

The Tesla Beauty Contest

✘ Tesla has confirmed that it will proceed with plans to build the battery 'gigafactory', choosing Nevada as the location. Now, it will have to secure the critical raw materials to launch production and keep the plant running. There has been much focus on the lithium supply requirement, but for the initial period, Tesla does not need to secure a lithium offtake agreement as there are two or three major suppliers in the western United States (such as Western Lithium – TSX: WLC – in Nevada), which have expansion capabilities. Three new lithium mines have also opened in the last couple of years and at least another is ready to proceed subject to financing. However, it is unlikely Tesla could go ahead without a secure source of graphite which is needed to make the anode material in the battery.

Batteries contain some 10 to 12 times more graphite, by weight, than lithium. Losses in the manufacturing process end up consuming 30 to 40 times more graphite than lithium. China produces 70 to 80 per cent of the world's graphite and its industry has serious environmental and resource management challenges. The associated resource nationalism and the preference for selling value added products rather than cheap natural resources suggests that the supply chain could be compromised and unreliable. Tesla's domestic sourcing ambitions are not a secret and the Gigafactory will source such materials as cobalt, graphite and any other critical material it needs in North America in order to establish as tight a supply chain as possible with an aim to keeping low costs and low environmental impact.

Who will win the Tesla graphite beauty contest? There is only one company that can meet Tesla's volume and timeline requirements some contend. It is also located in North America and has the best location/infrastructure and the lowest capital cost of any new graphite project – that company is

Northern Graphite (''NGC', TSXV: NGC | OTCQX: NGPHF).

NGC is planning on producing about 44,000 tons of graphite concentrate per year. 90% is battery grade and the yield of anode material (called "spherical graphite" or "SPG") is 50%, both the highest in the industry. This would put its annual SPG production at 20,000 tons and the company has already defined the resources to expand beyond this. Tesla's initial requirement is 27,500 tons in 2017/2018. Other companies with similar sized projects have 40-70% battery grade material and a yield of 33% or less which make their potential annual SPG production less than 10,000 tons. What will they do with the high percentage of non-battery grade material that must be sold to maximize projects economics?

NGC has completed a bankable Feasibility Study and has also secured its most important environmental permit. The company is ready to start construction next year and reach the production phase before the end of 2016. The competition is well behind in the engineering/permitting process. NGC also has one other huge advantage over its peers...

It is not enough to just be able to produce graphite. It must be purified to 99.95%C for use in lithium ion batteries. The Chinese wet chemical approach, a veritable environmental nightmare, and the thermal method, too expensive and inefficient, are not options. The only company that already has a proven, proprietary purification technology also happens to be NGC. In part, this is due to the pristine nature of its flake graphite which makes it easier to remove impurities. Even if its peers knew the process, it is unlikely it would work on their concentrates due to different mineralogy. Initial testing also indicates that this high quality flake results in greater battery capacity but further testing and validation is required.

We don't know when or what Tesla will decide to do about its graphite supply, but those who would venture a gamble in the

graphite beauty contest would clearly have to place NGC at the top of this list.

Of course, there are also questions as to whether the Gigafactory will actually be built; indeed, even Tesla's sales targets of 500,000 EVs by 2017/2018 are rather ambitious. However, few would venture to bet against Elon Musk. Alternatively, it seems highly probable that the production of EV's from all car companies will exceed 500,000 units per year by 2017, considering that every major manufacturer already has an electric or hybrid vehicle on offer in 2014. This is less than 1% of the annual new car market. Regardless of the outcome, Tesla will need more graphite than lithium and NGC is in the best position to supply it.