

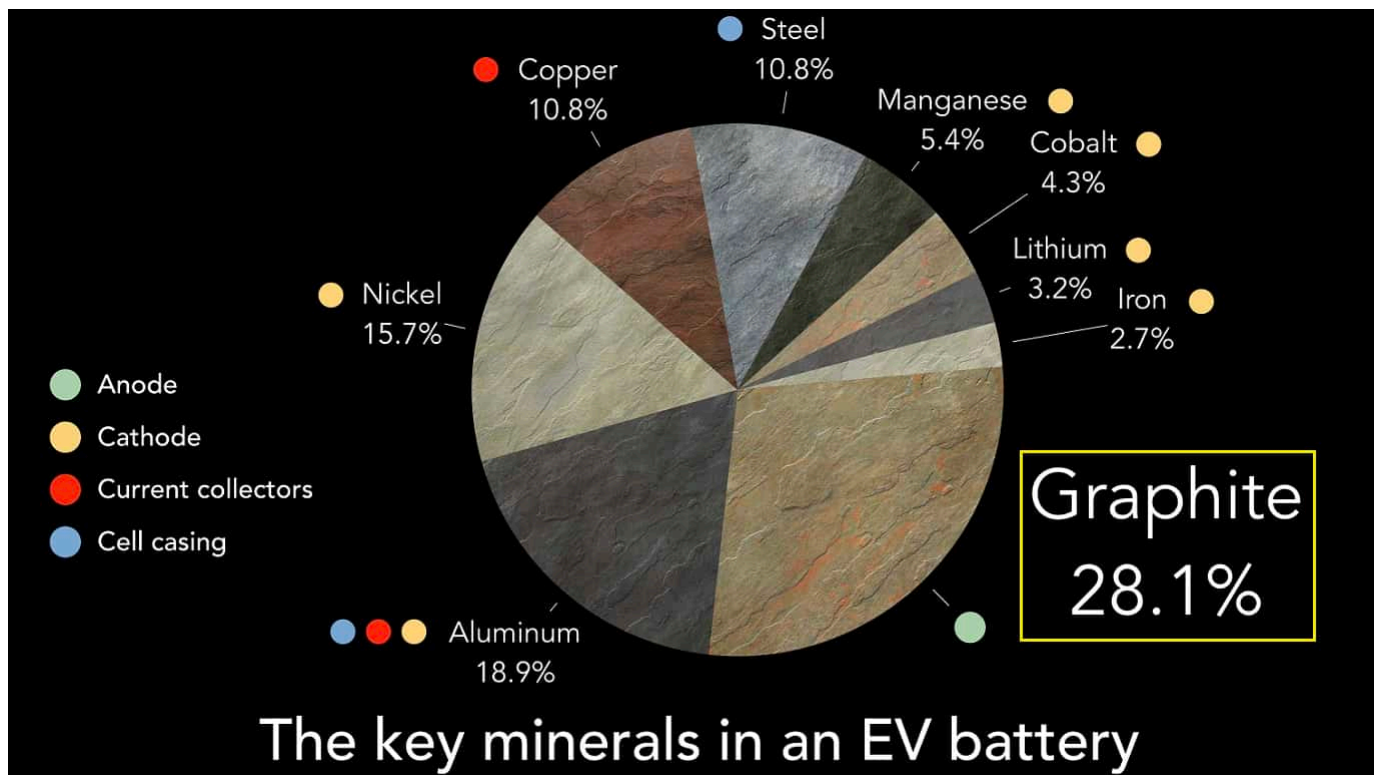
Can the Western graphite and anode industry rise to meet China's challenge?

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”.


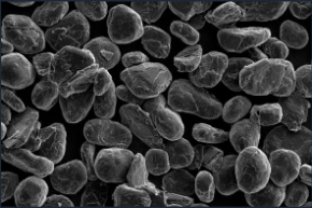

- [Novonix Limited](#) (NASDAQ: NVX | ASX: NVX) – Has a production capacity target of [up to 20,000 tpa](#) of synthetic graphite anode material from their Tennessee facility in the USA.
- [Anovion Technologies](#) (private) – The USA anode producer plans to invest US\$800 million to produce a [40,000tpa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

Our Position



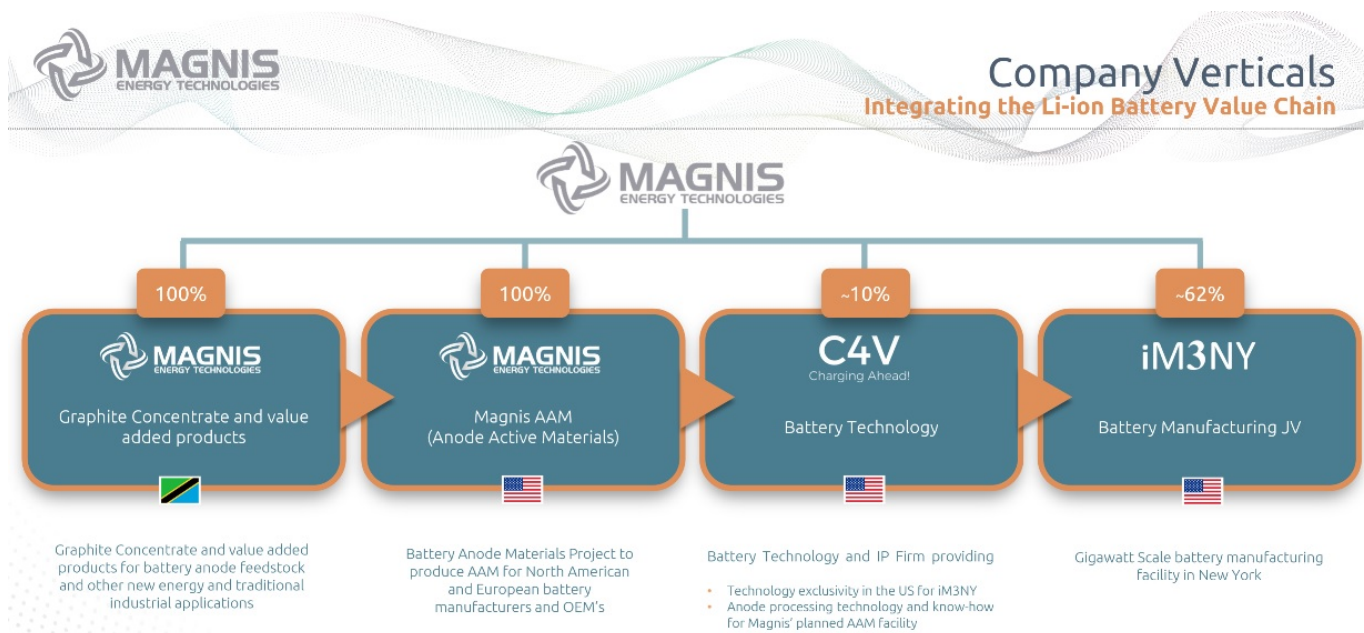
Syrah is a major ex-China natural graphite and active anode material (AAM) supplier for global customers, with upstream and downstream expansion potential underpinned by its world-class Balama resource

 <p style="margin-top: 10px;">Natural graphite and AAM demand will increase four and six times, respectively, over the next 10 years¹</p>	 <p style="margin-top: 10px;">Syrah is the only operating vertically integrated natural graphite AAM supplier outside of China</p>	 <p style="margin-top: 10px;">Balama is a 350ktpa graphite producer in Mozambique supplying global battery anode and industrial customers since 2017</p>	 <p style="margin-top: 10px;">Syrah is nearing completion of an 11.25ktpa AAM facility at Vidalia in the US with commercial sales arrangements in place with tier 1 customers</p>
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1. Source: Benchmark Minerals Intelligence Flake Graphite Forecast, Q3 2023. Note: AAM demand is for natural graphite AAM.

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.

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-fast 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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If you have any questions surrounding the content of this interview, please contact us at +1 416 792 8228 and/or email us direct at info@investorintel.com.

Danny Huh of NEO Battery on EV Industry Attention as it Revolutionizes Silicon Anode Technology

written by InvestorNews | October 25, 2023

In this InvestorIntel interview, Tracy Weslosky talks with [NEO Battery Materials Ltd.](https://www.sedar.com)'s (TSXV: NBM | OTCQB: NBMFF) Strategy and

Operations Manager Danny Huh about achieving a significant [technology milestone](#) in the nanocoating manufacturing process of silicon anodes that can increase the driving range of electric vehicles and enable ultra-fast charging.

Speaking about the high performance and cost-reduction capabilities of their uniform nanocoating technology, Danny discusses how there is an increased interest from ten companies, including global battery and electronic manufacturers and EV automakers, to use NEO Battery Materials' silicon anodes in their lithium-ion batteries.

Providing an update on its South Korean Commercial Plant construction that has completed the Request for Quote ("RFQ") process, Danny also discusses filing NEO's [6th patent](#) to Korean Intellectual Property Office for one-step nanocoating technology for silicon anodes.

Danny also talks about the recent [appointment](#) of Dr. S. G. Kim, a silicon/polymer material and chemical technology development expert, as NEO's Chief Technology Officer. Dr. Kim is the former Executive Vice President and Head of R&D of Hanwha Solutions Corporation (KSE: 009830), a multi-billion South Korean chemical manufacturing conglomerate.

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

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About NEO Battery Materials Ltd.

NEO Battery Materials Ltd. is a Vancouver-based company focused on electric vehicle lithium-ion battery materials. NEO has a focus on producing silicon anode materials through its proprietary single-step nanocoating process, which provides

improvements in capacity and efficiency over lithium-ion batteries using graphite in their anode materials. The Company intends to become a silicon anode active materials supplier to the electric vehicle industry.

To learn more about NEO Battery Materials Ltd., [click here](#)

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NEO Battery Materials moves another step forward in the EV Battery market race

written by InvestorNews | October 25, 2023

The EV battery race is heating up, and there seems to be a decided ABC (anyone but China) theme to the progression of this race, at least in the West. With that said, China likely isn't all that worried at present given the advantage they currently have in various necessary commodities (via outright ownership or purchasing control) and the subsequent upgrading and/or refining of those commodities into some of the most important end-use products. Nevertheless, the rest of the world is doing their best to work together, get along and advance the green revolution as quickly as possible.

One part of the world that is "playing nice" with the West is Southeast Asia, with many EV battery deals of late in both the U.S. and Canada being announced with joint venture partners including Panasonic (Japan), LG Energy Solution (South Korea), Posco Chemical (South Korea) to name a few. Not to mention all

the actual car manufacturers from the region, like Honda, Toyota, Hyundai, etc. getting in on the act. It has become pretty obvious who these nations want to align themselves with, or perhaps it's more of a tale of who they don't want to partner with and potentially have all their IP put at risk. Maybe I'm being a little unfair, I'm sure there are plenty of reasons behind the trends we are seeing of late, but it's always fun to stir the pot a little bit.

Before I sink any deeper into speculative conspiracy theories, let's circle back to something with a more investable theme. A company looking to advance the next generation of EV batteries. [NEO Battery Materials Ltd.](#) (TSXV: NBM | OTCQB: NBMFF) is developing lithium-ion battery materials for electric vehicle and energy storage applications. NEO has a focus on producing silicon anode materials through its proprietary single-step nanocoating process, which provides improvements in capacity and efficiency over lithium-ion batteries using graphite in their anode materials. The Company intends to become a silicon anode active materials supplier to the electric vehicle industry with their [management](#) and [technical advisory team](#) cherry picked from LG Chem, Samsung and various renowned universities.

This Vancouver-based company has strong ties to South Korea, where on January 26, 2022, the Company [received approval](#) from Gyeonggi-do, the largest Economic Province in South Korea, to build its commercial plant on a 10-year lease term. The site is located in Oseong Foreign Investment Zone in Gyeonggi-do and is approximately 106,700 square feet (or 2.5 acres). NEO Battery Materials will initially invest, over the next 5 years, 24 billion KRW or approximately C\$25 million to support the construction and expansion of the silicon anode commercial plant. NEO Battery Materials aims to transform the region into an essential manufacturing and R&D hub of silicon anode materials. The first phase of the commercial plant will possess

an initial annual production capacity of 240 tons of NBMSiDE™, and the facility will be with additional space that can accommodate production expansion to 1,800 tons annually of the Company's anode material.

NEO is making solid progress towards this goal on numerous fronts, having [announced in October](#) that it had successfully installed additional production equipment into the R&D Scale-Up Centre to step-up efforts in incrementally optimizing the all-in-one mass production process for NEO's silicon anode materials, NBMSiDE™. This scale-up milestone will enable product development as the series of NBMSiDE™ material characteristics and manufacturing costs can be evaluated and adjusted to meet the various specifications of downstream customers. Additionally, on the commercial front, the Company signed NDAs with 3 European companies and 1 U.S.-based company, and a European company is scheduled to visit the R&D Scale-Up Centre to discuss practical cooperative initiatives such as a joint development agreement.

Keeping the ball rolling, at the end of November [NEO reported](#) that following the announcement of the late stage in architectural design, NBM Korea, NEO's South Korean subsidiary, has submitted the construction permit application for the Silicon Anode Commercial Plant to Pyeongtaek City, Gyeonggi Province. With a processing period of 1 month, the construction permit is expected to be obtained at the end of December 2022. Upon the approval of the construction permit, the initial construction process from site clearance to basic civil engineering work will be carried out sequentially.

It would appear shovels are about to start digging and NEO will take another step forward from concept to reality. NEO has a market cap of less than C\$22 million with roughly a little over C\$2 million in cash at the end of August. Keep an eye on this

situation to see if someone steps up to help NEO fund the build out of the silicon anode commercial plant. After all, Twitter is so yesterday for Elon Musk, I'm sure he's gotta be looking for the next big thing by now.

These are the graphite leaders as we head towards a forecast graphite deficit in 2023

written by Matt Bohlsen | October 25, 2023

The flake graphite sector does not get as much attention as [lithium](#), yet the demand wave coming is also very significant. For example, in 2021 the International Energy Agency [forecast](#) that flake graphite demand could grow between **8x to 25x** from 2020 to 2040. Benchmark Mineral Intelligence [forecasts](#) we need **97 new (56,000tpa) natural flake graphite mines** from 2022 to 2035.

The calm before the storm

More recently in October 2022, Fastmarkets [stated](#):

*"Fastmarkets has forecast that demand for graphite from the battery sector in 2022 will rise by 40% year on year, in line with growth in the EV sector.....**We expect to see the graphite market tip back into deficit in late 2022.....**Graphite prices are in a lull, but this lull will prove to be temporary and may well be **the calm before the storm.**"*

Note: Bold emphasis by the author.

An 8 to 25x increase in demand, 97 new graphite mines, graphite deficit coming in late 2022! Yet no one is talking about graphite. Today we cover the main western graphite producers and touch on a few promising near term graphite producers, noting China currently dominates the graphite and anode sectors.

The western flake graphite leading producers

[Syrah Resources Limited](#) (ASX: SYR) – Syrah is an Australian company and one of the world's largest flake graphite producers from their Balama graphite mine in Mozambique. Syrah is also working towards becoming a vertically integrated producer of Active Anode Materials ("AAM") at their Vidalia facility, Louisiana, USA. In some exciting [recent news](#) for shareholders, Syrah was selected for a U.S Department of Energy grant of up to US\$220 million towards their Vidalia facility expansion (initial production targeted to begin in Sept. quarter 2023). This comes on top of the news late in 2021 that Syrah [signed a four year deal](#) to supply graphite anode materials to Tesla. Syrah also recently signed an [MOU with Ford and SK On](#) as well as an [MOU with LG Energy Solution](#). Clearly, Syrah Resources is in the box seat to become a critical supplier of both graphite and active anode materials this decade, especially for western OEMs.

The following companies are smaller scale western flake graphite producers:

- **Advanced Metallurgical Group NV** (AMS: AMG | OTC: AMVMF) – Is a diversified producer of critical metals. They mostly produce lithium and vanadium, but also [some high purity natural graphite production](#).
- **Ceylon Graphite Corp.** (TSXV: CYL | OTCQB: CYLYF) – Produces graphite from their '[vein graphite](#)' mine in Sri Lanka.
- **Mineral Commodities Ltd.** (ASX: MRC) – [State](#) they have the

“world’s highest-grade operating flake graphite mine with mill feed grade averaging ~25%C”. Also that they are “the biggest crystalline graphite producer in Europe and the fourth largest producer globally outside of China and accounts for around 2% of global annual natural flake graphite production” at their Skaland Graphite Operation in Norway. They also own the Munglunup Graphite Project in Western Australia and [have received Critical Minerals Grant funding](#) to build a pilot scale battery anode plant in Australia.

- **Northern Graphite (TSXV: NGC | OTCQB: NGPHF)** – Recently completed the [purchase](#) from Imerys of the Lac des Iles producing graphite mine in Quebec and the Okanjande graphite deposit/Okorusu processing plant in Namibia. They also own the Bissett Creek graphite project located 100km east of North Bay, Ontario, Canada and the nearby Mousseau West Graphite Project.

Near term western potential flake graphite producers

- **NextSource Materials Inc. (TSX: NEXT | OTCQB: NSRCF)** – Completion of construction activities and the start of mining activities is expected in [November 2022](#), at their Molo Graphite Project in Madagascar. Phase 1 of the Molo Mine is designed to operate at a production capacity of [17,000 tonnes](#) per annum.
- **Westwater Resources Inc. (NYSE: WWR)** – Owns the [Coosa Graphite Plant](#) (2023 production start targeted) in USA. The Company plans to source natural graphite initially from non-China suppliers and then from the USA from 2028.
- **Nouveau Monde Graphite Inc. (NYSE: NMG | TSXV: NOU) (“NMG”)** – Own the Matawinie graphite project, located in Quebec, Canada. In September this year it was [announced](#) that Tesla had recently visited their project in Quebec. Also recently the Company [announced](#): “NMG, Panasonic

Energy and Mitsui announce Offtake and Strategic Partnership supporting the supply of active anode material plus US\$50 million private placement by Mitsui, Pallinghurst and Investissement Québec.”

- [Lomiko Metals Inc.](#) (TSXV: LMR | OTCQB: LRMF) – Earlier stage but 100% owns the promising [La Loutre Graphite Project](#) in Québec, Canada, where a PEA has been completed.

Closing remarks

An 8 to 25x increase in demand by 2040, 97 new graphite mines needed by 2035, graphite deficit coming in late 2022! Investors should not forget about graphite, and particularly focus on those graphite miners that are working towards being able to manufacture value-added active anode materials (spherical graphite), as that is where the real money is.

We may be experiencing ‘the calm before the storm’ (before graphite deficits push up prices), which means the sector still offers many great opportunities for investors.

Disclosure: The author is long Syrah Resources (ASX: SYR) and Advanced Metallurgical Group NV (AMS: AMG).

The Dean’s List – Part 3: What graphite company could benefit from Canada’s commitment to

critical minerals?

written by InvestorNews | October 25, 2023

Part 3: Northern Graphite Corporation

It's time for another installment in [our series](#) that looks at Canadian companies in the mining sector that could be impacted by Federal and Provincial government announcements with respect to critical materials, supply chain, EV battery manufacturing, etc. As a reminder, the province of Ontario first announced in March its [strategy for 'critical minerals'](#) followed shortly by a [C\\$4.9 billion electric vehicle battery plant](#) in Windsor, Ontario. This was followed in April by the Federal Government's [Budget 2022 proposing up to C\\$3.8 billion in support](#) over eight years to implement Canada's first Critical Minerals Strategy. The Fed's followed this up in late June with a House of Commons Standing Committee on Industry and Technology report entitled: [Positioning Canada as a Leader in the Supply and Processing of Critical Minerals](#). Just to highlight a few of the momentum building actions in the sector.

Today we're going to have a look at what I consider to be the least publicized critical mineral that comprises a lithium-ion battery (LiB) – graphite. Not only is graphite the largest component in a lithium-ion battery (up to 48%), it also requires the largest production increase of any battery mineral in order to meet forecast demand.



Source: Northern Graphite [Corporate Presentation](#)

Conversely, over 80% of [graphite mine](#) production in 2021 came from China, while China makes almost 100% of the graphite anode

material for lithium-ion batteries. Does this sound like a recipe for disaster for the rest of the world to you? Perhaps it's stats like these that have put graphite on the critical minerals list of virtually every country that is attempting to develop a critical minerals strategy.

Assuming governments get their strategies at least partially right, that could result in opportunities galore for miners and explorers of these critical materials. This includes [Northern Graphite Corporation](#) (TSXV: NGC | OTCQB: NGPHF), a Canadian company focused on becoming a world leader in producing natural graphite and upgrading it into high-value products critical to the green economy. Northern is the only significant graphite producing company in North America and will become the third largest non-Chinese producer when its Namibian operations come back on line in the first half of 2023. The Company also has two large-scale development projects, [Bissett Creek](#) in Ontario and [Okanjande](#) in Namibia, that will be a source of continued production growth in the future. All projects have "battery quality" graphite and are located close to infrastructure in politically stable countries.

Looking a little closer at the Bissett Creek project, testing has indicated that graphite from Bissett Creek is very well suited for the manufacture of high capacity, durable, long-life lithium-ion batteries. Bissett Creek is projected to produce 20,000 tonnes of graphite per year in phase 1 of development and has the resources to increase production to approximately 100,000 tpy as demand grows. By comparison, Canada's graphite production in 2020 was estimated to be only 10,000 tonnes. An independent study has rated Bissett Creek the highest margin graphite project in the world, including existing producing mines. This is due to its very high percentage of valuable large flake graphite, simple metallurgy and favorable location which provides ready access to equipment, supplies, labor, grid power,

natural gas and markets.

Why is this important? Along with the above noted Windsor battery plant JV between Stellantis and LG Energy Solution, the latter has also announced two projects in Michigan, just across the US border from Ontario. It is investing US\$1.7 billion to expand its LiB cell plant in Holland, Michigan and has a third joint venture with GM to build a US\$2.5 billion cell plant in the City of Lansing and Delta County, Michigan. Combined with the investment in Ontario, LG will have a collective LiB production capacity of 200 GWH in North America, requiring 250,000 tpy of graphite. And Bissett Creek is the nearest graphite deposit to these megafactories which provides Northern Graphite with a unique opportunity to deliver a secure, local, responsibly sourced supply of graphite.

It seems Northern Graphite might be sitting pretty as LG Energy Solution looks to start sourcing supply for all its facilities. This could dovetail nicely with two upcoming milestones the Company has stated. In Q3, 2022 Northern is planning to announce an LiB anode production strategy, which also aligns with two of the Ontario government's strategies: [Growing domestic processing and creating resilient local supply chains](#) and [Investing in critical minerals innovation, research and development](#). Then come Q4, 2022 they are looking to arrange financing for the Bissett Creek Project which could potentially include government support or possibly loan guarantees, a strategic offtake agreement with LG Energy Solution or just an old-fashioned capital raise. Regardless, the appetite should be there for whichever means the Company determines is its best course of action with the current tailwind for critical minerals.

Did you miss a previous edition? *Check it out...*

[The Dean's List – Part 2: What nickel company will benefit from Canada's commitment to critical minerals?](#)

[The Dean's List – Part 1: What rare earths company will benefit from Canada's commitment to critical minerals?](#)

NEO Battery Materials' next generation EV battery is the focus of its new Korean R&D hub

written by InvestorNews | October 25, 2023

I'm going to make a bold prediction. The electric vehicles we see on the road today will be virtually obsolete in 5 years. The amount of capital and brain power being applied to battery technology coupled with the desire/need for fewer and lower carbon footprint resources that go into those batteries is going to result in material step changes in vehicle range, speed of charging and hopefully the corresponding cost. Whether the electrical grid can keep up with this rapid transition to EVs remains to be seen but we can save that discussion for another day.

Imagine you want to go on a road trip in your EV, but every 300-400 miles you have to spend a few hours charging. What if the next generation of EVs could add 50+% to that range and fully re-charge in 15-30 minutes. How much would you be willing

to pay for the old generation of EV versus the convenience of a new one? For sure there will still be a market for used EVs as some people only need it for their daily commute or trips to the grocery store and otherwise the vehicle sits idle for hours, at which point in time there is little to no inconvenience to charge it. But for me, as someone who likes to fish and hike in the great outdoors of the Rocky Mountains, I can assure you there is no chance I'm buying a current generation EV with its theoretical range that potentially leaves me stranded in the middle of nowhere when the actual range ends up being 25% lower than optimal operating conditions.

One company leading the charge into the next generation of batteries is [NEO Battery Materials Ltd.](#) (TSXV: NBM | OTCQB: NBMFF), a Vancouver-based company focused on lithium-ion battery materials for electric vehicle and energy storage applications. NEO has a focus on producing silicon anode materials through its proprietary single-step nanocoating process, which provides improvements in capacity and efficiency over lithium-ion batteries using graphite in their anode materials. The Company intends to become a silicon anode active materials supplier to the electric vehicle industry with their all-star [management](#) and [technical advisory team](#) cherry picked from LG Chem, Samsung and various renowned universities.

The numbers are impressive both from a capacity/capability perspective and relative cost to their competition. In mid-2021 the Company announced that in [a half-cell coin test](#) that its nanocoated silicon anode allowed for a safe full charge within 5 minutes, which demonstrates the potential for scaling and implementation in larger cells such as those used in high power EV batteries. Through a mix of treatments and nanocoating materials, NEO utilizes pure metallurgical-grade silicon (Si) particles, which provide a 40-70% higher initial capacity compared to current competitors that employ SiO_x, SiC, or other

composite silicon materials. Due to NEO's advantage of retaining a higher initial capacity, on average, a 5% silicon weight loading of NBMSiDE™ can have the equivalent impact of a 10% loading of a competitor's materials. Initial coulombic efficiencies (ICE) – the ratio of the discharge capacity after the full charge and the charging capacity of the same cycle and is usually a fraction of less than 1 – for NEO's 100% micron-size level Si anode have exceeded the 86% level, and cycling performance presents excellent capacity retention after 300 charging/discharging cycles.

And all this technology is advancing beyond research lab theoretical work. The latest press release from the Company confirms an [MOU with the Province of Gyeonggi](#) (basically Seoul, South Korea, and the surrounding area) to establish grounds for investments and cooperation between NEO and the Province to advance the mass production of silicon anode materials for EV batteries. NEO Battery Materials will initially invest, over the next 5 years, 24 billion KRW or approximately C\$25 million to support the construction and expansion of the silicon anode commercial plant located on a 107,000 sq. ft. site in Oseong Foreign Investment Complex, Pyeongtaek City, Gyeonggi-do. The Company aims to transform the Province into an essential manufacturing and R&D hub of silicon anode materials. The first phase of the commercial plant will possess an initial annual production capacity of 240 tons of NBMSiDE, and the facility will be built as a 4-story office building with additional space that can accommodate production expansion to 1,800 tons annually of the Company's anode material.

I have no idea if NEO Battery Materials will be one of the success stories to advance the next generation of battery technology for EVs and energy storage. I do know that they have generated some interesting results and have NDAs signed with over 20 globally established industry players in the battery

cell manufacturing, materials manufacturing, and automotive industries. With a market cap of roughly C\$30 million, you can decide if this is one of the companies you'd like to hold if you are investing in the future of EVs.

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 SiO_x, 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](#).

Making lithium ion battery components more durable and efficient to improve battery capacity

written by InvestorNews | October 25, 2023

NEO Battery Materials' Progressing on the Development and Commercialization of Longer Lasting Higher Energy Density Lithium Ion Battery Components

Investors looking for a cutting edge technology company in the electric vehicle (EV) battery components sector need look no further than [NEO Battery Materials Ltd.](#) (TSXV: NBM | OTCQB: NBMFF). NEO is a North American battery materials company with a current focus on developing silicon anode (the negative electrode in a battery) materials through its “ion-and electronic-conductive polymer nanocoating technology.” Or, in simpler language, a ‘silicon material’ for batteries, used to make the anode last longer in service (make it capable of being charged and recharged more times without losing integrity or efficiency) and be capable of holding more energy, thus making the battery more durable and efficient

NEO [states](#): “NEO has a focus on producing silicon anode materials through its proprietary single-step nanocoating process, which provides improvements in capacity and efficiency over that of lithium-ion batteries using graphite in their anode materials.”

NEO’s stock price has been on a tear in 2021; however, the recent pullback potentially gives a better entry point for investors.

NEO Battery Materials (TSXV: NBM) 1 year stock price chart



Source: [Yahoo Finance](#)

Another thing that investors love is active management that can rapidly progress a company and produce lots of good news. We’ll take a look at the news flow summary below, just for November 2021.

- [Nov. 23, 2021](#) – NEO Battery Materials appoints lithium-ion battery electrode binder and polymer technology expert, Dr. Byeong-Su Kim, to Scientific Advisory Board. The news [states](#): “Utilizing robust binder technologies with characteristics such as a high elastic modulus can **help contain and control the volume expansion of silicon**, resulting in lower probabilities of particle pulverization and a cracking anode.”
- [Nov. 18, 2021](#) – NEO Battery Materials receives approval for a core patent from the Korean Intellectual Property Office.
- [Nov. 16, 2021](#) – NEO Battery Materials announces research consortium LOI with both the University of Toronto **and with an undisclosed global OEM for R&D and scale-up of EV Battery Materials**. The preliminary project will involve

the full electrode fabrication of silicon-carbon composite anodes through NEO's silicon particle nanocoating process....With the active material (silicon and/or graphite), binders and conductive additives as core components....

- [Nov. 10, 2021](#) – NEO Battery Materials appoints Dr. Dongmok Whang, expert in low-dimensional nanomaterials and graphene, to Scientific Advisory Board. His research expertise lies in the field of fabrication and manufacturing of low-dimensional nanomaterials, especially **graphene, semiconductor nanowires, and porous nanostructures** for applications in electric vehicle lithium-ion batteries, fuel cells, and various energy storage solutions.
- [Nov. 4, 2021](#) – NEO Battery Materials accomplishes **anode production capacity upscaling Project** over the past three months. The news [states](#): “From the initial production rate of several grams per hour for manufacturing silicon anode materials at the lab-scale, **NEO's engineering team has accomplished to expand the rate to a level of several kilograms per hour.** This is a result of improving productivity by more than 1,000-fold, and the success of the Project at this level has given stronger validation for **the 120-ton semi-commercial plant that is scheduled to be commissioned by the end of next year.**” President & CEO Spencer Huh, added: “As NEO understands the need to fast-track into mass production, we are pleased to announce the accomplishment of the Upscaling Project. The Company is at the forefront of developing unique Si anode lines through the low-cost manufacturing process, and we are customizing solutions for various downstream users to optimize the products for high-power electric vehicle lithium-ion battery applications.”

The above 5 news items, when added together' show the rapid pace

and progress NEO is achieving. Looking back on the previous two months there were even more great achievements by NEO. The standout news came on October 26 when NEO [announced](#): **“Completion of semi-commercial plant conceptual design** and initiates engineering EPC stage for construction.” The facility will be in South Korea. President & CEO, Spencer Huh, [stated](#): “NEO is now another step towards commercializing our silicon anode materials for EV lithium-ion batteries and is actively expediting our timelines and milestones.”

As shown below the problem with silicon in anodes can be that as the silicon absorbs the electrons it expands then cracks the anode, leading to a low cycle life (low longevity). NEO has managed to improve this by using its cost-effective and efficient one-pot, single-step, nanocoating process.

NEO Battery Materials state that their silicon anode materials are already achieving much higher cycles than competitors



Source: [NEO Battery Materials company website](#)

Closing remarks

A lot of the details surrounding NEO Battery Materials' achievements are not very well understood by investors. This is only natural as most investors are not battery material scientists.

The key to understanding NEO's work is that its silicon anodes or composite silicon graphite anodes can significantly improve battery capacity, which relates to greater energy density, and hence longer range for the same size battery. What EV manufacturers and customers all want is better performing batteries that result in longer driving range for a given size

battery. Silicon anodes today present many challenges, especially cracking leading to poor cycle life. NEO is making great strides in solving this problem by producing silicon anode materials with a much longer cycle life.

If NEO can succeed in meeting commercial standards it will have Tesla and other EV and battery/anode OEMs knocking on its door. For now it appears there is plenty of promise, especially given the longer cycling results (1,000 cycles) and recent production scaling progress, as well as the interest from an OEM in joining NEO's research consortium.

NEO Battery Materials trades on a market cap of [C\\$39 million](#). It's one to watch.

Recharging a battery in 5 minutes is the starting block for NEO Battery Materials interest

written by InvestorNews | October 25, 2023

It seems like it was only last week that I was writing about nanomaterials and how they were going to save the world by making everything better. Oh wait, it was just [last week](#). I guess the difference here is that this company has an actual resource (targeting silica in quartzites) that would supply their proprietary nanocoating technology. Nope, that's almost the same as well. So to quote baseball's philosopher, Yogi

Berra, it's déjà vu all over again. Today is another story about nanomaterials that look like they have the potential to improve the technology required to lower our carbon footprint and make the air we breathe a little cleaner.

The company being discussed this time around is [NEO Battery Materials Ltd.](#) (TSXV: NBM | OTC: NBMFF). A six-month chart of this stock will tell you that there is plenty of buzz around what is happening, given it has traded in a range of \$0.14/share to as high as \$1.31, closing yesterday at \$0.89. Most of this activity is being driven by the steady stream of exciting news that comes out on an almost weekly basis. Two of the biggest surges in the stock price came first in early June when the Company made the remarkable announcement that its [nanocoated silicon anode](#) allows for a safe full charge on small battery cells within 5 minutes leading to a two-day rally of 62%. Then this past Friday NEO reported the [first prototype of silicon anode](#) active materials has been successfully produced, and samples have been sent to partners for full cell evaluation and electrochemical characterization. The latest news causing the stock to surge 30% on the day with further follow through on Monday adding another 14% to the share price.

These are some pretty stunning moves so let's look a little closer at what this all means in the grand scheme of things and why the stock may be responding like it is to this news. The first news seems pretty obvious to me, recharging a battery in 5 minutes is impressive no matter how you look at it. If we could all recharge our smartphone, wearable device, tablet, laptop, cordless yard equipment, etc. in 5 minutes, life would be a whole lot more convenient. But convenience isn't going to save the earth. Where this becomes a game changer is if they can evolve this technology for use in the Li-Ion batteries used in EVs. Imagine the change in adoption of EVs over internal combustion engines if you can recharge your battery in almost

the same amount of time it takes to fill a vehicle with gas. It almost wouldn't matter what the range of the battery is as long as there was adequate charging capability. Going to Starbucks for a coffee? Plugged in the car before I went in and it was charged when I came out. Stopping by the grocery store on the way home from work to pick up something for dinner? No problem, also charged the car while I was in the store.

Perhaps I'm getting a little bit utopian but it's hard to argue that an EV that could charge in 5 minutes wouldn't be revolutionary. This leads us to the latest news from the Company, the first working set of NEO's proprietary silicon anode materials has been manufactured through their unique process. This prototype will be utilized by NEO's third-party partners for evaluating the performance and efficacy of NEO's silicon anodes in each respective party's cell system and environment. The Company expects this development to act as a catalyst to accelerate the commercialization of its silicon anode active materials. Another critical piece of information in the [latest press release](#) was the signing of two new Non-Disclosure Agreements (NDAs) with global top-tier battery material producers in China and South Korea for NEO's innovations with silicon. They are getting the word out and in front of the right people to make something happen.

The Company [raised \\$2 million in early May](#) and had a cash balance of \$872,171 as of their May 31st financials. NEO has likely raised another \$1.4 million from the exercise of in-the-money (\$0.30 strike) warrants that were set to expire on August 21st. There are still 17 million warrants outstanding but with an expiry date of May 2024, who knows if/when those might get exercised. In the meantime, there should be enough cash to continue operations for a couple of more months at which point in time we will see what's next for NEO Battery Materials. They

may have to go back to the market to raise some capital, or perhaps a JV with one of their NDA partners will provide some financial support. Regardless, there are some exciting things happening that will keep investors on the edge of their seats for the foreseeable future.