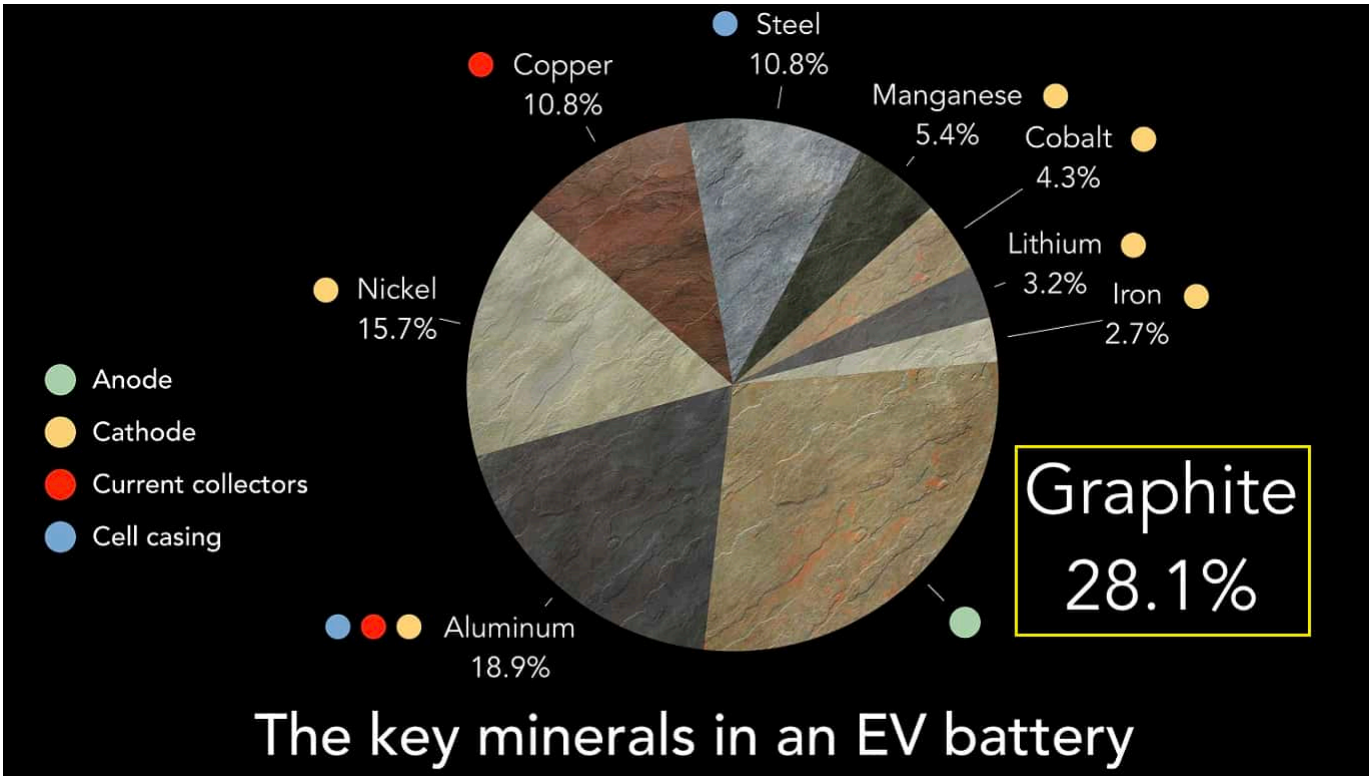
Can the Western graphite and anode industry rise to meet China's challenge?

written by Matt Bohlsen | October 25, 2023

China to impose some graphite and processed graphite materials 'export permits' from December 1, 2023

Last week it was reported that China, the world's top graphite producer plans to curb exports of key battery material by implementing export permits for some graphite products from December 1 to protect national security. Another report stated: "China graphite export restrictions could hinder ex-China anode development….if it lasts into the longer term, it is likely to accelerate the build-out of a localized graphite and battery anode supply chain outside China."

Graphite is the number one metal required for lithium-ion batteries making up about a 28% share. It is used in the anode.



The key metals and minerals in a battery of an electric vehicle

The world is very dependent upon China to supply processed graphite material and anodes for Li-ion batteries

The reason why this is huge news in the graphite world is that China produces 67% of global natural flake graphite supply and refines more than 90% of the world's graphite into active anode material (typically spherical graphite). If China were to deny or delay permits for spherical graphite it will cause major problems for anode manufacturers outside China, such as those in South Korea, Japan, or North America.

China currently produces ~77% of global lithium-ion batteries and 75-80% of global electric cars, thereby completely dominating the industry. If the West is shut out from sourcing

processed EV battery materials from China then they will have a major problem producing their own EVs. China plans to prioritize EV battery materials for their own needs. This is why President Biden introduced the Inflation Reduction Act (IRA) and the EU introduced the EU Critical Raw Materials Act. Both are designed to address the shortages in the EV supply chain and the forecast shortages of future supply of critical raw materials. The problem is the IRA has done little to address the supply of raw materials and the EU Critical Raw Materials Act is woefully inadequate and targets fall way short of what will be needed.

Which western graphite companies can rise to meet the challenge to establish an ex-China graphite supply chain

The leading western graphite companies that are working to establish an ex-China supply chain for flake graphite, synthetic graphite, and spherical graphite include:

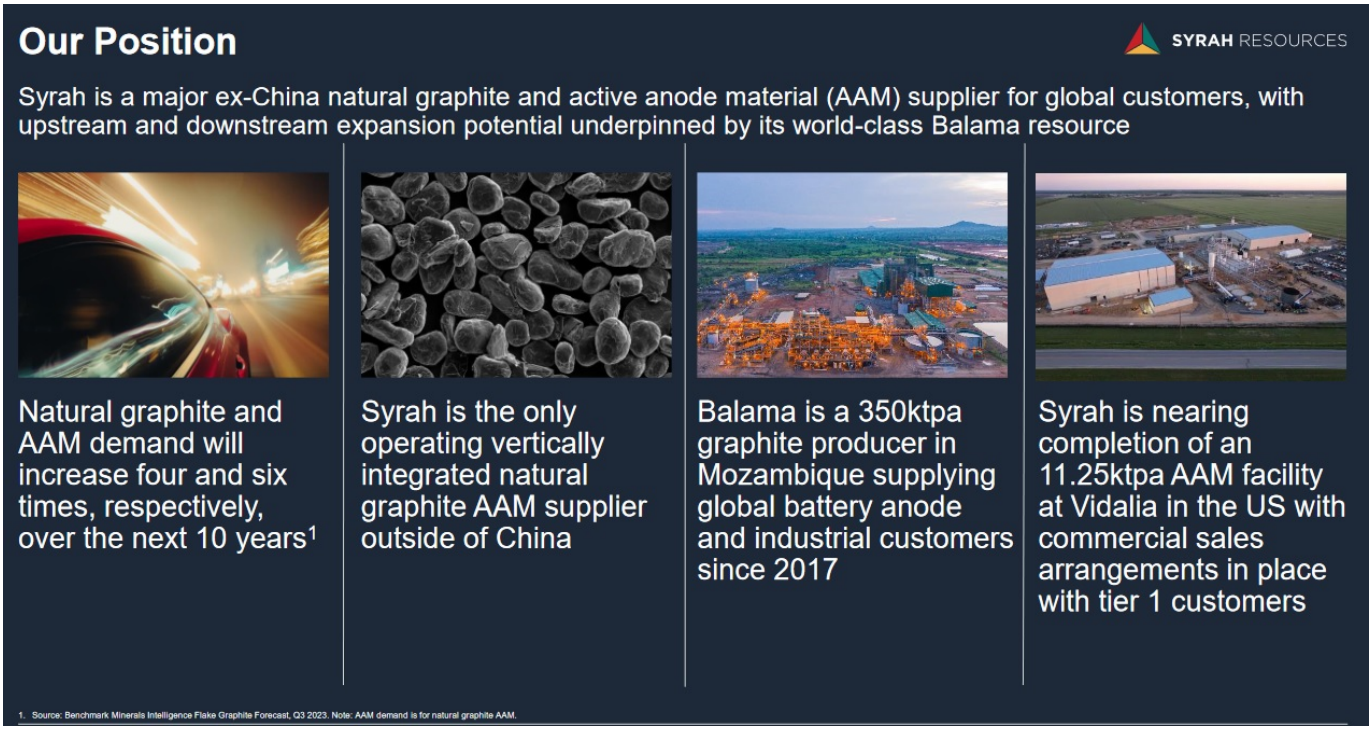
- **Syrah Resources Limited (ASX: SYR)** – Largest western flake graphite producer with their 350,000tpa flake graphite capacity Balama Mine in Mozambique. Currently constructing the Vidalia spherical graphite facility in Louisiana, USA with Stage 1 production plans to produce 11,250tpa of spherical graphite. Longer term they plan to expand to 45,000tpa in 2026 and then to >100,000tpa by 2030 with an Europe/Middle East facility. Syrah already has an off-take agreement with Tesla (NASDAQ: TSLA). Syrah's stock price has surged ~80% higher the past week following the release of the China export permits news.
- **Nouveau Monde Graphite Inc. (NYSE: NMG | TSXV: NOU)** – Is

rapidly progressing their plans for their Matawinie Graphite Mine and Bécancour Battery Anode Material Plant in Quebec, Canada. The company is working with Panasonic to qualify their graphite anode material. Panasonic supplies Tesla with batteries.

- **Northern Graphite Corporation (TSXV: NGC | OTCQB: NGPHF)** – Owns graphite producing and past producing mines in Quebec, Canada and Namibia. They also own the Bissett Creek graphite Project in Ontario, Canada. The Company state that they are "North America's Only Significant Natural Graphite Producer". The Company plans to develop one of the world's largest battery anode materials facilities in Baie-Comeau Québec with 200,000tpa of capacity.
- **NextSource Materials Inc. (TSX: NEXT | OTCQB: NSRCF)** – A new graphite producer from their Molo Graphite Mine in Madagascar with Phase 1 capacity of 17,000tpa of flake graphite production and plans to expand to 150,000tpa. The Company's short term plan is for a Battery Anode Facility in Mauritius and longer term for similar facilities in USA/Canada, UK, EU.
- **Magnis Energy Technologies Ltd.** (ASX: MNS | OTCQX: MNSEF) – Magnis aims to produce high performance anode materials utilising ultra-high purity natural flake graphite from their Nachu Graphite Project in Tanzania. Magnis' partially owned U.S.-based subsidiary Imperium3 New York, Inc ("iM3NY") operates a gigawatt scale lithium-ion battery manufacturing project in Endicott, New York.
- **Talga Group Ltd. (ASX: TLG)** – Own the integrated mine to anode Vittangi Graphite Project in Sweden. In September 2023 Talga broke ground on their 19,500tpa anode facility, stating "the refinery is projected to be the first commercial anode production in Europe for electric vehicle Li-ion batteries".

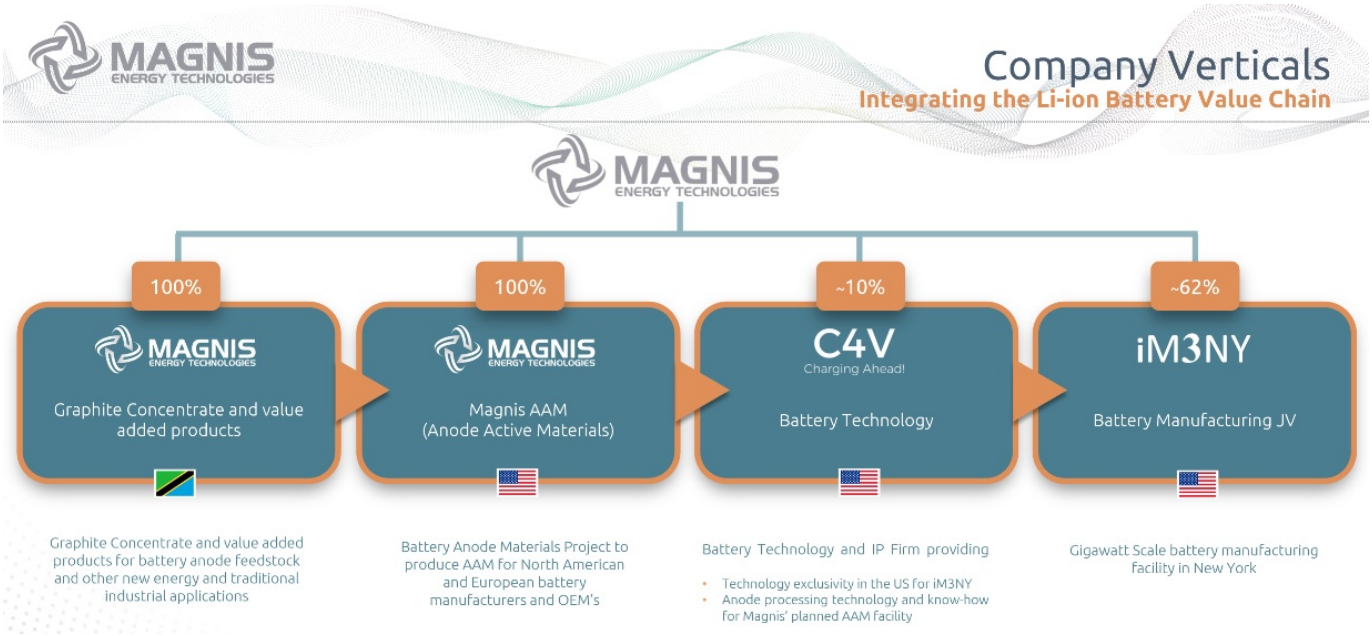
- **Novonix Limited (NASDAQ: NVX | ASX: NVX)** – Has a production capacity target of up to 20,000 tpa of synthetic graphite anode material from their Tennessee facility in the USA.
- **Anovion Technologies (private)** – The USA anode producer plans to invest US$800 million to produce a 40,000tpa synthetic graphite anode material facility in Georgia, USA with plans to expand to 150,000tpa by 2030.

Syrah Resources leads the West's attempt to build an ex-China flake graphite and anode material supply chain



Source: Syrah Resources September 2023 Quarterly Activities presentation

Magnis Energy Technologies is working towards becoming a graphite producer, anode materials producer and is already a small scale JV battery producer in the USA



Source: [Magnis Energy Technologies company presentation]

Closing remarks

The Western world received a loud wake-up call the past week. The China graphite products 'export permits' may only serve to restrict or slow down some anode material supply from China, but it puts the West on notice of how dependent they are upon China.

Given the world is rapidly moving to electric vehicles, the West must urgently build up its EV materials supply chains or risk being left behind in the global EV race.

The USA is making some bold moves and the companies discussed in this article are moving in the right direction. Let's just hope that the western EV supply chain build out accelerates rather than stalls like [GM's latest electric pickup truck plans]. I think Americans will want U.S.-branded electric cars and I know Europeans will want European branded electric cars. If we are not careful our only choice one day might be Tesla and Chinese electric cars. Stay tuned.

China’s Tightening Control over the Global Graphite Market

written by Tracy Weslosky | October 25, 2023

China’s Ministry of Commerce has announced that, effective December 1, export permits will be mandated for specific graphite products, citing national security reasons. Graphite, a pivotal component for electric vehicle (EV) batteries, finds China at its epicenter, producing 67% of the global supply of natural graphite. Additionally, China refines over 90% of the world’s graphite, which is integral to almost all EV battery anodes.

NEO Battery Materials Focuses on EV Market Transformation with Silicon Anodes

written by InvestorNews | October 25, 2023

In this InvestorIntel interview, Tracy Weslosky talks with NEO Battery Materials Ltd.’s (TSXV: NBM | OTCQB: NBMFF) Strategy and Operations Manager Danny Huh about their South Korean commercial plant to manufacture silicon anode materials for lithium-ion

batteries. With the pre-construction phase expected to start in August 2023, Danny explains how NEO Battery Materials has accelerated its commercialization efforts with targeted completion of the South Korean plant by the first half of 2024.

Highlighting the need for expanded production capacity due to their growing customer pipeline, Danny discusses NEO Battery Materials' recent decision to upsize their R&D Scale-Up Centre in "one of the epicenters of battery production, as well as battery research, in South Korea."

Danny goes on to provide an update on their American subsidiary, NEO Battery Materials America LLC (NBM America), to market NEO Battery Materials' silicon anode materials in the US. Danny also discusses their plans to establish another R&D facility in either Ontario or Quebec, Canada, to establish closer ties with battery manufacturers and other battery material players involved in the Canadian EV battery supply chain.

To access the full InvestorIntel interview, click here

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About NEO Battery Materials Ltd.

NEO Battery Materials is a Canadian battery materials technology company focused on developing silicon anode materials for lithium-ion batteries in electric vehicles, electronics, and energy storage systems. With a patent-protected, low-cost manufacturing process, NEO Battery enables longer-running and ultra-fasting charging batteries compared to existing state-of-the-art technologies. Building the first commercial plant in South Korea, the Company aims to be a globally-leading producer of silicon anode materials for the electric vehicle and energy

storage industries.

To learn more about NEO Battery Materials Ltd., click here

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Danny Huh of NEO Battery Materials Discusses Silicon Nanocoating on Anodes for the 1000-Mile EV Battery

written by InvestorNews | October 25, 2023

In this InvestorIntel interview, Tracy Weslosky talks with NEO Battery Materials Ltd.'s Strategy and Operations Manager Danny Huh about their ongoing commercialization and optimization process to achieve the 1000-Mile Electrical Vehicle Battery using silicon anode materials. Having achieved a significant technology milestone of uniform nanocoating capability on silicon anodes, Danny explains how their technology can help increase driving range of electric vehicles and enable ultra-fast charging.

Lomiko Metals' Belinda Labatte

on the global graphite shortfall expected in 2023

written by InvestorNews | October 25, 2023

In this InvestorIntel interview, Tracy Weslosky interviews Lomiko Metals Inc.'s (TSXV: LMR | OTCQB: LMRMF) CEO and Director Belinda Labatte about how Lomiko is developing a sustainable approach to critical minerals development in North America. Providing an update on their La Loutre Graphite Project in Québec, Belinda explains how Lomiko is well positioned to be part of the solution for the global graphite shortage that experts anticipate we will start to see in 2023.

As interest in North American source for natural flake graphite continues to grow, Belinda discusses how the shortfall in graphite supply may increase to 8 million tons by 2040. Speaking on the strength of Lomiko's management team that has experience in getting exploration plays to production, Belinda states, "We know how to take a project all the way through the stages of development."

To access the full InvestorIntel interview, click here

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About Lomiko Metals Inc.

Lomiko Metals has a new vision and a new strategy in new energy. Lomiko represents a company with purpose: a people-first company where we can manifest a world of abundant renewable energy with Canadian and Quebec critical minerals for a solution in North America. Our goal is to create a new energy future in Canada where we will grow the critical minerals workforce, become a

valued partner and neighbour with the communities in which we operate, and provide a secure and responsibly sourced supply of critical minerals.

In addition to La Loutre, Lomiko is working with Critical Elements Lithium Corporation towards earning its 70% stake in the Bourier Project as per the option agreement announced on April 27th, 2021. The Bourier project site is located near Nemaska Lithium and Critical Elements south-east of the Eeyou Istchee James Bay territory in Quebec which consists of 203 claims, for a total ground position of 10,252.20 hectares (102.52 km2), in Canada's lithium triangle near the James Bay region of Quebec that has historically housed lithium deposits and mineralization trends.

To learn more about Lomiko Metals Inc., click here

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King discusses Global Graphite Shortage and Lomiko Metals with Belinda Labatte and Gordana Slepcev

written by InvestorNews | October 25, 2023
In this InvestorIntel interview, Byron W King interviews Lomiko Metals Inc.'s (TSXV: LMR | OTCQB: LMRMF) CEO and Director Belinda Labatte, and COO Gordana Slepcev about the coming global

graphite shortage. With the recent drill results further extending graphite mineralization in multiple zones at the La Loutre Graphite Project in Québec, Belinda provides an update on Lomiko's portfolio of critical minerals projects in Quebec.

With the Canadian Government announcing that all new vehicle sales will be electric by 2035, Belinda explains how the graphite supply shortage may increase to 8 million tons by 2040. Gordana says that 95% of the anode in a lithium-ion battery is composed of graphite. She goes on to discuss how graphite from Lomiko's La Loutre Project may be suitable for anode battery applications which require graphite concentrate of 99.95%.

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NEO Battery Materials fast tracks their silicon anode EV battery material plant in Korea

written by InvestorNews | October 25, 2023
NEO Battery Materials Ltd. (TSXV: NBM | OTCQB: NBMFF) ("NEO") is advancing at full speed with their recent announcement that they have "completed a contract for the Commercial Plant's construction, design, and permits with an architectural firm". The plant will be located in Gyeonggi Province's Oseong International Investment Zone in South Korea, near major battery manufacturers LG Energy Solution and Samsung SDI.

As a brief reminder for new investors, NEO has developed high-performance silicon anode materials to replace parts of the graphite used by anode and battery manufacturers in their battery anodes. Their leading product is NBMSiDE™, a silicon anode material for EV lithium-ion batteries. NBMSiDE™ is manufactured through the Company's proprietary nanocoating

technology, achieving a high specific capacity of >2,500 mAh/g. This essentially means the NEO silicon anode material helps improve the all-important battery energy holding capacity and ultimately the charging speed of the EV.

As NEO states: "Through a mix of treatments and nanocoating materials, NEO utilizes pure metallurgical-grade silicon particles, which provide a 40-70% higher initial specific energy or capacity compared to current competitors that employ SiOx, SiC, or other composite silicon materials."

South Korea anode plant design progressing with an increased production target

Regarding the new anode materials plant, the final site approval has now been granted. Due to the land site being in a Foreign Investment Zone, NEO will receive a range of benefits including a 99% reduced lease rate and tax incentives. NEO may also access Provincial financial support for equipment purchases, employment subsidies, and education/training subsidies.

Additionally, NEO recently stated that the "Company will now advance to the detailed process design for the production lines and will proceed with early orders of components that have long lead times for the commercial plant. Through a structured execution plan of performing procurement and construction processes one after another, NEO expects to achieve the initial commission of the Commercial Plant by the first half of next year… We are currently working on pursuing strategic investments and communicating with the respective companies and investors to finance the construction of the commercial plant."

In another very interesting development from NEO, the Company has increased their anode material production targets again. The original pilot plant capacity was 10 tons, which last year was increased 12 fold to a commercial scale of 120 tons pa. This was

recently increased to 240 tons pa. Even more impressive is the longer term target of the full facility capacity after installing the maximum number of mass-production lines through expansion, of 2,000 tons of NBMSiDE™ anode material pa.

NEO has also been busy sending NBMSiDE™ product samples to several potential off-take companies for testing. If this stage goes well then usually off-take agreements follow, which then typically helps the project financing process.

"The first refined sample of NBMSiDE™ has been provided to a Europe-based battery materials company," NEO recently stated, "and a second delivery is planned in April. NEO is additionally conducting sample tests with several Asia-based and European battery manufacturers."

NEO has also recently internally developed NBMSiDE™ pouch-type full cells which have been manufactured to evaluate product performance, viability, and durability in genuine battery charging conditions.

In an April 5, 2022 news release NEO stated that: "NEO Battery Materials will commence construction in June 2022 and will follow stringent timelines and protocols to aim completion in June 2023." I would assume this is subject to project financing.

Closing remarks

NEO is making great progress with their silicon-anode material commercialization plans, with the excellent advantage of locating their manufacturing facility in the Oseong International Investment Zone in South Korea.

Investors should understand that the next stages of product evaluation and testing, off-take deals, financing, and project construction all carry risks and the possibility of delay.

Nonetheless, NEO is certainly making all the right moves and looks to be very well connected to the major Korean battery manufacturers.

NEO Battery Materials trades on a market cap of C$52 million.