POWER
METAL RESOURCES

GRAPHITE – THE OVERLOOKED BATTERY METAL POISED FOR MAJOR DEMAND GROWTH

IN THIS REPORT

- The many, many uses of graphite...
- The case for natural graphite
- Localising graphite supply
- Doerksen Bay's exciting potential

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DIVERSIFYING INTO GRAPHITE

At Power Metal, we place a lot of emphasis on diversification–particularly when it comes to commodities.

For one thing, securing exposure to projects in stable jurisdictions prospective for various metals is a great way of reducing overall portfolio risk. Ask any professional investor, and they'll tell you this is a golden rule of asset allocation.

But beyond this, there's another reason for the commodity diversification we've established:

There are a lot of exciting opportunities out there right now.

Whether its copper or uranium...lithium or rare-earth elements...even tungsten or vanadium....

The reality is that the long-term outlook for so many commodities is one of soaring demand and limited supply. In other words, a good recipe for a structural bull market.

It's for this reason we acquired the Doerksen Bay Project in mining friendly Saskatchewan, Canada, earlier this year.

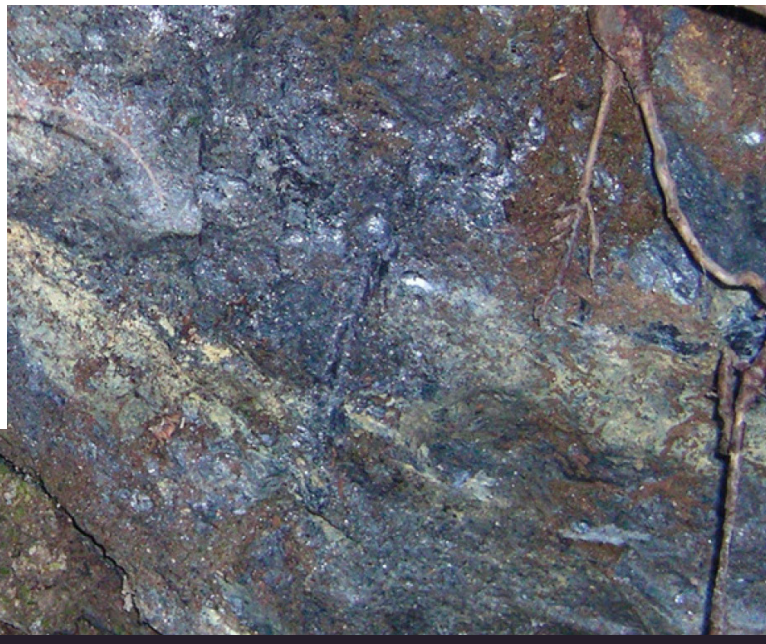
You see, Doerksen Bay is prospective for high-grade *graphite*.

And although graphite might not get the same coverage as some other strategic commodities, it's positioned to play an equally pivotal role as its peers in enabling global "*greenification*" as fossil fuels are phased out.

As we'll show in this report, this crystalline form of carbon is a key component in the new battery technology powering everything from electric vehicles to renewable energy sources. So, as demand continues to soar for graphite in its natural (as opposed to synthetic) form, we expect the value of economic deposits to increase.

That's why we were so keen to get quality exposure to a Project prospective for graphite.

More on our plans for Doerksen Bay shortly. For now, however, let's take a step back and look at the outlook for graphite in more detail...



THE MANY, MANY USES OF GRAPHITE...

As touched on before, graphite is a type of carbon. Specifically, it's one of the crystalline forms in which carbon is naturally found–alongside diamonds.

But where diamonds are effectively giant molecules of carbon atoms (giving them their incredible strength), graphite consists of stacked layers of carbon atoms called "*graphene*".

It's this structure that give graphite its extreme resistance to heat, acids, reagents, and electricity, and its ability to "cleave"–or split–with very little pressure. And its these properties that ideally suit the material to so many applications.

That's right. Graphite is not just used in pencils–in fact, this really only makes up a very small portion of the demand.

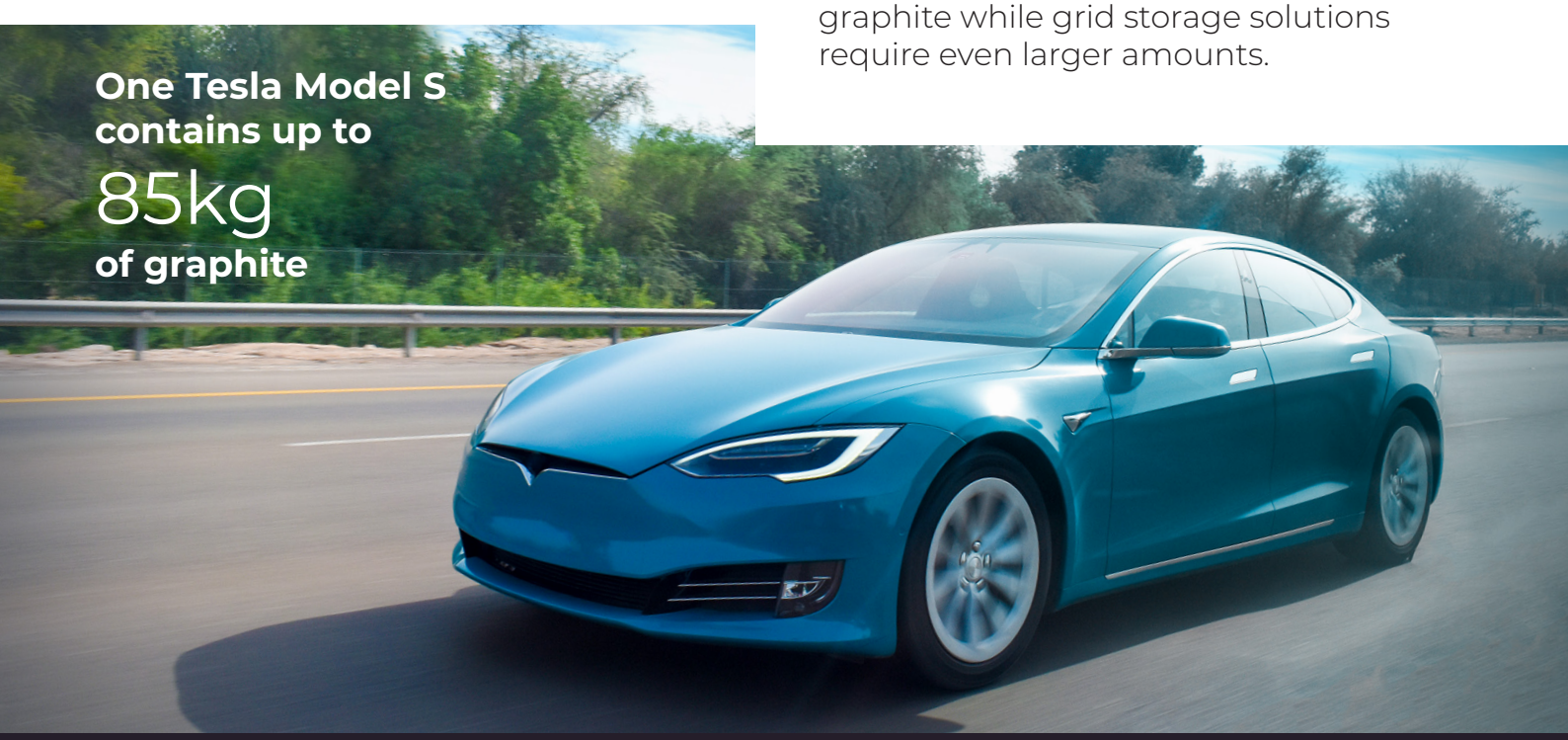
Beyond stationery, it's used in everything from nuclear reactors, where it reduces the speed of neutrons to enable reliable and efficient electricity generation....

To the electrical industry, where it transfers heat away from critical components in electrodes.

To refractories, where it's used as a counter-electrode in the furnaces essential to all the "mini-mills" that power the steel industry.

Perhaps the most interesting–and certainly the most rapidly growing–use of graphite, however, is in batteries.

Its conductivity, resistance to corrosion, and layered structure means there are few substitutes for it in the anodes essential to pretty much every rechargeable battery. In fact, just one Tesla Model S contains up to 85kg of graphite while grid storage solutions require even larger amounts.



Given the battery storage market is very much having its time in the sun and looks set to continue doing so for some time...

Graphite's indispensability is very attractive from an investment perspective.

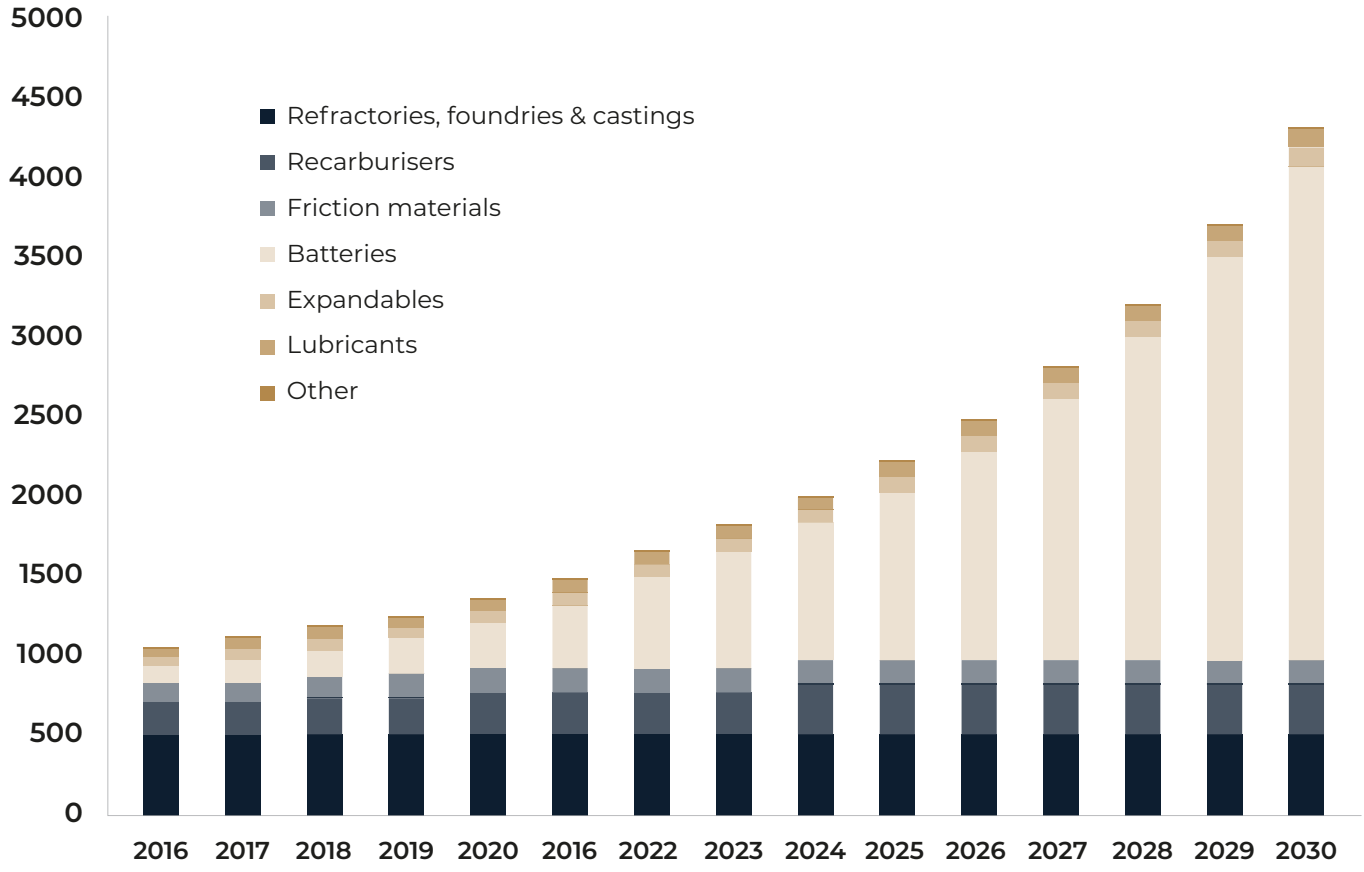
After all, major global consultancy McKinsey expects demand for electric vehicle batteries to grow by around 30% to nearly 4,500 gigawatt-hours a year annually by 2030. Similarly, in late 2021, the International Energy Agency forecasted that global installed storage capacity would expand 56% by 2026.

In other words, the world needs a lot more batteries, and it needs them quickly.

As a result, although the steel industry is expected to remain an important global graphite consumer the battery market is the one expected to shape long-term demand.

In fact, industry analysts expect demand for graphite from the battery sector to grow by 1,400% between 2020 and 2050. Meanwhile, Fortune Business Insights puts the value of the entire global graphite market at US$25.7 billion in 2028 from US$14.8 billion in 2021, driven largely by battery demand.

Demand for natural graphite ('000 tonnes)



Source: https://tirupatigraphite.co.uk/graphite-markets

THE CASE FOR NATURAL GRAPHITE

It's clear demand for graphite is growing, but what about supply?

Ultimately, this is just as important as demand when it comes to a commodity's long-term value.

Well, unlike many other battery raw-material markets, where historical under-investment has led to insufficient reserves, overall graphite supply is not necessarily lacking. Instead, it's an additional nuance in the graphite supply chain that stands to make a discovery at Doerksen Bay all the more valuable.

You see, graphite comes in two forms: **synthetic** and **natural**.

Synthetic, as the name would suggest, is made artificially by superheating a variety of carbon-containing substances to temperatures of more than 4,000°C.

Natural, meanwhile, occurs in the form of deposits arising from metamorphic processes that are mined and then processed before use. This is the type of graphite we're exploring for at Doerksen Bay.

According to Wood Mackenzie, the global split in total demand for natural and synthetic graphite is currently skewed heavily in the latter's favour. Thanks largely to its use in electrodes for the steel market, some 2,256kts of the stuff were used in 2021, compared to natural's 1,147kts.

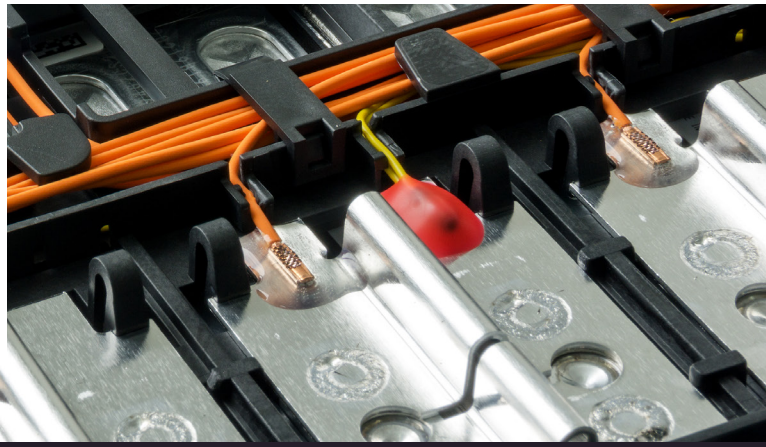
But when it comes to the rapidly growing battery market, this split is far less distinct. In fact, according to Benchmark Mineral Intelligence, annual demand in 2021 for synthetic graphite totalled 300,000ts, while natural graphite had a slight edge at 400,000 tonnes.

Many believe, however, that this split is set to shift significantly further in natural graphite's favour as battery demand continues to grow.

Why?

Well, synthetic graphite has historically been favoured by manufacturers over natural in many cases due to its superior consistency and purity. After all, the purer graphite is, the more conductive it is, making it all the more effective.

However, quality aside, synthetic graphite is also more expensive than natural graphite and up to four times more carbon intensive due to its use of energy and fossil fuels as feedstock. In the case of electric vehicles in particular, this somewhat undermines the spirit of phasing out petrol and diesel.



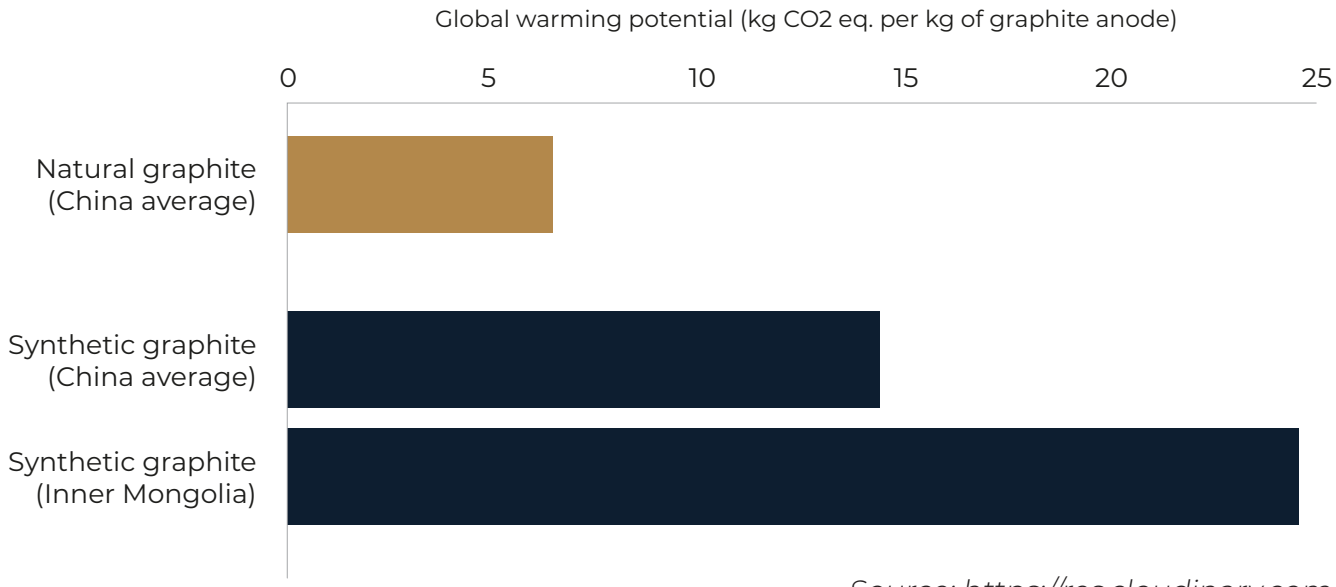
When you also add in the fact that modern purification processes and thermal treatments are enabling natural graphite to achieve a purity of up to 99.9% compared to around 99% for synthetic graphite...

The stage is very much set for natural graphite to take an even larger share of demand from the battery market.

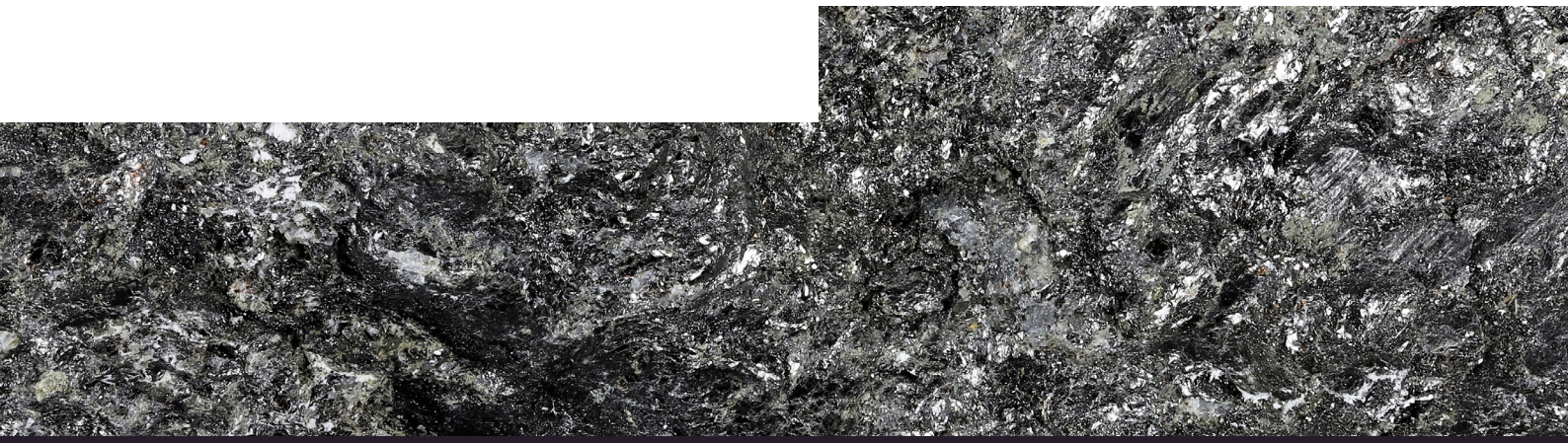
In fact, Benchmark anticipates that the sector will require 3Mts of natural graphite a year by 2030 compared to 1.5Mts of synthetic.

Should this trend play out, then it could mean any discovery we make at Doerksen Bay will be more attractive to graphite producers looking to bolster their reserves.

Lower emissions associated with natural graphite than synthetic



Source: https://res.cloudinary.com



LOCALISING GRAPHITE SUPPLY

It's not just the type of graphite supply that's expected to shift, either: it's also the location.

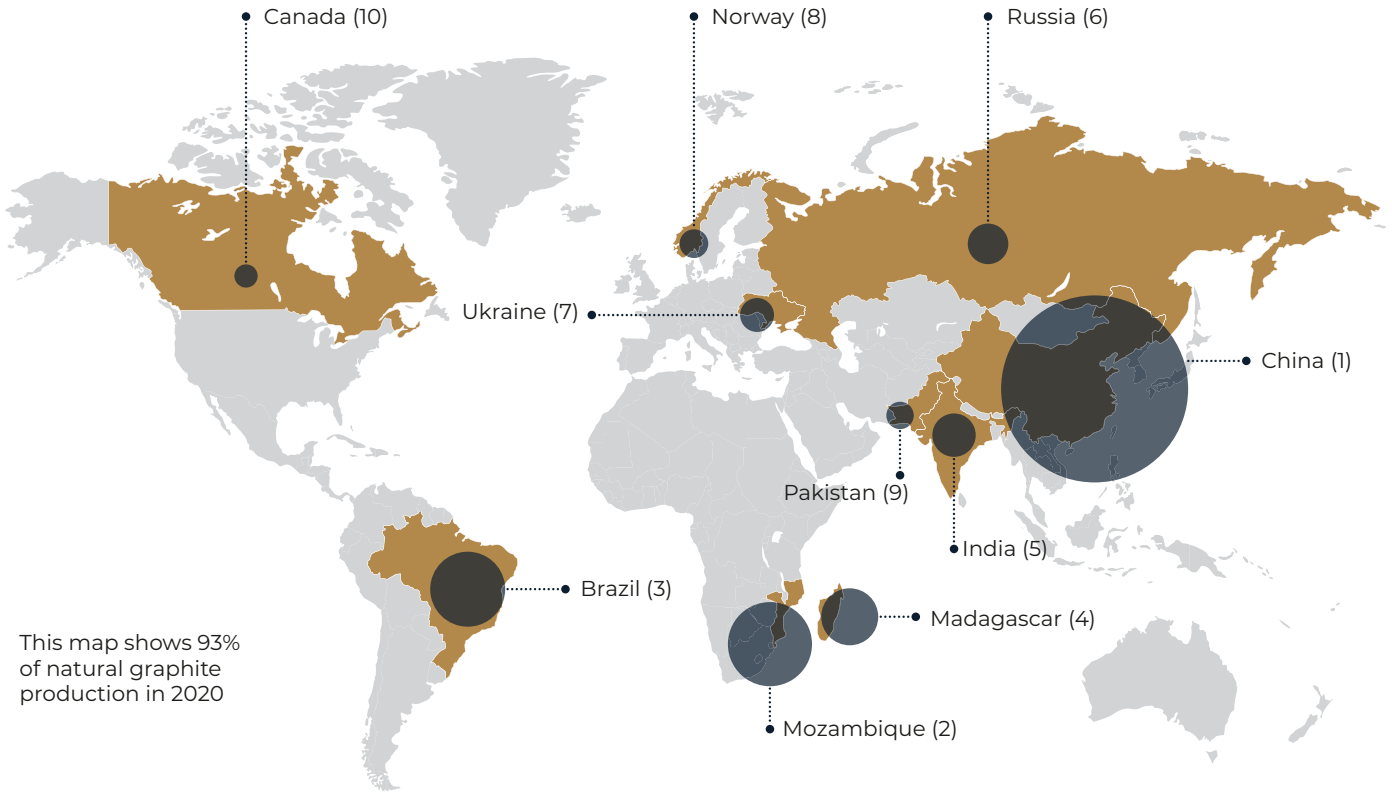
You see, as is so often the case in the world of commodities, natural graphite production and processing are currently dominated by China. Last year, the nation was responsible for some 68% of the world's natural graphite.

Against this backdrop, it won't be a surprise to learn that foreign dependence on China for graphite has increased significantly alongside demand.

And fundamentally, this stands very much as odds with the desire of western governments and automakers for more localised raw material sources. To see this in action, just look at the supply chain issues that faced manufacturers during Covid-19 and the many developed nations releasing "*critical mineral strategies*".

There are signs, however, that this is now shifting.

Top 10 Producers of Natural Graphite 2020E, tonnes



Source: https://elements.visualcapitalist.com

Countries outside of China are looking into establishing their own natural graphite processing capabilities. And perhaps more pertinently, interest in potential natural graphite deposits globally is growing.

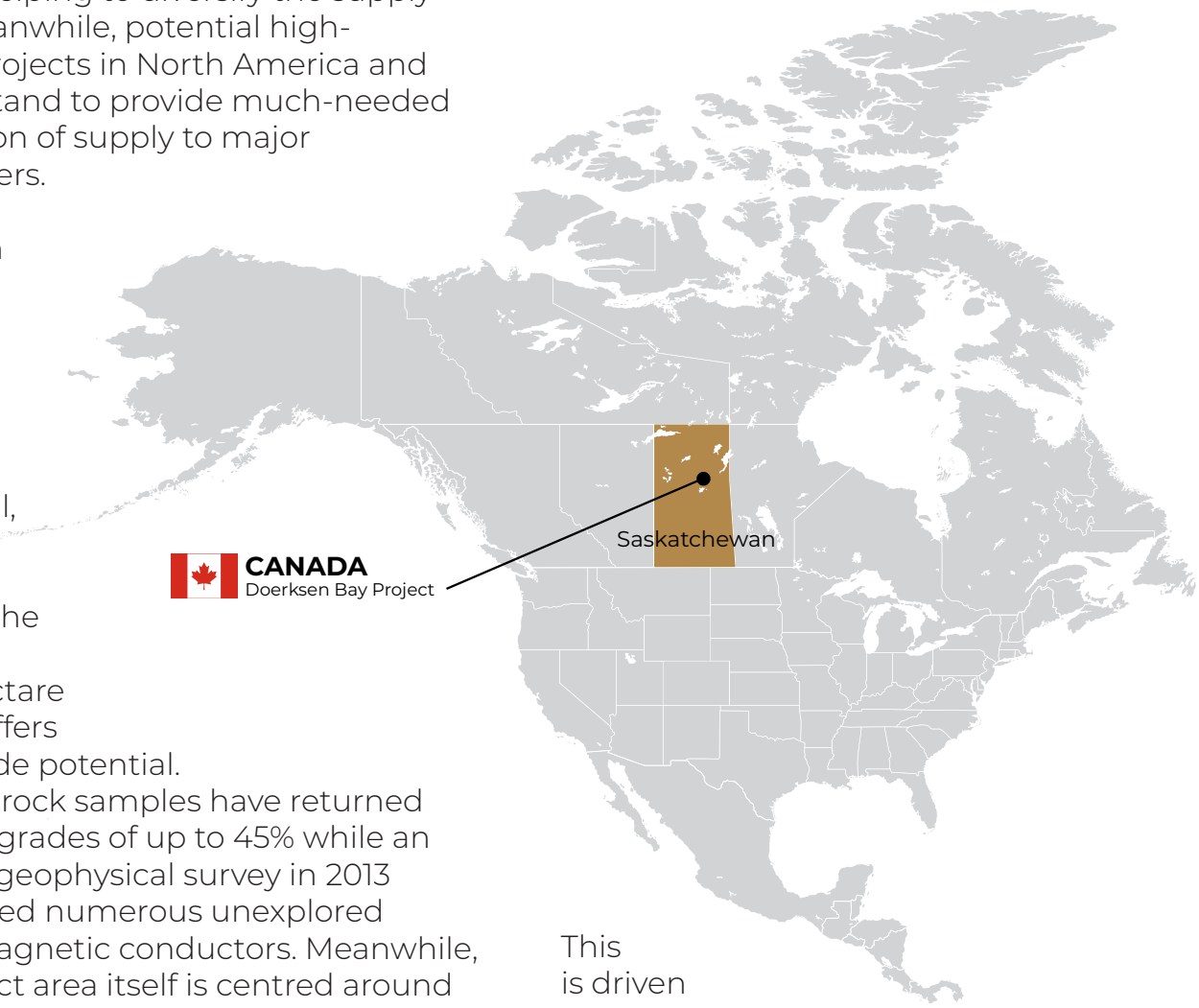
New greenfield projects in Africa are already helping to diversify the supply base. Meanwhile, potential high-quality projects in North America and Europe stand to provide much-needed localisation of supply to major automakers.

Doerksen Bay, of course, falls into this latter category.

First-of-all, historical results suggest the 4,222-hectare Project offers high-grade potential. Likewise, rock samples have returned graphite grades of up to 45% while an airborne geophysical survey in 2013 highlighted numerous unexplored electromagnetic conductors. Meanwhile, the Project area itself is centred around five Saskatchewan Mineral Deposit Index graphite occurrences – proving graphite mineralization is present on the Project.

But beyond its geological potential, the Project is also based in Saskatchewan, Canadian projects are valued highly for Canada.

Canadian projects are valued highly for their proximity to the US, which is the world's second-largest car manufacturing country. Meanwhile, according to the Fraser Institute, Saskatchewan itself is the number one jurisdiction in Canada, and the number two globally, for mining investment attractiveness.



This is driven by the Province's stability, topography, regulation, tax regime, and infrastructure. And it all means that if we do make a discovery, then it will be in exactly the sort of leading area a larger peer would want to develop a mine.

AN EXCITING OPPORTUNITY

To round up, Doerksen Bay stands to expose us to massive forecasted growth in demand specifically for natural graphite deposits in stable jurisdications.

Of course, this is all predicated on us making a discovery. So, in that respect, what's next?

Right now, we're continuing our desktop research over the Project with a view to designing a ground exploration programme in the near future. The goal of this will be to test the high-grade graphite occurrences reported historically and to follow-up on the geophysical anomalies with ground-based investigation.

We're excited to see the results, and look forward to reporting them publicly.

Whatever happens though, we continue to pride ourselves on our ability to give our investors quality exposure to as many exciting commodity markets as possible.

Photograph of the Ben Showing in greater detail, looking southwest.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