

# Kibaran produces superior-quality battery-grade graphite, opening door to major expansion opportunity

*Samples sent to leading makers of lithium battery components*

## HIGHLIGHTS

- Graphite from Kibaran's Epanko project in Tanzania has been used to make high-quality battery-grade graphite
- The analytical specifications of the final product exceed those required by leading anode manufacturers and those of all existing Chinese producers
- Tests were conducted under commercial production conditions and resulted in excellent analytical values including high tap density, very low remaining impurities and exceptional high carbon grades
- Product samples distributed via Sojitz Corporation to major Japanese lithium-ion-battery anode producers
- Results highlight outstanding potential for Kibaran to establish a substantial value-adding operation at Epanko, which would also underpin increased production of graphite concentrate

**Kibaran Resources Limited** (ASX: KNL) is pleased to announce that it has produced superior-quality battery-grade graphite for the lithium-ion battery market using graphite from its Epanko Project in Tanzania.

Kibaran considers the results to be extremely important because they demonstrate the strong potential for the Company to establish a downstream processing operation to supply the high growth lithium-ion battery market.

Samples of the battery-grade graphite, which was produced under commercial production conditions at a well-regarded graphite processing plant, have been sent to key anode manufacturers in Asia under the binding agreement and partnership the Company has with leading graphite trader Sojitz Corporation.

The tests were part of Kibaran's Feasibility Study on the production of battery-grade graphite using product from Epanko. The Epanko mine and flotation project is at an advanced stage with due diligence for bank finance currently underway (refer announcement 27 September 2016).

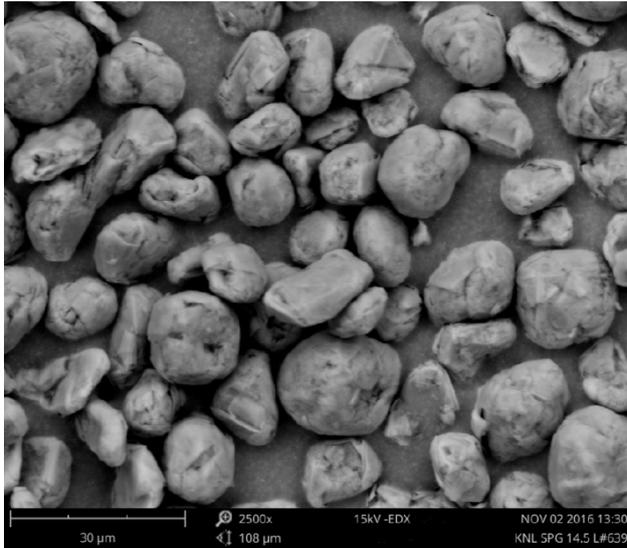
Kibaran is specifically targeting the major anode manufacturers outside China, where enormous growth in demand is expected on the back of the electric vehicle market.

The quality of Kibaran's battery-grade graphite is superior to that produced in China. One major anode manufacturer has advised Kibaran that the product's analytical values even exceeded their high expectations.

Current demand for lithium-ion-battery-grade natural graphite is estimated at 48,000 tonnes per annum with all this material sourced from China.

Kibaran has sufficient quantity to distribute its samples all over the world, including to the important market of the US where Tesla dominates production of electric vehicles, and to Germany.

The German government has announced 1.2 billion in subsidies and provided a resolution to the EU to ban the sale of internal combustion engines in the European Union by 2030. Only zero-emissions vehicles would be allowed on the market after that time, according to the resolution (reference [www.forbes.com](http://www.forbes.com)).



**Figure 1: Spherical graphite made in a production plant from Epanko graphite (uncoated purified graphite at 2500 x magnification).**



**Figure 2: Photo of samples despatched to leading anode manufacturers in Japan**

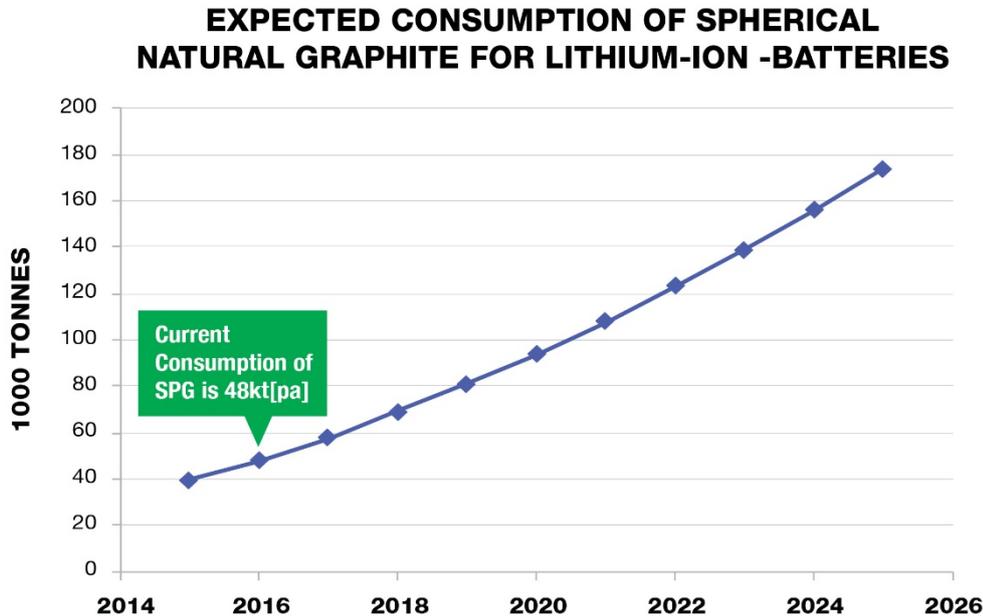
The results support the Company’s view that it will be able to vertically integrate its operations from the mine through to the production of battery-grade graphite. This provides the Company with significant competitive and technical advantages due the existing binding agreements which have been secured due to the superior quality of Epanko graphite and project.

<b>Fixed Carbon</b>	(%)	99.985
<b>Ash Content</b>	(%)	0.015
<b>D10</b>	(Micron)	9.77
<b>D50</b>	(Micron)	14.81
<b>D90</b>	(Micron)	22.32
<b>SSA</b>	(m <sup>2</sup> /g)	7.82
<b>Tap Density</b>	(g/ml)	0.95
<b>pH</b>		6.3
<b>Fe</b>	ppm	5
<b>Al</b>	ppm	3
<b>Si</b>	ppm	5

**Table 1: Test results for Spheronized Purified Graphite (SPG) from the Epanko Deposit, produced in a large scale test at an advanced producer.**

Besides high carbon content, high tap density is key for high performance batteries. Higher tap density means more graphite (active material) can be packed into a battery, increasing the higher capacity of the battery. A lower specific surface area (SSA) increases the amount of cycles in the battery life and it also contributes to number of other positive effects for the performance of the battery. The SSA is significantly reduced during the coating process.

Demand for lithium-ion batteries is expected to increase through the demand from both the electric vehicle (EV) and energy storage systems (ESS). It is expected these markets will require diversified sources of graphite manufactured to higher environmental standards than existing supply.



**Figure 3: Expected consumption of spherical natural graphite for Lithium-Ion Battery**  
(Source: ProGraphite)

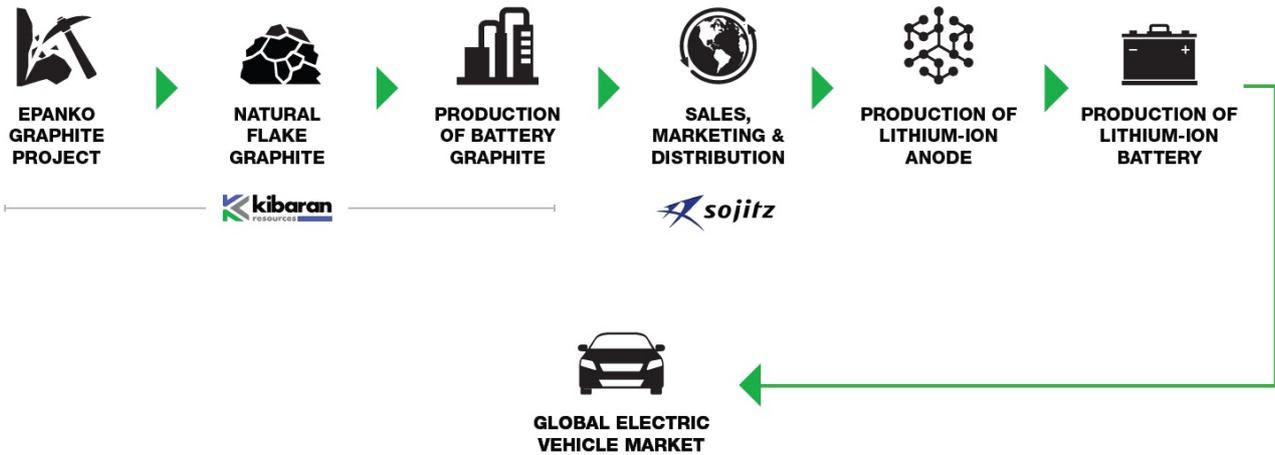
The Company now plans to optimise the flow sheet to allow all major market specifications to be met. Other activities that will run in parallel with the feasibility study include:

- Production of lithium-ion batteries (Coin Cells) in a leading LIB research centre in Germany to evaluate battery performance
- Production of Coated Spherical Graphite at a commercial production scale plant requested by end user customers
- Discussion with strategic groups with the view of developing partnerships for the downstream processing facility

Kibaran is taking the same approach to the production of spherical graphite as it took towards the Epanko processing plant. This is based on building production capacities which match market demand. At the same time, the facilities are designed in a way that enable additional production to be added at low cost.

Kibaran is conducting its product testing in commercial facilities in order to generate credible products that can be replicated in production scale plants.

Kibaran Managing Director Andrew Spinks said: “Kibaran is capitalising on the strong forecast growth in demand for battery-grade graphite from the booming lithium-ion battery industry. With a focus on production of realistic quantities of high-quality battery-grade graphite at competitive costs, paired with environmental sustainability, Kibaran can be a leading non-Chinese supplier.”



**Figure 4: Graphite supply chain for electric vehicle (EV) market**

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