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Lithium A Moody Market Darling

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2010-03-01

Unconventional commodity plays have become commonplace in recent years as investors seek to capitalize on extraordinary price gains in these once obscure markets. First, uranium grabbed the headlines. Then, molybdenum and potash became fashionable. Now lithium and rare earth metals are the market darlings.

In every case, junior mining companies have been quick to jump on the bandwagon and raise the necessary capital for exploration or acquisition, regardless of their experience with the underlying commodity.

Although the rewards can be great, investing in these plays can be like walking through a minefield. The learning curve is steep and the technical challenges can overwhelm a junior. Markets lack transparency and are extremely volatile. Mining investors will recall, for instance, the sudden crash of the molybdenum market that forced Canadian resource guru Eric Sprott to close his molybdenum fund before its second birthday.

Lithium -- the source of the latest market mania -- is one of the more difficult commodities to assess because economic viability depends so much on the deposit type and the ability to convert resources into a product that can be successfully marketed to end users. The three main producers in northern Chile, for instance, each use a different technique to process their resources into sought-after lithium compounds.

"The type of geological evaluation that you have to do is entirely different from most commodities" says Edward Anderson, president and CEO of TRU Group, a Toronto-based consulting company with expertise in engineering, feasibility, and production of lithium deposits. "The value of the resource is directly related to the chemicals you can make from it and there is a huge amount of misinformation about this. As an investor, you have to be extremely careful."

But it is impossible to ignore the numbers. Investors who jumped into the junior lithium space a year ago have been rewarded with annual returns of 250% to 1,000%. Their success is largely attributable to the growing demand for lithium as electric cars -- which increasingly rely on lithium-ion battery technology -- begin to penetrate the automobile market.

Lithium-ion batteries already power more than 60% of cell phones and 90% of laptop computers, but the real growth is in the automotive sector. Canaccord Adams, which recently initiated research coverage on three juniors in the lithium sector-- **Canada Lithium** (CLQ-V), **Western Lithium** (WLC-V), and **Lithium One** (LI-V)-- expects penetration rates of 20% for hybrid cars and 10% for electric cars by 2020. That rate would yield an incremental increase in demand of 286,000 tonnes of lithium carbonate equivalent that would outstrip current supply by a wide margin.

But the supply-demand argument gets a little shaky when existing producers report they can easily ramp up production to meet future demand. Chemetall, a division of specialty chemical supplier Rockwood Holdings (ROC-N) and the second-largest lithium producer in the world, says its Salar de Atacama resources in northern Chile alone could satisfy global market needs for lithium carbonate for at least the next 100 years. Atacama represents about 20% of the world's resources (150 million tonnes of lithium carbonate equivalents or 28 million tonnes of lithium metal), according to Chemetall.

And that's assuming that lithium-ion batteries become the technology of choice for electric car manufacturers -- not exactly an airtight assumption given that lithium batteries still face significant safety and cost hurdles.

"Existing producers can expand substantially and there is likely to be at least one more major producer coming onstream in the next ten years," concurs TRU's Anderson. "As far as we're concerned, there is no shortage of lithium supply through 2020."

Recycling will add to supply once the first generation of electric cars begins to wear out around 2030. Chemetall predicts a recycling rate of about 50%.

Canaccord's analysts acknowledge the supply threat, but think it may be overstated. "We believe that investors should be exposed to lithium exploration, development and production in the event that, for example, electric vehicle penetration exceeds expectations or senior producers have overstated their ability to ramp up production."

That's far from a ringing endorsement of the juniors touting lithium. But another key component of the investment argument that is often overlooked is the growing demand for secure supply from lithium consumers, namely the Toyotas, Mitsubishihs and Nissans of the world. If they are promising an electric car future, they must be able to deliver on this promise by finding a reliable source of raw material for the lithium-ion batteries that will make their products go.

Currently, global lithium production is controlled by just three companies. The largest, Chile's **Sociedad Quimica y Minera de Chile** (SQM-N), produces 30% of the world's lithium, while Chemetall produces another 28%. **FMC Corp.** (FMC-N) has 19% of global market share. All three operate in the same region of South America known for its abundance of lithium-rich salt lakes.

"The end users of lithium do not want to be beholden to companies like SQM because they hold the power in the lithium market," says Judy Baker, a consultant for **American Lithium Minerals** (AMLM-O) and former president and CEO of Canada Lithium. "And they don't want the majority of supply concentrated in one country or geographic location."

Carmakers are already securing alternative supplies. **Toyota Tsusho Corp.**, a trading house 22%-owned by **Toyota**, recently announced that it would jointly develop the Salar de Oloraz brine deposit -- a low-cost lithium-potash brine resource in Argentina -- with Australian-listed **Orocobre Ltd.** (ORE-A), the project's owner and operator. Orocobre shares jumped by as much as 47% in record trading volume on the news.

In Canada, **Mitsui & Co.** holds the sales rights to lithium produced from Canada Lithium's Quebec lithium project near Val D'Or, Que.

Meanwhile, companies such as American Lithium and **Rodinia Minerals** (RM-T) are positioning themselves to be domestic suppliers to the U.S. market by acquiring lithium deposits in the Great Basin region of the U.S. as that country commits to vehicle electrification. Chemetall's Clayton Valley operation in Nevada, currently the only lithium producer in the U.S., was recently awarded US\$28.4 million in stimulus funds by the federal government to refine its product for the car battery market.

There are two main sources of lithium: salt lakes, such as Orocobre's Salar de Oloraz and hard rock mineral deposits, such as Canadian Lithium's Quebec lithium deposit.

The Puna district spreading over Argentina, Bolivia and Chile -- where the big three operate -- hosts more than 80% of the lithium reserves of the world in salt lakes. The lakes are formed by evaporation under hot, dry air and contain concentrated amounts of sodium, potash, boron, calcium, and sometimes lithium. Since the late 1990s, these salt lake brines have been the main source of compounds such as lithium carbonate, the ingredient in lithium-ion batteries, because they have significant cost advantages over mineral deposits.

The hard rock deposits mainly provide lithium to the ceramics and glass industry in the form of less valuable spodumene. Spodumene can be converted to lithium carbonate using an acid roast process, but the conversion is energy intensive and expensive (US\$1,500-3,000 per tonne). If the cost to produce the spodumene is factored in, total costs soar to about US\$5,000 per tonne. Lithium carbonate at the highest purity level sells for about US\$6,600 per tonne, according to research by Cormark Securities.

"If you have a spodumene deposit, you will not be able to compete. You will be killed," concludes Anderson. He expects lithium prices -- which he says are already inflated in many junior company documents -- to fall in the short term and moderate over the long term as new projects come onstream that will put the industry into oversupply.

Current producer Talison Lithium and developer **Galaxy Resources** (GXY-A) would refute that claim. Both have spodumene deposits in Australia and both are targeting the lithium-hungry battery market in China.

Talison, a private company, owns a high-grade spodumene producer in Western Australia with an average grade of 3.31% Li₂O. The company produced about 69% of the world's spodumene in 2008. Most of the spodumene is sold to chemical producers in China that convert the lithium mineral into lithium carbonate.

Galaxy is at the advanced stages of developing a spodumene operation in Western Australia, and is finalizing plans to build a chemical facility in China that will convert the spodumene to lithium carbonate at costs of about US\$1,500 per tonne. Galaxy expects to become the fourth-largest producer of lithium carbonate in the world and the largest low-cost producer in China.

Other companies targeting mineral deposits include Canada Lithium and Lithium One. Canada Lithium is upgrading its resource at the Quebec Lithium deposit and conducting a feasibility study for the production of spodumene and/or lithium carbonate. Lithium One is drilling on its Cyr property in northwestern Quebec, which hosts a swarm of spodumene-bearing pegmatite dykes stretching for almost 5 km.

A conceptual model for Canada Lithium's project produced by Cormark Securities suggests that the best option for development would be to convert spodumene to lithium carbonate, rather than produce a high-grade lithium product for the ceramics industry, because of the higher margins and larger end market conversion would allow.

"Success for this growing group of lithium mineral explorers will come from defining large, high-grade deposits with mineral conversion potential or by-product credits," Cormark concludes.

Juniors focusing on brines include Rodinia, First Lithium Resources (MCI-T) and Lithium Americas, a private company with projects in Argentina. Rodinia is drilling in Nevada, at its Clayton Valley project, which surrounds the Chemetall Foote lithium plant. The company has entered into an agreement with Borax Argentina, a subsidiary of Rio Tinto Minerals, to acquire three separate lithium-brine projects in Argentina to add to its existing brine project there. First Lithium plans to explore for brines on its property in Alberta and investigate a pegmatite dyke deposit in Manitoba.

"These are mostly area plays at a very early stage with a potentially long and expensive path ahead," says the Cormark report. "However, in a production scenario, this group would have the cost advantage (over spodumene-lithium carbonate converters)."

TRU is a consultant for Rodinia Minerals as well as private companies Next Lithium and Lithium Americas, but Anderson says he has terminated contracts with some other juniors because he was uncomfortable with their approach to disclosure.

"There has been all this hype and quite a bit of dishonesty," Anderson says. "We've withdrawn from two junior mining companies because we didn't want to be involved with that when there is such a huge amount of money being thrown at the industry."

At other end of the spectrum, the big three producers hold the power to control the market. For instance, in what some market watchers saw as an attempt to scare off new entrants to the market, SQM recently announced that it would reduce prices for its lithium products by 20%.

As the world moves towards a future dominated by electric cars, miners that can supply lithium to the car industry stand to benefit. But it will be difficult for some juniors to succeed as long as supply-demand fundamentals remain balanced and the big three producers are calling the shots. The winners in the junior sector will be companies with large, low-cost projects run by management savvy enough to attract consumers looking for a guaranteed supply.

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