Cobalt's Much-Anticipated Demise (Not) - An Insider's Opinion

06.09.2018 | ACCESS Newswire

Martin Vydra, Head of Strategy, Cobalt 27 Capital Corp. (TSX-V: KBLT; OTC PINK: CBLLF; FSE: 27O), a battery metals streaming and royalty company offering direct exposure to cobalt and nickel, integral elements in key technologies of electric vehicles and energy storage systems.

TORONTO, September 6, 2018 - Historically, whenever a commodity appreciates to all-time highs, pundits and naysayers are quick to forecast its eventual demise. Having tripled in value within two years, cobalt is now (once again I may add) being subjected to that same sentiment. However, despite the cobalt obituaries, there is an undeniable reality here: while battery manufacturers are indeed optimizing their chemistries, research suggests there simply isn't an easy solution to eliminating cobalt from a lithium-ion cell without a trade-off, such as performance or safety. Combine this with projected growth in other sectors that utilize cobalt (think jet engines and magnets that provide the electric motors for our new EVs) and forecasted demand for cobalt is as robust as it has been for many years, if ever.

While it's true that cobalt's meteoric rise has caused everyone to take a hard look at supply and demand fundamentals, we need to take a step back and realize that this is hardly the first time that cobalt has significantly appreciated in value. Just ten years ago, in 2008, cobalt hit US$50 per pound thanks to the birth and rapid spread of the smartphone. Despite its high price, cobalt was not engineered out of phone batteries nor did it curb our appetite for what has become the standard technology for personal communications across the globe. In fact, while there were some attempts to reduce its content in consumer electronics batteries, cobalt demand actually increased.

In 2008, the global cobalt supply/demand market was approximately 50,000 tonnes per year, with China not yet a significant player. At that time, a number of industry commentators were particularly vocal in their skepticism that cobalt supply could meet the demand being created by cell phones, camcorders and laptop computers (collectively referred to as the three C's). They predicted significant shortages and stressed the likelihood of cobalt eventually being sidelined. This was obviously not the case because in 2017, cobalt production surpassed 100,000 tonnes per year to keep pace with demand.

We believe current and future production is not capped at that 100,000-tonne mark. There are untapped resources and there is further room to potentially increase production. However, it is important to note that cobalt supply is closely tied to copper and nickel production. Therefore, in order to bring new sources of cobalt supply to the market, it will require economics that can support these operations and an acceptable return to the investor. If a resource is developed to bring cobalt production on, the incentive price for nickel or copper will have to support the investment because that is the economic driver.

The sentiment and approach to cobalt that took place with the smartphone explosion in 2008, may have strong similarities to the current anticipated electric vehicle explosion. Given the cycle time that automakers need in order to introduce new products, combined with the supply chain complexity in mass producing millions of cars, industry indicators suggest it is highly unlikely and bordering on impossible that lithium-ion batteries containing cobalt won't be powering EV's for the next 5-10 years at the very least. Despite intentions to reduce or eliminate cobalt from batteries, our research shows cobalt usage in batteries to be increasing. If one factors in all of the LFP batteries being phased out in favor of NMC cells, and the trend to increase battery pack size to meet range expectations, real cobalt consumption remains, even if cobalt content per battery is on the decline. Couple this with the fact that lithium-ion cell manufacturers are currently investing billions of dollars to create cell capacity (specifically NMC formulation) we believe, despite daily media releases about new cobalt-free chemistries that, for the foreseeable future, we can expect batteries containing cobalt to be the transportation workhorse as internal combustion engines are phased out.

If we take a look at production costs, we see that the cathode of a lithium-ion battery makes up approximately 33% of the manufactured cost. It's important to note that despite its price, cobalt is not the

sole driver of cathode cost. Industry insiders are more than happy to point the finger at expensive raw material costs for batteries because it is the easy target, given all of the discussion around its price appreciation. The reality is that companies are investing billions of dollars to bring on new cathode manufacturing capacity. This CAPEX impacts cathode pricing because investments must be recovered and investors need to see a return. So as manufacturers continue investment in new capacity, it is expected that their ability to reduce the cost of the battery is limited. We believe blaming high costs on raw materials deflects from the entire story.

Additionally, the process for manufacturing metal cathodes for lithium-ion batteries is still evolving. Cathodes are still manufactured in a batch process because of the furnace time required to alloy the materials for the cathode. Batch processing is not the preferred route of mass production if you want to reduce costs. We believe when cathode manufacturing has time to mature (rather than expand at unprecedented rates) then new and improved manufacturing may be identified to reduce costs. Reducing battery costs by reducing raw material costs is only part of the equation. One just has to look at how much the cost of producing a kWh has dropped in the last 10 years despite appreciation in the cobalt price.

We believe there are good reasons why cobalt has been the cathode material of choice for lithium-ion batteries since Sony patented it in the 1990s. It is fairly abundant, it has high energy density and it is stable in the cathode matrix. Then, in the early 2000's, as cobalt was identified as a potentially limited material, battery manufacturers began pursuing mixed metal cathodes.

However, cobalt has never been completely eliminated and based on our research, we believe it will remain a component of lithium-ion batteries into the next generation. While chemistries that increase nickel content are being pursued, high nickel chemistry batteries have demonstrated greater susceptibility to thermal runaway and overheating (and by extension have shown a higher risk of combusting). That is where cobalt comes into play; it has been proven through intensive scientific and industry research to provide greater thermal stability.

Much has been written about the pursuit of a cobalt-free battery and perhaps this will occur sometime in the future. The current reality is that, given the potential risks involved with battery combustion, we do not foresee automotive manufacturers accepting potentially elevated safety risks that may come with a new battery technology.

Sure, Tesla uses a chemistry of NCA which has seen cobalt content drop from 15% to 3% in a decade and industry sources claim they are working on a 1.5% content battery, however, many in the industry believe that is coming at a different cost. The NCA battery has a higher energy density compared to NMC however, performance indicators suggest it may also be more prone to thermal runaway. To mitigate this potential risk, Tesla utilizes a sophisticated battery management system to monitor and control each of the 1,000 or so cells and measures performance and temperature of each cell individually. According to Tesla, if a cell's temperature approaches runaway limits the system shuts down that cell. Although I am not familiar with all of the specifics, practically implementing such a sophisticated safety system is expected to add additional expense, hence why the new roadster is expected to cost US$250,000. There is software programming and management and there are also the costs for the physical system itself (wiring, sensors, etc.)

History has proven that elegant (i.e. sophisticated) systems may not always be the most economical to adopt in mass production if you are looking at reducing costs. Simple usually turns out to be less expensive than sophisticated and elegant. That's why, as the world's major automakers continue to roll out lower-cost, mass market EVs, Tesla may continue to be a niche player in the global automobile industry.

I would like to conclude by touching upon the holy grail of any industry, which is recycling. There are a lot of companies that have demonstrated the ability to recover metals from spent batteries on a laboratory or pilot scale. The challenge is that large scale commercial operations demonstrating positive economics have yet to be established. Our research indicates there may be major costs and challenges around recovering valuable metals from spent electronics. In addition, the waste streams and final environmental impact of large scale commercial recycling operations have yet to be determined. Research shows recycled materials may be 2-3 times more expensive to recover when compared to traditional resource exploitation to produce a finished metal. We believe recycling will become a factor when the economics of doing so make it viable and not before.

In conclusion, we do not foresee cobalt falling out of favour in the EV industry for a long time. There may be

many discoveries and, of course, new chemistries will be pursued, but industry is all too aware that the time from laboratory discovery to commercialization and mass adoption is usually much longer than estimated, as has been proven by Elon Musk himself many times.

About Cobalt 27 Capital Corp.

Cobalt 27 Capital Corp. (TSX-V: KBLT) is a leading electric metals investment vehicle offering exposure to metals integral to key technologies of the electric vehicle and battery energy storage markets. The Company holds over 2,900 Mt of physical cobalt, is acquiring the world's first producing cobalt nickel stream on the low-cost, long-life Ramu Nickel-Cobalt Mine, and has acquired a cobalt stream on Vale's world-class Voisey's Bay mine‎ beginning in 2021, including the announced underground expansion. The Company also manages a portfolio of nine royalties and intends to continue to invest in a cobalt-focused portfolio of streams, royalties and direct interests in mineral properties containing cobalt, while potentially adding to its cobalt physical holdings when opportunities arise.

For further information please visit the Company website at www.cobalt27.com

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In some cases, forward-looking statements can be identified by terminology such as "may", "will", "should", "expect", "projects", "plans", "anticipates" and similar expressions. These statements represent management's expectations or beliefs concerning, among other things, future operations and various components thereof affecting the economic performance of Cobalt 27. Undue reliance should not be placed on these forward-looking statements which are based upon management's assumptions and are subject to known and unknown risks and uncertainties, including the business risks discussed above, which may cause actual performance and financial results in future periods to differ materially from any projections of future performance or results expressed or implied by such forward-looking statements. Accordingly, readers are cautioned that events or circumstances could cause results to differ materially from those predicted. For further information, we refer you to our legal notice.

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