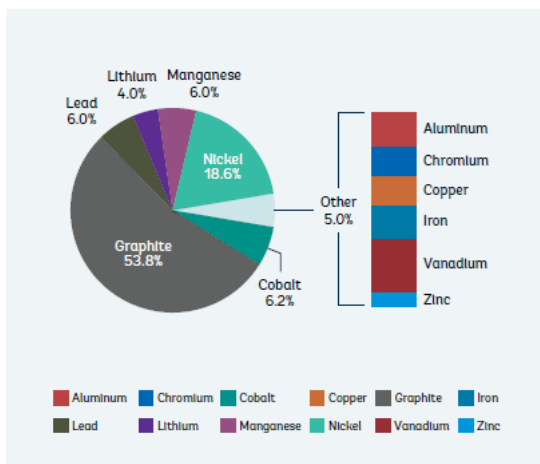


## What You Should Know About Graphite (edited version of article appearing on Investing News Network)

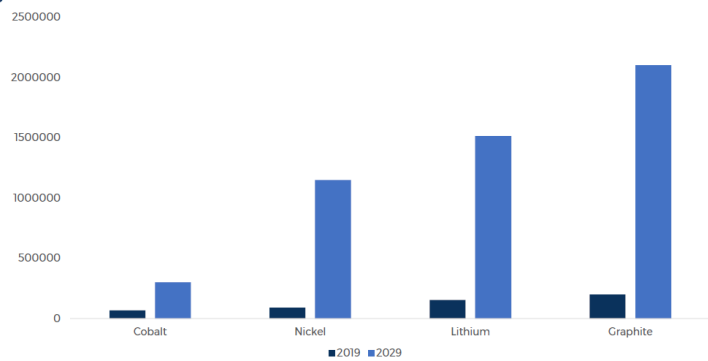
In order to meet its 2025 EV sales targets, VW needs 300 giga watt hours (“gWh”) of lithium-ion battery (“LiB”) production. Tesla needs 350 gWh, Daimler (Mercedes) needs 200 and China needs at least 250. Then there are all the other automobile manufacturers plus the grid storage market.

Most investors do not know the difference between a gWh and a lightbulb. But they should know that for the car companies to execute their business plans these figures translate into a requirement to invest billions of dollars in multiple new graphite mines and upgrading facilities. You cannot have any kind of EV market without a lot more graphite. Graphite is the anode material in a LiB and is the single largest component. There are no substitutes. Elon Musk said they should be called nickel-graphite batteries. Graphite requires the largest production increase of all the battery minerals. And almost all of it currently comes from China.

### Share of Mineral Demand from Energy Storage (source:IEA)



Battery raw material demand will grow between 5x and 13x to feed the megafactories



While there is an ongoing debate with respect to using natural vs. synthetic graphite to make lithium ion battery anode material (“BAM”), it really doesn’t matter. The potential demand is so large and the supply challenges so great that a lot of both will be required. The automobile/battery manufacturers are saying little about this issue, perhaps because they do not want to draw attention to the massive problem they face. Synthetic graphite is made from petroleum coke, the residue of oil production and refining. Plants require a huge investment, have a very large environmental footprint and have substantial energy requirements. Much of which comes from coal. None have been built outside of China for many years and doing so will be a permitting/environmental challenge. China also dominates natural graphite production and supplies almost 100% of natural graphite based BAM.

Gregory Bowes, CEO of Northern Graphite commented that: “It is incumbent on all participants in the supply chain to contribute to an open and transparent discussion about the environmental and social governance issues associated with greatly increasing the production of both natural and synthetic graphite. Northern is demonstrating its commitment by initiating a study of the footprint of its Bissett Creek Project and BAM related processes so that mitigation and offset strategies can be developed.” <http://www.northerngraphite.com/resources/news/Minviro.pdf>

Automobile manufacturers and their battery suppliers are betting that China, which has the largest EV market in the world, will continue to have the resources and the desire to supply the rest of the world with battery anode material. They are also betting that the market will finance new mines in the west. That bet is not looking so good as none are currently under construction due to low prices and the clock is ticking faster and faster. New production does not happen overnight.

Large companies are conservative by nature and the history of commodity markets shows us they generally do not move until supply shortages occur and prices take off. Then they all try to get through the same door at the same time. Investors might want to consider making a bet that day is coming soon to the graphite market. And it should be done by taking advantage of inefficiencies that currently exist in the market whereby a few very good graphite mining projects still have low valuations (and vice versa).

### **Not all Graphite Deposits are Created Equal**

There are approximately 20 junior public graphite companies with advanced stage, feasibility study ("FS") level projects. 14 are in Africa with varying degrees of security/stability risk. Many have weathered deposits which can be (but not always) metallurgically challenging. Two recent attempts to bring new deposits into production both had serious and in one case fatal financial/metallurgical issues. Not all graphite is "battery grade" which is more difficult for the average investor to determine. Strong, independent third party validation is recommended. Finally, many years of low graphite and share prices have left most graphite juniors with hundreds of millions, or even over a billion, shares outstanding with mine construction yet to be financed.

The number of advanced stage graphite mining projects located in politically stable countries is limited. Only four are in North America, **Nouveau Monde** (TSXV:NOU, OTCQX:NMGRF, Frankfurt:NM9), **Northern Graphite** (NGC:TSXV, NGPHF:OTCQB), **Focus Graphite** (TSXV:FMS) and **Mason Graphite** (TSXV:LLG,OTCQX:MGPHF). Almost all graphite deposits have substantial resources so production is largely a function of corporate strategy. NOU plans on producing 100,000tpy which far too large for the current market, but will be needed in the future when demand grows. Timing is a challenge as being early will depress prices and cause negative cash flow (see Syrah Resources). NOU also has ambitious plans to build a US\$545 million facility to upgrade mine concentrate into BAM. It has been a stock market and social media darling and now has a market cap over \$600 million which is more than three times the others combined. Whether or not the share price is supported by the fundamentals is an open question but there is no disputing that early investors have enjoyed great returns. NGC, Focus and Mason seem to be taking a more conservative approach, targeting initial production rates of 25-50,000tpy, expanding as the market grows and entering the battery market when the economics improve.

Graphite prices are a function of flake size and purity with the larger, high purity material commanding a premium. A recent independent study by Benchmark Mineral Intelligence estimated that NGC's Bissett Creek Project will have the highest margin of any existing or proposed graphite deposit, largely due to it having the best flake size distribution (as well as a very favorable location and simple metallurgy). NOU has the second best distribution followed by Focus and then Mason (for an analysis of how flake sizes affect pricing go to <http://www.northerngraphite.com/about-graphite/graphite-pricing/>). Concentrate purity should be over 94% graphitic carbon ("Cg"). A premium is paid if it is higher and prices are discounted if it is less. NOU, NGC and FMS have all demonstrated the ability to produce concentrates in the order of 96-98% Cg. According to Mason's FS, 56.6% of its concentrates will be very small flake/fines at 91.9%Cg.

Capital costs for the four projects in CDN dollars are NOU (\$283M), Mason (\$258M), Focus (\$166M) and NGC (\$108M). NGC's low capital cost reflects its location, with ready access to labor, supplies, equipment, natural gas and markets, as well as a very simple process plant. NOU is also favorably located north of Montreal while Focus and Mason are in Northern Quebec with greater logistical challenges/costs. Both NGC and Mason have updated their original FS numbers and NOU's is relatively recent. Focus' 2014 FS numbers are out of date and being re-estimated. Focus has concentrated more on graphene development than mine development in recent years.

Operating costs fall within a fairly narrow range when concentrate transportation costs are included with NGC being the highest due to its lower grade. However, NGC has by far the highest margin due to premium concentrates. Base or precious metal projects are compared on the basis of costs because everyone gets the same price. With industrial minerals, costs and price must be evaluated together as the latter is not the same for everyone.

Shares outstanding are Focus (374M), Mason (136M), Northern (76M) and NOU 36M (after a recent 10 for 1 rollback).

The economics of most graphite projects are not great at current prices which have remained frustratingly low despite rising battery demand. Many expect that to change dramatically. And while a rising tide may lift all boats, some will float better than others.