introduced by scientist John Goodenough. The lithium-ion battery itself only came into commercial being thanks to Sony in 1991.

For the battery world, lithium is the essential element for the foreseeable future—and as such the driver of our energy revolution.

When it comes to lightweight, rechargeable power for a massive range of consumer goods - from laptop computers and smart phones to tablets, watches and even pacemakers - our digitally dependent world is nothing without lithium.

Battery experts note that although different battery chemistries exist, the energy density of lithium is far superior to other chemistries.

No new battery chemistry will likely be able to supplant lithium in battery cathodes for decades, and lithium cathodes are the centerpiece of several leading chemistries which are already available.

For miners, a premium will be paid for those able to produce lithium hydroxide (LiOH) over lithium carbonate (Li2CO3).

High-end battery producers prefer Lithium Hydroxide, and require processing of carbonate prior to use in batteries.

What the Analysts Say about Lithium

Overwhelmingly, analysts are bullish on lithium and the bigger picture here, but there are still plenty of skeptics, too—though many of them will be what the Economist dubs ‘petrolheads’.
Goldman Sachs’ Bob Koort, head of Industrial and Materials research, has called lithium the “new gasoline”, explaining that this lightest of solid elements is the “key to unleashing the mass market potential of electric vehicles.”

“Prices are likely to continue rising, particularly as demand from the new battery megafactories kicks in. Therefore, we expect the supply shortage to not only continue throughout 2016 but also intensify.”

-- Benchmark Mineral Intelligence

“Solar is at the edge of being a competitive power generation technology. The biggest drawback has been its intermittency. This is where batteries and electric vehicles (EVs) come into play. Battery costs have declined rapidly, and we expect a further decline of more than 50% by 2020.”

–UBS

We’re witnessing a “global scramble to secure supplies of lithium by the world’s largest battery producers, and by end-users such as carmakers”.

–The Economist

Then, when the initial euphoria started to calm down after prices spiked in early 2016, the electric vehicle producers and analysts closely watching this particular segment started to take a more serious look at supply, sounding the alarm bells and warning that a lack of lithium could hold the EV market back.

“We are seeing an acceleration in the bringing of electric vehicles to market, but the big question we have is where are the batteries going to come from for these vehicles? Because if you look at global lithium-ion cell production today, it’s really only satisfactory to supply around 900,000 to a million units of total production, which in a global market of almost 100 million light vehicle sales, we’re talking about 1 percent essentially.”

—Evercore ISI analyst George Galliers

This is concerning for the EV market, but euphoric for new lithium suppliers. However, it’s more complicated than this, which we’ll explain in detail later in this report.

The most rational perspective comes from—among others—PriceWaterhouseCooper:

“Supply will continue to trail until new projects come online in the next five years. As prices for lithium soar, more than 100 companies are exploring for new supplies, many focused on the lithium triangle defined by Bolivia, Chile and Argentina.”

--PwC

The skepticism is not about the clear and present energy revolution for the most part; rather it centers on whether lithium-ion batteries are what is going to power that revolution at the end of the day. Some will argue that lithium-ion technology is not up to the task of making batteries big enough to allow for long enough driving ranges and fast enough charging. Tesla Motors Inc., however, is confident that the performance of lithium-ion batteries will be at least doubled in the not-so-distant future, maintaining the precious metals’ claim on an energy revolution that is already in process.

“Large corporate actors -particularly in the electric vehicle market- are designing their products around lithium-ion technology and this will not change overnight.”

--PwC.
“We are in the beginning of a long term cycle of significant lithium demand growth and are ending a cycle of significant underinvestment in lithium supply. No matter what certain “experts” say – supply and demand are NOT in balance. If the market is adequately supplied, why are we having the current price run-up?”

—Lithium expert Joe Lowry

Supply, Demand and a Visibly Battery-Powered Future

Supply is already tight, and it’s only getting tighter.

The Electric Vehicle Revolution

Electric vehicles are exploding on the mainstream from every corner of the earth.

- As of the first-quarter of this year, electric vehicle sales had grown 42% year-on-year, worldwide.

- In Europe, EVs are already profitable. Europe sold 125,000 units as of August, with annual sales expected to come in at 200,000.

- In October, the Germany Bundesrat made a landmark decision to ban the internal combustion engine by 2030. Prior to that, a new German incentive program saw the country break the 1% mark for the first time in September 2016.

- September 2016 marked the first month in history that US electric car sales were over 1% of total sales, coming in at 1.15%, with total sales of over 108,000, and total sales in North America over 115,000. The North American Market is expecting around 175,000 EVs by the end of the year.

- Tesla alone is eyeing an estimated 500,000 cars by 2018—up from 80,000 in 2016.

- China is eyeing 5 million electric cars on the road by 2020. China has sold 193,000 units as of August, with some calling for 450,000 units by year end.

- If the current rates hold—even if there is no additional sales momentum, which is highly unlikely—we’re looking at 5 million EVs, or 6% of total sales, by 2020. That’s just the worst-case scenario.
The bottom line? Electric cars alone will require 4,615 tons of lithium. If we consider the massive growth from 550,000 vehicles in 2016, we will likely require another 2,000 tons of lithium just for electric cars.

With a new lithium mine coming in at around 1,500 tons of the metal each year (or around 15-20,000 tons of Lithium carbonate, with a 3:37 weight ratio), the lithium demand from electric cars this year will be over the equivalent of one good-sized mine.

By 2020, this will be 7,500 tons a year – or three to four lithium mines – just for the annual increase from that year.

All of this indicates a new level of demand for which the market will need two new lithium mines in operation to even begin to satiate.

That’s not even considering the electric bus market, which remains largely untapped outside of China, where it’s exploding, and could alone bring the global lithium supply to its knees.

**Grid Storage: Probably Even Bigger than EVs**

Grid storage is the real wildcard in this energy revolution, and could represent the largest market for lithium out there—but we’re just on the edge of the explosion here, while EVs dominate the news.

Right now, we have about 750 grid-level storage projects—either already operational or planned—requiring 450 tons of lithium.

This is definitely where massive new future demand for lithium will come from, and it’s the longer-term game-changer.
Grid storage is already price-competitive with diesel fuel for stand-alone renewables and remote locations. Now the idea is making major inroads in the market—particularly Tesla's powerwall.

In some locations, grid-scale peaking applications have already been implemented, often in old coal power plants, re-using the building and grid connections.

Grid-scale storage battery demand can easily eclipse the need for automotive batteries.

Here are just a few immediate indicators of where this is going:

- In August 2016, the UK announced a $86.4 million program to buy 201MW of grid storage – this is the equivalent of over 10,000 electric cars of lithium demand.
- Also in the summer of 2016, California moved to buy 2,000 electric cars worth of lithium demand for its electric grid. For California to make its grid as green as it plans, it will need 15 GW of storage – the equivalent of 750,000 electric cars. That’s just for a single state.

**Gigafactories for Gigademand**

The battery gigafactories will feed the EV revolution. Everyone’s building them—we count 12 in the works in total.

- Tesla’s gigafactory—announced in 2014 with Panasonic—is set to begin production by the end of 2016. By 2018, it should reach full capacity and produce more lithium ion batteries annually than were produced worldwide in 2013.
- Volkswagen AG announced earlier this year that it was considering LG Chem Ltd. or Panasonic Corp. to partner in SEVERAL $2-billion battery factories, and confirmation of this is expected as soon as the end of 2016.
- Daimler is investing $550 million into tripling its battery production capacity in Germany.
- Nissan is planning investments in the UK for its third-generation Leaf.
- GM’s joint venture with LG Chem will produce batteries in Michigan for its Volt and Bolt

It’s clear that auto manufacturers are beginning to shift to electric—and in a very big way.
By 2020, the production capacity of lithium batteries is set to triple:

The lithium ion battery market is forecasted to expand to $46.2 billion through 2023, which represents an 11% average annual growth rate.

**Price: Where it Gets Really Exciting**

Lithium will go for a premium, and the market has already spoken, with prices spiking from $7,000 per ton to over $20,000 per ton earlier this year—and that is just the beginning.

So far, lithium has been the hottest metal of 2016. Although the price trajectory has been subdued in recent months, the fundamentals behind the long-term trajectory suggest strong potential for long-term growth.

Price doubling from 2014/2015 was first seen in China and is now being felt worldwide, with lithium hydroxide prices from $16-20 and carbonate prices from $12-14 thousand USD per ton.
While new supply has managed to satiate the current increases in lithium demand since highs last March, if you look at the forecasted PEV sales for China – you see a huge increase by the end of the year.

**Global Lithium: The Sweet Spots**

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<thead>
<tr>
<th>Identified lithium resources in major producing countries</th>
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<tbody>
<tr>
<td>In 2018, the total demand for lithium is expected to reach 252,653 metric tons of lithium carbonate equivalent. (mining.com)</td>
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<tr>
<td>Lithium accounts for only about 5% of the materials in some car batteries, and for less than 10% of their cost. (economist.com)</td>
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By 2040, 35% of U.S. vehicle fleet will run on electricity (bloomberg.com)

<table>
<thead>
<tr>
<th>Country</th>
<th>Lithium (million tons)</th>
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<tbody>
<tr>
<td>Bolivia</td>
<td>9.0</td>
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<tr>
<td>Chile</td>
<td>7.5</td>
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<tr>
<td>Argentina</td>
<td>6.5</td>
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<tr>
<td>United States</td>
<td>6.7</td>
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<tr>
<td>China</td>
<td>5.1</td>
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<tr>
<td>Australia</td>
<td>1.7</td>
</tr>
<tr>
<td>Others</td>
<td>4.5</td>
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United States

U.S. Geological Survey
The Lithium Triangle: Argentina, Bolivia, Chile

When we think of the global future of lithium, we think of the Lithium Triangle in South America. As much as 75% of the world’s lithium reserves are concentrated here.

Argentina has recently passed a new legislative landscape which allows for quick development of lithium properties. President Mauricio Macri recognizes the potential for Argentina’s economy to develop lithium, and has removed taxes on mining exports, meaning larger potential profits for mining companies. The land rush in Argentina is on in full force, and Argentina is poised to become a major lithium exporter.

Within the Lithium Triangle, it’s all about Argentina right now. Chile is not granting any new concessions, and opposition in Bolivia has led to a suspension of lithium mining. Argentina is poised to be the new leader.

Nevada: The Heart of the American Lithium Boom

In North America, lithium is all about the state of Nevada—it’s the only place on the North American radar. But it’s also the staging ground for a US lithium boom that will feed the manufacturing beasts for everything from EVs, battery gigafactories, powerwalls and energy storage solutions to the long and growing list of consumer electronics that we use every day.

The land rush is already on in full force in Nevada’s Clayton Valley, which is ground zero for the American lithium boom. This is home to the only already producing lithium mine in the US: Albemarle’s Silver Peak mine. It’s also less than four hours from Tesla’s battery business.
So, while this is all highly attractive because of its geographical proximity to some of the biggest lithium buyers in the world, what’s even more attractive is perhaps what lies beyond Clayton Valley. Nevada’s geology tells a much more lucrative story, and so far, we’ve only got the introduction.

Re-Defining The Lithium Playing Field

Up until two years ago, the so-called “big three” – Albermarle (NYSE:ALB) in Chile and Nevada; SQM (NYSE:SQM) in Chile; FMC (NYSE:FMC) in Argentina – controlled 89% of the world’s lithium production. This group of lithium players has recently evolved into the “big five,” as Sichuan Tianqi and Ganfeng in China have become significant players.
At the start of this year, the de facto big five was still a reality, with FMC repeatedly stating that supply and demand are in line—an assessment akin to sticking its head in the sand, as lithium prices rise exponentially.

From an investor perspective, however, it's not a game best played through the traditional big players, who have met some fundamental production challenges.

Albermarle has had significant difficulties with its brine expansion that will most likely contribute to decreased production in 2016, and realistically, SQM is the only “big 3” producer with a clear strategy for future growth.

In January 2016, the big five controlled 90% of the market, with no significant producers outside these sources. However, 2016 can be considered the year the lithium oligopoly came to an end.

There are quite a few juniors out there to choose from. We won’t be making any recommendations, but we will help you figure out what to look for in a junior lithium miner.

The best strategy for exploration stage companies coming into this field is to:

- Raise capital for land purchases and drilling. The key for sustained growth during a capital raise is to limit share dilution.
- Seek out land that is highly prospective, either beside operating mines, on previously operating mines, or in land that is analogous to existing development land.
- Prove to the markets that the management team is worthwhile through flawless execution of good land acquisitions, execution of drilling campaigns, with strategic drilling done to move forward into economic assessment.
In this lithium rush, junior, pure-play miners with exposure to multiple lithium plays are the best bet. They’re focused solely on lithium, so investors gain direct exposure to the metal, for which demand is already overtaking supply, and for which the situation is only going to get worse come November-December (China’s EV demand). They are also more flexible and offer better rates of return due to their tight share structure.

Welcome to the Turning Point

The most important time in a product’s life cycle for investors is at the late stage of the introduction phase, when sales start moving from the early adopters to the early majority.

This is the time when profits in the industry will elevate market valuations in the whole industry like a flood as investors pour in.
Much has been said about the electric car revolution, but without understanding what is happening in detail, investors will lose out on this once a century opportunity.

In the 1600s, Spain benefited from gold from the new world. In the 1800s, the industrial revolution brought on the age of coal. A century later, oil became the new gold. Now, we are starting to break the chasm in the lithium revolution.

![EV sales and market share in a selection of countries and regions, 2015](image)


However, larger markets need a smaller penetration for profitability. Norway has already reached the profitability level, while the Netherlands is on the cusp. But with a mandate to be 100% electric by 2025, the country will get there fast.

In China, the third quarter saw over 2% electric car penetration, but there’s a much bigger story here: Major cities like Beijing and Shanghai—with 100-million-strong populations—are on the cusp of the chasm. This year, China is going to sell over 50% of all electric cars. The drive for cleaner air will bring on a period of huge growth in a market over 10 times the size of Norway.

![China Monthly PEV Shares](image)

**The Bottom Line**

Lithium will be the biggest disrupter on the energy market. And the big winners will be those that have the funds, expertise and capacity to ramp-up production as quickly as possible—the first to find new supply and get it into production. The crucial moment is right now, the turning point where investment becomes profit.