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STORMCROW

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## The Antidote for Extremism is a Big Dose of Reality

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Welcome to the 1st Issue of the Stormcrow Capital Monthly Newsletter!

In this issue we discuss:

- **What's Happening to Prices?** Are battery material prices headed up or down, and what we expect to happen to those prices in the future.
- **Is Demand Fundamentally Strong?** Our short answer is "yes", but see below for more detail.
- **Do Things Get Messed Up by an Expanding Trade War?** Again, the short answer is probably "yes", but the critical materials that are most likely to be impacted if a trade war went that far are probably not the ones most people think of, and are definitely not the ones that the mainstream press is fondest of discussing.

## *As a Matter of Introduction…*

So, welcome to the first of these monthly notes. Hopefully many more will follow.

Stormcrow deals with the markets for critical materials. Generally speaking, what amounts to a critical material is in the eye of the beholder, but we think of them as materials that are essential to making a product with the characteristics intended by its designers, even if those materials are not anything like the highest-cost item on a bill of materials. As an example, think lithium in the battery of your cell phone. That lithium costs pennies as a raw material, but if your cell phone manufacturer was forced to do without it the resulting cell phone would have a very, very different operating experience.

Over the next while, we are going to deal with our views of the market prospects for some critical materials, and interesting facts about others. We will talk a little about technology and the impact, both good and bad, that it can have on demand for critical materials. We hope you find this interesting and worthwhile! Note that when not writing newsletters like this one, Stormcrow Capital functions as a corporate adviser (capital markets / financing / M&A) in the critical materials sector. We are registered as an Exempt Market Dealer in Canada *(additional disclosures included at the end of this note)*

## *The Antidote for Extremism is a Big Dose of Reality – or – You're Both Wrong*

Not that long ago, lithium chemical prices were hitting historical highs. The prevalent argument was that these prices would do nothing but go higher, because lithium is such a small part of overall battery cost which is, in turn, such a small part of the complete product cost. The argument boils down to lithium cost simply not mattering, because it is essential.

The argument that the price of a critical material simply doesn't matter, when properly parsed and analyzed, actually turns out to be true, with one other condition. The argument is true only if the stuff in question is actually rare. It turns out, as we all should know by now, that lithium is essential for some applications such as use in rechargeable batteries (but can be replaced in others, either by using other materials or by using different technology) but it is certainly not rare. There are more than enough lithium deposits out there, good and bad, to keep us swimming in lithium for a very long time. By this same argument, copper should trade at upwards of $6 a pound, copper being a really

useful conductive metal, but it doesn't because more than enough people will line up to sell it to you at $2.60.

Now the prevalent argument is about how low lithium prices will go and for how long. The standard-bearers for this side of the argument appear to be the analysts at Morgan Stanley, who are now calling for the price of lithium to fall to the level of marginal cost (plus, we presume, some level of profit for the dirty wretches making the stuff). The sky is clearly falling.

Morgan Stanley will be shown to be just as wrong as the "paradigm shift" crowd.

The argument that market prices will drop to marginal cost is true if that substance is truly a well-supplied commodity in a fairly static market. Lithium is well-supplied and is not fundamentally rare, but battery-grade lithium chemicals are not commodities. The choice of a lithium chemical supplier, if you are a cathode chemical manufacturer, sees you trading off levels of certain contaminants in your lithium chemicals with levels of those contaminants in your cobalt sulfate, for example. In addition, your lithium chemical supplier probably has a tight limit on how much material they can make in a given month, but what happens if you suddenly receive a much bigger order from a battery manufacturer because they, in turn, just received a much bigger order from one of their automotive customers? The answer is, you go out and pay up to secure immediate additional supply, and prices don't sag to levels of marginal cost.

The lithium market is dynamic and growing, and lithium is not a true commodity. To be fair, if you listened to Morgan Stanley and got out of the lithium market last year, you saved yourself a lot of headaches. You would have done the same thing if you had listened to us. However, we will now tell you that there is another lithium cycle coming, but it isn't happening tomorrow (or even next year). For the details around that, we will be publishing a separate lithium market update soon. But how you treat this news depends on whether you are a semi-interested market player or a firm that is willing to make long-term investments backing the transition to electrified vehicles.

On the topic of that transition, we remain firmly and strongly committed to the notion that the vehicles we drive will largely become electrified vehicles. We remain just as strongly committed to the notion that those vehicles probably won't be the pure battery electric vehicles that most consumers think of today. The basic reason for our belief is that the automotive companies believe that the transition will happen, as well.

Ask automotive executives a basic question: why don't vehicles in the US and Canada run on natural gas? There are a number of obvious advantages. First, natural gas as a fuel is readily available in North America, with no additional refining required. Second, engines running on natural gas, like engines running on diesel, would last a very long time because

natural gas, unlike gasoline, doesn't wash oil off cylinder walls in an engine and contribute to excessive wear. Third, burning natural gas would be better for the environment, at least to first order, because burning natural gas comes closer to burning hydrogen (methane is $CH_4$) than coal (octane, one of the components of gasoline, is $C_8H_{18}$). Unfortunately, the answer from the auto industry executive will be a variant of "But what's in it for us?". For a major automotive manufacturer to switch everything to natural gas requires significant research on emissions and control systems, safety, vehicle construction, etc., all while the infrastructure is changed to accommodate refueling. The effect would be spending billions of dollars to build a vehicle that is probably just as complex as the vehicles of today, selling for about the same price as the vehicles of today and yielding the same lousy margin to the manufacturer.

But their view of the correct electrified vehicles is that they can eventually build something that the consumer embraces, sell it for less money than the typical vehicle of today, have it cost the owner much less to operate per driven kilometer and actually make the manufacturer more money per vehicle sold than current vehicles. All the talk of what happens when battery electric vehicles eventually achieve "cost parity" ignores the fact that, at this point, an electric vehicle does nothing extra for the automobile manufacturers. The reason automotive companies around the world are researching and developing electric vehicle technology is that the car companies believe that such designs can allow them to make more money than they make today, while reducing emissions to the levels required by legislation and keeping their customers happy.

As we've said in the past, there has never been a popular uprising for battery electric vehicles. No one was marching in Washington or Ottawa, there were no protests on Tiananmen Square in Beijing. Battery electric vehicles were just about the only available technological response to a legislated need to build zero emission vehicles by the automotive industry, because hydrogen-powered fuel cells were simply too expensive and too difficult to implement. Consumers want something that they can buy that provides all the features they are used to, including "recharge" that is as rapid as stopping to fill up with gasoline in a conventional internal combustion-powered vehicle, but that they can purchase for less money and that costs them less to operate. Battery electric vehicles are not going to achieve all those goals.

Some of the possible new "hybrid" designs will come much closer to meeting those goals and will also change the landscape in terms of what a battery must do in a vehicle. In turn, the chemistry changes in the lithium batteries used in these vehicles will also change the demand profile for some of the critical materials demanded by automobile manufacturers. For some materials, such as lithium, this will probably be a good thing. For others, such as nickel, perhaps not so much. We will share more of our thoughts on

these issues later, but for now, let's look at the current state of play in the battery materials sector.

### *July Wasn't Good…*

Simply put, July wasn't a good month for those making cathode active material feedstocks (all references to prices are to spot market within China):

Battery-grade $LiOH \bullet H_2O$ down 7.5%

Battery-grade $Li_2CO_3$ down 7.2%

Battery-grade $CoSO_4 \bullet 7\ H_2O$ down 10.8%

Battery-grade $NiSO_4 \bullet 6\ H_2O$ down 2.7%

However, we note that we are still roughly 30% above the level which Morgan Stanley believes that we will settle in on as the long-term lithium price. In contrast, we believe that we will have a few tough years in here as demand eats into a supply glut, but that we will see yet another upward trend in pricing before lithium producers next invest the capital to take care of increasing demand.

We would also note that, if you are a manufacturer of battery-grade lithium chemicals with a cost of, let's say, $4,000 a tonne, then selling chemical at $10,000 a tonne in what is being viewed right now as a horrible market is not exactly a bitter pill to swallow. May all the industries we study view a 60% gross margin as a bad thing.

### *August So Far?*

If we were forced to guess at the end of July, August should be another month of declining prices, although perhaps not as severe an environment as what we saw in July. Vacations are upon us, so that limits the number of deals done, but there is nothing happening until September that would drive demand higher. And to date this month (to end-of-day on the 16$^{th}$), battery-grade lithium carbonate is down another 4.5%, battery-grade lithium hydroxide monohydrate is down another 5.2%, battery-grade cobalt sulfate heptahydrate is actually up 13.5% and battery-grade nickel sulfate is flat. It could turn out that August will be a better month than July.

## *Trade War*

Since we have an interest in all things related to critical materials, we have seen a variety of news publications suggest that the Chinese might well respond to the latest imposition of tariffs on Chinese imports into the USA by restricting rare earth exports to America. The usual blather is that the rare earths are "irreplaceable" or "critical" or some such.

None of this was true in 2010 and 2011, the last time that China imposed dramatic reductions in export quotas of rare earths to the rest of the world. To keep the story short, what happened in that case was that prices spiked, then companies and people learned what substitutes (both material and technological) could be made, then demand collapsed (as you would expect for something that suddenly became 50 times as expensive as it was), then prices collapsed and the overall Chinese market for rare earths took years to recover.

Now, why would Chinese suppliers want to do that, again? The clear answer is that they won't, that China learned a lesson. For starters, their current trade war is largely being waged against the United States. Taking a shot at the world by stopping all rare earth exports wouldn't win any friends. But the other point is that limiting rare earth exports won't accomplish what is desired during a trade war.

Trade wars demand that asymmetric effects be achieved. If I impose tariffs on your goods, it is my belief (or, at least, it should be my belief) that the additional tax I am effectively imposing on companies and citizens of my nation is smaller than the job losses and economic upheaval I am causing you. The United States simply doesn't import that much in the way of raw rare earths, much of it is in the form of semi-finished or finished goods (so the US doesn't get much raw neodymium oxide, it shows up in the form of magnets or the small but powerful electric motors in drones that are actually made in China, instead). Why would Chinese authorities look to punish their own industries and shift production of such magnets and goods outside of China when the US resorts to buying their toy drones from Japan and Korea?

We seriously question whether rare earths are a good target for such an export restriction. But that doesn't mean that there are not critical materials for which China dominates US (and global) supply, and which are imported into the US in raw form. Cutting off the supply of these materials could have a very negative impact in the US, with factories that process those raw materials being shuttered, and downstream factories that depend on supply from those US processors also being heavily impacted, temporarily. Now, in the medium term, supply of more finished chemicals or goods could be sourced to the US from Vietnam or Korea or Japan or wherever, but that will also raise

the price for these intermediates to US business and consumers. And if these raw materials form relatively small markets, some Chinese buying and stockpiling could shelter their own workers from damage. It would be a relatively unconventional, but perhaps highly effective, response.

For more, please see the recent report on the China Trade War (A Critical Materials Perspective) issued by Stormcrow!

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