

EV Sales Expected to Grow in 2023 Despite a Slow Start in Q1, Now Fueled by Tesla-Led Price Wars

written by Matt Bohlsen | April 25, 2023

After a stellar 2022, which saw global plugin electric car sales [increase by 55% year on year \("YoY"\) to 10.522 million](#) and reach approximately a 13% market share, what will 2023 bring? We already saw a soft start to the year in January, which resulted in a Tesla-led price war. February and March sales of electric cars have seen some improvement.

Overall in Q1/2023, global plugin electric car sales are growing YoY, just not as fast as in 2022. BloombergNEF is forecasting [13.6 million deliveries](#) in 2023, compared to Trend Investing's forecast of [14.35 million](#) (up 36% YoY).

Auto Shanghai 2023

Looking at Auto Shanghai 2023, which is on now in China, it appears that interest in EVs is at an all-time high, with [70 of the 100 new models](#) on display being electric. China continues to dominate global electric car sales, selling [almost 60%](#) of global electric cars in 2022.

Image 1: Auto Shanghai 2023 – Embrace the new era of automobile industry



Source: [Auto Shanghai 2023](#)

Q1/2023 sales

Global plugin electric car sales in Q1/2023 are estimated to have reached approximately 2.3 million to 2.4 million units (January [662,000](#), February [812,000](#), March approximately 850,000 (estimate)). At first glance, it may seem like the yearly targets of 13.6 million or 14.3 million look out of reach, but this may not be the case. The first quarter is always the slowest quarter of the year and it was negatively impacted this year by the end of Chinese Federal subsidies and Covid-19 impacts in January in China.

A lot has happened since then, including a 'price war', where EV car manufacturers are significantly discounting prices to secure growth and market share. Reuters recently reported March China sales [stating](#): "Sales of new energy vehicles (NEVs), which include pure battery electric cars and plug-in hybrids, rose 21.9% in March and accounted for 34% of the month's sales.....More than 40 brands have joined a price war started by Tesla this year."

Q1/2023 sales by manufacturing group

[BYD Co](#) (HK: 1211 | OTC PK: BYDDF) remains the global sales leader

having sold [552,076 new energy vehicles](#) (“NEVs”) in Q1/2023. BYD’s sales are up 92.81% YoY.

[Tesla](#) (NASDAQ: TSLA) is at number two globally with [422,875 sales in Q1/2023](#).

Next in terms of Q1 sales is [Volkswagen Group](#) (Xetra: VOW | OTCPK: VWAGY) followed by [Geely Automobile Holdings Ltd.](#) (HK:0175 | OTCOK: GELYY).

In terms of the better-known U.S. brands, they are still a very long way behind. For example, [General Motors](#) (NYSE: GM) sold [20,670](#) electric cars in Q1/2023 and [Ford](#) (NYSE: F) sold only [10,866](#). Rivian (NASDAQ: RIVN) sold [7,946](#) electric pickup trucks in Q1/2023.

The Chinese upstarts Li Auto ([52,584](#) sales), Nio ([31,041](#) sales), and XPeng ([18,230](#) sales) performed ok but failed to deliver significant numbers in Q1/2023.

A conclusion from all of the above is that the big are getting bigger, BYD and Tesla dominate, and Volkswagen Group, Geely, and others are all chasing.

Image 2: Tesla has slashed their prices in 2023 – Model 3 now sells in the USA for US\$39,990, and much less after various incentives



Source: M. Bohlson

2023 EV trends – Price wars and U.S changes to the IRA and the EPA proposed aggressive new ‘clean vehicle’ standards

The emerging trend of 2023 in a sluggish global economy is an

all-out 'EV price war'. Fierce pricing competition has emerged in order to boost sales growth. Falling commodity prices (notably lithium) are helping battery prices to come down and hence also helping EV makers to pass on cost savings.

The big winner so far in 2023 is the consumer. Tesla '[slashed prices](#)' in 2023 thereby starting the price war. You can now buy a Tesla Model 3 RWD in the USA for [US\\$39,990](#), which drops by the federal tax credit of US\$3,750 for eligible buyers (and a further [US\\$2,000](#) for California eligible buyers). Tesla has the highest auto margins and can afford to cut prices and still remain very profitable (Q1 net GAAP income [fell 24%](#) YoY, but remains profitable with 19.3% gross margin).

BYD recently launched their small electric car 'Seagull' at an astonishingly low price (from approximately US\$11,400) in China, receiving 10,000 new orders on the first day.

The incumbent ICE companies and lower volume manufacturers/startups are the ones who will really feel the pinch, with many of them making a loss on their EV sales. At this rate, 2023 may see a few smaller EV startups go bankrupt and potentially some industry consolidation.

Another key trend in 2023 is the changes to the Inflation Reduction Act ("IRA"). As [reported](#) by Bloomberg on April 18, 2023: "Only 10 electric and plug-in hybrid vehicles will qualify for \$7,500 federal tax credits in the US after stricter battery-sourcing rules take effect and render most plug-in models ineligible.....General Motors, Tesla, and Ford Motor all have at least one EV that will qualify, while Ford and Stellantis NV (NYSE: STLA) each have one eligible plug-in hybrid model...."

In a further twist of the knife to the internal combustion engine ("ICE") manufacturers, it was reported in April 2023 that the EPA proposes aggressive new 'clean vehicle' standards,

[stating](#): “The agency projects that EVs could account for 67% of new light-duty vehicle sales and 46% of new medium-duty vehicle sales in 2032, bolstered by the EPA proposals.”

Closing remarks

Global electric car sales are off to a sluggish start in 2023, but the recent price war looks to be helping with sales momentum growing in February and March 2023. Tesla appears to be determined to grow EV sales volumes at an average of 50% YoY this decade. Given Q1/2023 growth was [44% YoY](#), it looks like Tesla will continue the price war for some time.

In terms of 2023 EV trends, it looks like being a year of reckoning. BYD and Tesla are getting stronger and the ICE laggards and struggling EV startups are being left behind. At this rate, we may see some casualties before year end. At least the EV consumer is now getting some great deals!

American OEM automotive industry's big problem with lithium

written by Jack Lifton | April 25, 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

“gigaactories” 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.

Is there a Ford in your future?

written by Jack Lifton | April 25, 2023

The American Ford Motor Company, in its domestic operations, has now adopted the current business operations model of the Chinese OEM automotive industry, but lags far behind on the Chinese

approach to critical materials supply security.

The Chinese like to emphasize that their approach to politics and economics cannot be wholly understood as just an example or even a simple variant of these disciplines as practiced in the West and applied to China. They refer to their economic system as Socialism with Chinese Characteristics and say that the operating focus of their domestic economy is now dual circulation, the emphasis of domestic consumption leading to a declining importance of exports.

Nonetheless, foreign analysts continue to view China with a Western academic definitions filter.

This has allowed analysts to miss almost entirely the critical details of the growth of the business operations model of the (now world's largest) Chinese OEM automotive industry as it has adapted to what the Chinese call the production of "New Energy Vehicles " (NEVs).

To avoid internal conflict and increase efficiency, large Chinese auto companies now usually set up a separate NEV unit that runs independently from the traditional ICE car business.

I don't know James Farley, the CEO of the Ford Motor Company, personally, but I do know that he is among the most perceptive and far-seeing of American OEM automotive top managers, and one who actually understands the business of manufacturing of cars and trucks and the markets for those vehicles. How do I know this? By the action he announced last week that reveals his financial and market acumen. The Ford Motor Company has announced that it will separate its EV operations and its ICE operations into two separately managed and organized internal units, each of which will focus on a powertrain. There will be the Ford Model-e Division and the Ford Blue Division. The Presidents of both divisions will report directly to the CEO,

now Jim Farley.

As Farley states: "We still think that more than half our customers are going to be ICE, and they're going to be ICE for a long time," Farley said. "It's almost like our industry's kind of given up on that business. Even if the unit volume starts to fall over when mass adoption of electrification happens, in a lot of segments that's not going to happen, and we want to have a dedicated team to run that business with passion."

So, now, at least, one of America's remaining, "Big Two" automotive OEMs have caught up with Chinese management "style" in product development.

But, there's one more area where Capitalism with Chinese characteristics has outpaced the rest of the world. That is in security of supply of critical raw materials. China has an industrial policy that supports key industrial development, and it has had that policy for a long time.

When the Chinese domestic OEM automotive industry was in its infancy a generation ago China rapidly developed the domestic capability and capacity to produce a secure supply of raw materials to make ICE powered vehicles. Those main materials were steel, aluminum, copper and plastics. China soon overtook the USA and indeed the rest of the world combined in the production of those critical industrial materials.

About 6 years ago the Chinese government decided that the electrification of land transportation was critical to hedge against China's dependence on foreign fossil fuels and to reduce pollution in its rapidly advancing urbanization. Accordingly, the government set out to determine what materials would be critical for such developments. Lithium-ion battery and rare earth permanent magnet motor construction materials were determined to be priorities, and a national program to find

them, extract them, process them, and manufacture end-use products dependent upon them for their function was added to the five-year plan system of formulating and carrying out industrial policy. Today, China has sufficient domestic secure supplies of materials and processes already in place to build all of the BEVs it plans to build through most of this decade.

This is where America and Europe are woefully far behind.

Neither the Ford Motor Company nor anyone else can afford to wait for their national governments to catch up with China's industrial policy planning and execution.

There is nowhere near enough non-Chinese production and processing of the critical materials for batteries and electric motors to fulfill any but a small part of the planned non-Chinese production of BEVs, wind turbines, energy storage, aircraft and ship components, and consumer goods.

It's going to be every company for itself. I am hoping that the non-Chinese OEM automobile industry learns from the chart below what it will take to survive.



I am not optimistic.

Will Technology Metals' Supply

Meet the Demand for EVs?

written by Jack Lifton | April 25, 2023

Since market economics' common sense was codified by Adam Smith in the 18th century, people have been aware of the fact that the price for a good or service is what a willing buyer will pay a willing seller. Of course, the seller must be able to get the good or perform the service and the buyer must have or be able to get the money. These last requirements seem to have escaped the notice or understanding of the market manipulators also known as Western politicians.

The global OEM transportation vehicle market is really not free. It is being politically manipulated by climate change politics, based on the belief that eliminating the carbon dioxide output from the use of fossil fuels in vehicle powertrains, based on internal combustion engines (ICEs) and replacing them with onboard stored electricity in batteries driving electric motors (BEVs) will have a significant "positive" effect for humans on the earth's climate. Whether or not this cause-and-effect hypothesis is true the total conversion of the world's transportation fleet to battery electric power is not possible for the size of the present fleet and its projected growth. This is because the (battery) technology metals necessary to effect this change simply do not exist in sufficient quantities that are accessible to mankind's engineering abilities, willingness to deploy capital, and the real global energy economy.

This supply limit will not become apparent until after 2025, so it is being ignored as a problem easily solved by the "efficient" market, whose actual strictures the political class does not understand.

One clue about structural limitations, which politicians either do not understand or do not believe, is that the current Western

commodity price inflation is driven by efficient market supply shortages, which will automatically correct from infinite supply resources, not by free market excess (unsatisfiable) demand. Another, perhaps more insidious, supply limitation is simply the price ceiling, the maximum amount that the consumer can/will pay for a metal, before that metal becomes too expensive for the intended use. This is happening now, for aluminum, as soaring energy costs in Europe, for example, force the shutdown of aluminum electrolytic smelters, the production cost from which has become more than the market price of aluminum. This was caused by an entirely man-made shortage of electricity through sheer political short-sightedness, not by the aluminum marketplace.

The politically driven demand pull for BEVs has already skewed the lithium market by driving lithium prices high enough to allow mines and sources, that would have been marginal or worse, to appear to be economical and to develop. But lithium prices are already too high for the continuing decline in battery costs to achieve par with fossil-fueled engines in the near term, if ever. The politicians' answer to this is to restrict fossil fuel production and make it more costly. Thus a (n inflationary) price spiral has begun that could price BEVs as well as reduced production, thus more expensive, ICEs and their fossil fuels "out of the mass market!"

The structural metals and materials used to make vehicles used for the transportation of people and freight can be, and mostly are, recycled. This is driven by the fact that it takes less energy to recycle structural metals than to produce new material from mines. A significantly large proportion of the iron, aluminum, copper, zinc, and lead used to construct new vehicles is recovered each year from the recycling of end-of-life scrapped vehicles. Cars in North America, have average useful lives of 12 -17 years. The North American car "fleet" is over

300 million vehicles and each year about 5% of the fleet is scrapped. This means that enough iron, copper, aluminum, and lead is recycled each year to build 15 million new vehicles if 100% perfect recycling is assumed. It is noteworthy that the recycling efficiency of the American scrap, iron & steel, aluminum, copper and lead industries is very high and that most American steel for automotive use is made from scrap in, reliable, fossil or nuclear fueled (electrical) baseload requiring, electric arc furnaces. The North American OEM automotive industry considers 17 million vehicles produced and sold to represent a good year, so it does not have a problem sourcing structural metals for components. In fact, enough new vehicles are imported into North America that the need for structural metals for just domestic production by the OEM American automotive industry is met by just the metals produced from recycling.

So far, so good.

Now comes the not-so-good news about the technology metals required for manufacturing automobiles. Today's internal combustion engine powered motor vehicles use, on average, about 0.5kg of rare earth permanent magnets (REPMs), so the annual need for such by the domestic OEM industry is between 6,000 and 8,500 tons of REPMs (here I assume that of the 17 million units sold each year up to 5 million are imports from another country (including Mexico and Canada besides China, Japan, Korea, Germany, France and the UK).

And, a Tesla Model 3, electric vehicle (EV) with the range required by American buyers uses up to 5kg of REPMs, and 6-8 kg of lithium, measured as the metal, in its lithium-ion rechargeable battery-based powertrain.

How many Gigawatt hours of lithium-ion battery storage for use

in EVs and stationary storage can be produced with the earth's known physically and economically accessible deposits of the necessary critical materials? I was going to submit that question as an abstract to a coming battery conference, but I realized that the academics and bureaucrats, and corporate researchers who attend the conference don't have enough background in industrial mineral economics to understand what I want to say, and, in any case, don't want to hear it.

Below is Bloomberg's guesstimate of the demand growth for the supply of all of the metals necessary to build (projected levels of) EVs through 2030. It is very important to understand that the only increased demand for metals for building EVs that matters are for those metals that are non-structural, **the EV Technology Metals**. EVs will use no more of structural metals in the aggregate than ICEs do, so that as the ICEs are replaced by EVs, there will be no increased demand for iron, aluminum, or zinc, and a marked decline in the demand for lead as starter lead-acid batteries are phased out.



[Source](#)

But those technology metals specifically required for an EV's powertrain, the battery and the electric motors will see a dramatic increase in demand if and when EVs achieve a significant market penetration.

For some reason, which I think is just ignorance, the major news media "predictors" pay no attention to the distinctions between the demand for structural metals, which will simply be the same total, with the exception of that for copper, as is used today unless the annual global total production of motor vehicles increases dramatically, which is very unlikely. Mature Western (and Japanese and Korean) domestic markets will decline in demand as longer lived vehicles become necessities due to price.

This may well have a negative effect on recycling efficiency for all metals as the scrap market re-adjusts to lower supply and lower annual demand for new vehicles.

EVs, however, as they replace ICEs will not increase the demand for structural metals per unit, but it is the demand for EV technology metals that could skyrocket, if that much supply were possible.

To reiterate: The above chart is wrong with regard to iron and aluminum demand for vehicles; they are a function of the total number of vehicles built in a year, and, since Western markets are mature in transportation vehicles, the demand for new iron and aluminum for that use is unlikely to increase more than 25%, if that, to add new vehicle production, perhaps mostly for the Indian and African home markets.

For EV Technology Metals the story is very different. An EV uses about 50 kg of copper for its wiring harness, electric motor windings, and lithium-ion battery internal circuitry. This represents a 50% increase over the demand for copper in an average ICE, so that the demand for copper for EVs could add fifty percent to the overall demand for copper by the OEM automotive industry today if and only if ICEs are completely replaced by EVs. Thus, the factor for copper in the above chart, 10X, should be 1.5X.

The potential demand growth for the most critical EV Technology Metal, lithium, is the limiting factor in the projected transformation of power trains from fossil fuels to battery moderated electricity. Today BEV sales are reported to be 3% of the global total vehicle sales. This is projected to reach 10% by 2025, so that by 2025 at least three times as much lithium will be needed to satisfy the demand for batteries.

In 2021 some 86,000 tons of lithium, measured as metal, were

produced. 60% of that total was used to manufacture lithium-ion batteries. Let's call that 50,000 tons for batteries in 2021. The 36,000 tons of lithium used for non-battery uses is unlikely to grow, so the necessary supply increase to satisfy the needs for producing 10% BEVs in 2025 is 3x, for a total demand in 2025 of 150,000 tons of lithium, measured as the metal. Adding the 36,000 tpa of lithium demand for other uses we get a total lithium demand of 186,000 tons for 2025, which is essentially 2X 2021 total demand for lithium. This is most likely do-able by the lithium mining industry, but the downstream supply chain to turn 150,000 tons of lithium into fine chemicals and battery electrodes does not now exist, and although capacity increases may be planned it cannot be determined how much will actually be constructed in time. This is determined by the availability of capital, its proper allocation, the availability of engineering skills, and the availability of construction capacity. Although these can be quantified, government interference, also known as regulation, is the single largest time, and frequently capital, consuming impediment to mining and process engineering in the West.

The (mineral) economic illiterates who populate our universities and governmental bureaucracies live in a fantasy world of infinitely available natural resources and their unimpeded economic production. In that world, and only that world, is a green energy transition possible without an unacceptable decline in global standards of living, and the creation of a have and have-not society on a global scale. Let the UK's current

Production and processing of the EV Technology Metals are and will continue to be a good investment until a consensus is reached about a balanced energy economy, in which fossil fuels continue to be used for critical needs for which they are irreplaceable. Continued production of EV Technology Metals after that will be determined by price.

Rare earths ore production continues to ramp up at Vital Metals' Nechalacho Mine

written by InvestorNews | April 25, 2023

In the rare earths' business junior miners need to work with off-take partners to find and meet very strict product qualification requirements. These are specialty products, especially when it comes to the high value magnet rare earths used in electric motors for electric vehicles (EV). All of this takes time.

What this means for investors is that it is wise to first check a rare earths junior's partnerships and off-take relationships before investing. This is because the off-take partners will be very selective as they need a high spec product (low impurity, etc) and those juniors that have succeeded in securing off-take agreements are well on their way to success. The juniors still have to successfully ramp up their production of the 'at spec material', but if successful can then fully qualify their product and hence stand the best chance at progressing to larger scale production. The process can take years not months.

One company doing the above is [Vital Metals Limited](#) (ASX: VML) (Vital). Vital has an off-take agreement with REEtec in Norway and another with Ucore in the USA. In both cases, Vital is working with them to develop a qualified end product at commercial scale that can then be sold to end-use customers.

Rare earths ore production continues to ramp up at Vital's

Nechalacho Mine

Vital is already mining (lifting, crushing and [sorting](#) ore are performing well) at its Nechalacho' Mine in Canada's Northwest Territories (NWT). The Nechalacho Mine is a high grade, light rare earth (bastnaesite) project with a world class resource of [94.7Mt at 1.46% REO](#) (M& I, and Inferred). Nechalacho's North T Zone hosts a high-grade resource of 101,000 tons at 9.01% LREO (2.2% NdPr) and is where mining from a starter pit began in 2021 (Stage 1). Stage 2 will involve the development of the much larger Tardiff deposit.

Further ore processing is to be done at Vital's, under construction, Saskatoon cracking and leaching facility once completed, with first product expected [by June 2022](#). Vital aims to produce a minimum of 5,000 tons of contained REO by 2025 from the Nechalacho Mine.

Construction is underway on Vital's rare earth extraction facility in Saskatoon. Dense Media Separator (right) to be used in the extraction process



Source: [Vital Metals September 2021 Quarterly Report](#)

Vital [states](#): "More than \$120 million has been spent by previous owners on drilling, permitting and project development at Nechalacho, which includes a 40-person camp and airstrip. Vital aims to be the largest independent supplier of clean mixed rare earth feedstock outside China."

Vital's off-take agreements

- Vital has a binding off-take agreement with Norwegian company REEtec for Stage 1 production with the supply of 1,000t REO (ex-Cerium)/yr for an initial five-year period.

This was later increased to rare earth carbonate product containing a minimum of 750t NdPr, contained within [2,000t/year total rare earth oxides](#) (TREO) with a maximum of 25% cerium. The amended agreement extends Vital's product sales to REEtec to 2028 and provides the option to further expand operations during an additional 10 year long term supply agreement to provide up to 2,500t NdPr per annum contained within ~6,800 tonnes TREO (containing a maximum 25% cerium). It also means that the increase to 2,000t/year equates to [75%](#) of Vital's expanded Saskatoon plant capacity.

- Non-binding MOU with [Ucore Rare Metals Inc.](#) (TSXV: UCU | OTCQX: UURAF) to sell to Ucore a minimum of [500t REO \(ex-cerium\)/year](#), commencing H1 2024. Vital to expand production to support a minimum of 50% of Ucore's envisioned 5,000t TREO/yr processing capability (ie: 2,500t TREO/yr) by 2026. Customer acceptance protocols will include the supply of a sample (1-2kg) in Q4 2021 and with a 1t sample supplied in H2 2022.

The reason for the small initial volumes is that it allows both parties to scale together. As I discussed in the opening paragraphs, it takes time for miners to scale production of a high spec qualified rare earths product and for off-takers to go through their acceptance testing. The positive for Vital is that the process has begun with their two off-take partners, and a pathway towards full production and sale has been mapped out.

Vital Metal's other projects

Vital [is acquiring](#) the Zeus heavy rare earth project and 68% of the Kipawa Project in Canada, from Quebec Precious Metals Corporation, for C\$8 million, payable over 4 years. Vital also owns a second [light rare earths project](#) in Tanzania.

Vital [states](#): "These projects have the potential to complement

our light rare earths operations at Nechalacho and transform Vital into the only North American producer of both light and heavy rare earths.”

Closing remarks

Vital Metals is the first commercial scale [rare earths producer](#) in Canada and only the second in North America, since rare earth mining was revived earlier in this century. Production began on a small scale in mid 2021 with ore crushing and sorting at the Nechalacho’ Mine in NWT, Canada. Further ore processing will begin to produce product from June 2022 from Vital’s Saskatoon cracking and leaching facility.

Off-take qualification of a scaled up rare earths’ product is ongoing with REEtec in Norway and with Ucore in the USA, but it can take up to 2 years. Vital will grow its production as its customers accept more qualified product. In other words, scale production with your customer, thereby being capital efficient in terms of Vital’s capital outlay.

The pieces of the puzzle are all in place for Vital Metals to build a significant rare earths operation. Investors with a little patience should potentially be well rewarded this decade as demand for rare earths takes off.

Vital Metals trades on a market cap of [A\\$204 million](#).

EXRO’s CEO on deal with Clean

Seed Capital to advance electrification of farm equipment

written by InvestorNews | April 25, 2023

“I think what we bring to the table that is really different from anybody else is that we are looking at how we control efficiency through the power electronics, but working with the motor. We are looking at that complete system optimization. By doing that we have got this huge market that is interested in what we are doing. It doesn't matter if you are into green technology or motors or power electronics. We are kind of covering all three of it.” States Sue Ozdemir, CEO of [Exro Technologies Inc.](#) (CSE: XRO | OTCQB: EXROF), in an interview with InvestorIntel's Tracy Weslosky.

Sue went on to provide an update on Exro's collaboration and supply agreement with Clean Seed Capital Group Ltd. to integrate Exro's technology into Clean Seed's high-tech agricultural seeder and planter platforms, advancing the electrification of heavy-farm equipment. Sue said that Clean Seed is an industry expert in the agricultural segment. Agriculture still has 45% of the industry using non electric methods. With the Clean Seed deal, Sue said, Exro will be able to show scalability of its technology for the entire mobility industry. Sue also provided an update on Exro's partnership with Motorino Electric. She said that Exro has delivered the first Exro-powered e-Bike to Motorino. Exro's engineered technology provided a torque and acceleration increase of greater than 25% for the Motorino e-Bike.

To access the complete interview, [click here](#)

Disclaimer: Exro Technologies Inc. is an advertorial member of InvestorIntel Corp.

The Perfect Market Storm: Critical Materials, Cleantech and COVID-19

written by Tracy Weslosky | April 25, 2023

There seems to be a misguided notion (with some) that isolation means we have more time to waste. Far from reality, I am certain that many of you, like me are looking at your inbox wondering where or how to wade into the depth of quality deals and opportunities upon us...

Would like to kick your morning coffee off with a special nod to our longstanding friends from [Avalon Advanced Materials Inc.](#) (TSX: AVL | OTCQB: AVLNF) whose \$AVL soared 50% yesterday. We have been supporters of #Avalon since Don Bubar first did an interview with me in 2009 (with Jack Lifton) and introduced me to rare earths. And indeed, there is news flow in the rare earths a-n-d throughout the critical materials sector that is literally ricocheting from source-to-source online...

[How to follow?](#)

Jack Lifton, Clint Adam Smyth and I just launched the [TechnologyMetals.com](#) site to manage the influx of critical materials' news (and experts) we are communicating with regularly. Jack's interview with Dr. David Dreisinger on [Search Minerals Inc.](#) (TSXV: SMY) last week was purely outstanding (in

my opinion) as he describes David as “the leading authority on solvent extraction process”. This is a hot topic that we touch on in our weekly update that we just started...[click here to access a preview](#)

And associated technologies relating to cleantech? We saw [Exro Technologies Inc.](#) (CSE: XR0 | OTCQB: EXROF) stock move up 30% yesterday! Interviewing CEO Sue Ozdemir on how Exro makes “electric motors faster, stronger and greener” for InvestorIntel on Wednesday: we will get this up live as fast as we can!

Uranium continues to maintain a much-deserved interest, let me point you in the right direction for a quick update – Matt Bohlsen’s piece from last week titled, [The DoE’s plan to rebuild the uranium sector and ‘pull America’s nuclear industrial base back from the brink of collapse’...](#) reinforces the sustainability themes we are touting on the Technology Metals Show. Arranging interviews as we speak with Mark Chalmers of [Energy Fuels Inc.](#) (NYSE: UUUU | TSX: EFR) and Jeff Klenda of [Ur-Energy Inc.](#) (NYSE: URG | TSX: URE) as they “stand to be the major beneficiaries, especially given they started the whole S232 petition back in January 2018” you should see those live on InvestorIntel next week.

And yes, we are following the biotech and life sciences market. If you subscribe to our AI driven market updates on InvestorChannel.com – you can catch the 20 companies, we are following in the race for vaccinations...[click here](#)

Speaking of AI technology, we would like to ensure that you are aware of the news that was put out by [Predictmedix Inc.](#) (CSE: PMED | OTCQB: PMEDF) yesterday titled – [Predictmedix Files Patent for Mass Screening for Infectious Diseases Such As #COVID19](#)



1 YR stock Chart for Predictmedix Inc. (CSE: PMED) – Source: TD Waterhouse

And speaking on the war against the COVID-19, [StageZero Life Sciences Ltd.](#) (TSX: SZLS) put out the following news on April 20th [StageZero Life Sciences Initiates Testing for COVID-19 In the USA](#)

Remember, click here to subscribe to the [InvestorChannel](#) for daily market updates on the Canadian, US and Hong Kong markets – and to follow InvestorIntel's stock watchlist for Gold, Uranium, Rare Earths and of course, COVID-19...