

Value addition in Namibia:

Aukam Processing Facility

The **Aukam Graphite Project** "proudly hosts a state-of-the-art custom designed production facility, which is currently in its commissioning and calibration phase. Eco-friendly and sustainable, the custom-built plant is designed for expansion and with the environment in mind. The facility has been tailored for water conservation, boasting an estimated **95%** recovery rate during the graphite processing phase. "Processing is done by way of **gentle crushing, floatation, drying and finishing.**"



Aukam Processing Facility



Graphite stockpiles, lumps, fines and coarse fines

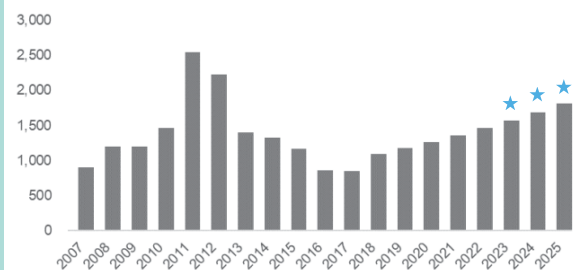


How is graphite priced?

"There are no standard, quoted prices for natural graphite and there is no spot or futures market. Actual transactions in the marketplace are largely based on **direct negotiations** between the **buyer** and **seller**. Companies such as **Benchmark Mineral Intelligence** and **Fastmarkets IM** are paid **subscription** services that periodically survey buyers and sellers and publish pricing information. Their prices are mainly provided by large, high-volume buyers and tend to be conservative. Most small buyers pay higher than published prices. "A reference price for graphite flakes for the past years is illustrated in figure 6.

Large flake graphite 94-97% C. + 80 mesh, average \$/tonne

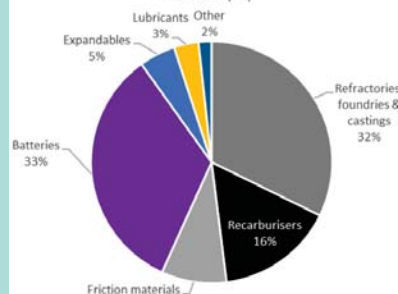
Figure 6



Source:Fastmarket IM

Natural graphite demand by application - 2022 (%)

Figure 7



Source:Fastmarket IM



6 Aviation Road
Private Bag 13297
Windhoek,
Namibia Tel: +264 -61-284
8267
Fax:+264-61-284 249144

Email: info@mme.gov.na
Web: www.mme.gov.na

MME Portals:
Earth Data Namibia
www.mme.gov.na/edn/
Mining Cadastre
maps.landfolio.com/Namibia/

Reference:
<http://www.gratomic.ca/aukam>
<https://www.fastmarkets.com>
<https://www.miningreview.com>
<https://www.gecko.na>



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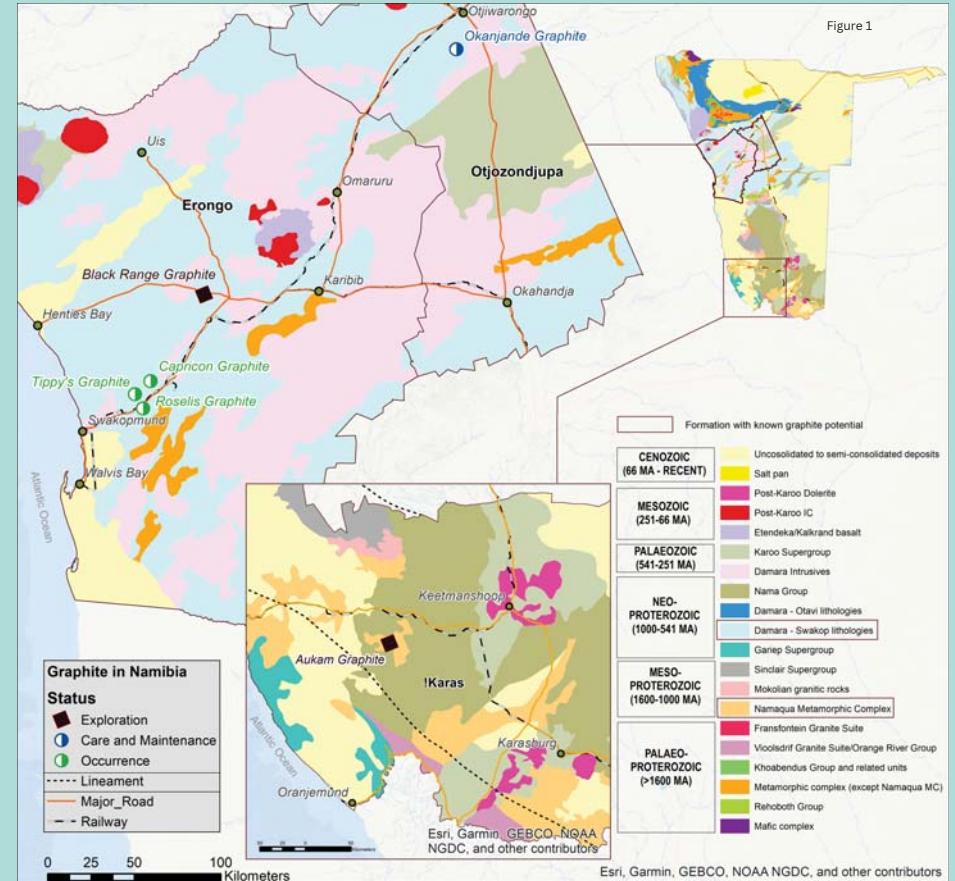


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Commodity & Host Geology

Namibia hosts two types of graphite deposits, which occur in the north central and southern part of the country. The two different styles of graphite deposits are classified based on the morphology of the contained graphite, primarily the vein/lump graphite deposits and the flake type deposits.



The vein/lump graphite deposits:

The **vein/lump type** graphite deposit is prominent in the altered rocks of the Namaqualand Metamorphic Complex in the !Karas region, southern Namibia. The Complex is comprised of assemblages of gneisses, marbles, schists, quartzites, and amphibolites with intrusive granites and gabbros. The **Aukam Graphite Mine** is a vein deposit located within the Namaqua Metamorphic Complex and hosts five underground adits and an open cut which were mined periodically between 1940 and 1974 that produced a total of 22,602 tons of graphite. In 1951, the mine produced peak productions of 2627 t of graphite. At Aukam Graphite Mine, the graphite is concentrated in veins, with minor disseminations in the host rock (c.f Table 2).

GEOLOGICAL SURVEY OF NAMIBIA

The flake type graphite deposits:

The **flake type** graphite contains ordered graphite crystals of various sizes disseminated in the host rock. The flake graphite deposits develop from the regional metamorphism of carbon-containing sedimentary rocks in mobile metamorphic belts such as the Damara Orogenic Belt in Namibia. The **Okanjande** Graphite Deposit, **Black Range** Graphite and **Tippy's** Graphite are known flake type graphite deposits within the Damara Supergroup found in the metasediments of the Nosib and Swakop Groups (c.f Table 1, 3, 4).

Graphite Projects

Table 1

Project	Deposit type	Host Geology	Ore minerals	Status & Production	Reserves	Resources
Okanjande Graphite	Sediment hosted	Nosib Group of the Damara Sequence within the North Central Tectonostratigraphic zone. The Nosib Group is comprised of arkoses and feldspathic quartzites subjected to high grade metamorphism	Graphite flakes	Care and maintenance Last Production was 20 000 t per annum by way of flotation and gravimetric separation	None	Measured resource NI43-101 compliant Weathered Ore Zone 3,266,000 tons @ total graphite content of 5.539% and TiO2 0.741% Fresh Ore Zone 9,564,000 tons @ 6.252% C and 0.814% TiO2 Indicated resource Weathered Ore Zone: 714,000 tons @ total graphite content of 5.11% and TiO2 0.975% Fresh Ore Zone: 4,874,000 tons @ 5.566% C and 0.895% TiO2
<p>"The Okanjande graphite project was in production from August 2017 until October 2018 when previous owners placed it on care and maintenance due to start-up issues with the processing plant which did not meet design specifications" Source: https://www.miningreview.com</p> <p>Location / Infrastructure</p> <ul style="list-style-type: none"> 14 km south of the town of Otjiwarongo 12 km from B1 road 388 km from the port of Walvis Bay 20 km from Otjiwarongo railway station GPS coordinates -20.587 S, 16.628 E <p>Source: https://www.gecko.na/</p>						
<p>Okanjande Graphite Preliminary Economic Assessment (PEA) July 1, 2022 (Northern Graphite)</p> <ul style="list-style-type: none"> "The PEA concludes that Okanjande/Okorusu can be back in operation by mid-2023 Average production will be 31,000 tonnes per annum of graphite concentrate C1 production costs of US\$775 per tonne Post Tax internal rate of return (IRR) of 62% Post Tax net present value (NPV) of US\$65M and a payback of under two years based on a 10-year mine life and a weighted average graphite price of US\$1,500/tonne Average carbon content overall size fractions of 96%" <p>Source: https://www.miningreview.com</p>						

Table 2

Project	Deposit type	Host Geology	Ore minerals	Status & Production	Reserves	Resources
Aukam Graphite	High grade vein deposit	Within the shear zone of the Namaqua complex.	Graphite	Active		www.gratomic.ca/aukam
<p>Location / Infrastructure</p> <ul style="list-style-type: none"> Luderitz Harbour – 500m cargo & Container quay Paved Highway, approximately 70 Km from B4 road Rail Line GPS coordinates -26.96422 S, 16.81596 E <p>Source: www.gratomic.ca/aukam</p> <p>Aukam Graphite, "this historic mine brought prosperity to the Karas region in previous decades. Its first operational phase began in 1940 and it remained in production for 16 years, ceasing operations in 1956. The second phase of activity began in 1964 and the mine remained active unit 1974. The Aukam Graphite Project is currently in preparation for phase three of its life, with commercial production anticipated to commence 2023. Phase three will allow the mine to realize its full potential with an estimated 22,000 tonnes per annum of high purity, vein graphite production" Source: www.gratomic.ca/aukam</p>						

Table 3

Project	Deposit type	Host Geology	Ore minerals	Status & Production	Reserves	Resources
Black Range Graphite		The graphite-rich member forms part of the locally termed "Sukes" formation that comprises feldspathic quartzites, muscovite-quartz schists and gneisses. The member is regionally within the Swakop Group, which has been intruded by the Salem Suite Granite rocks.	Graphite flakes	Exploration	Indicated reserves Eluvial overburden 0.75m average thickness at +- 180 000 tonnes	13.3 Mt @4.9% carbon at 2% cut off grade and 1.25 % TiO2 as rutile.
					Surface dimensions of main zone Strike length 1200m	Average width at suboutcrop 90m

Table 4

Project	Deposit type	Host Geology	Ore minerals	Status & Production	Reserves	Resources
Tippy's Graphite		Metasedimentary succession of schists, quartzites, marbles and calc-silicates of the Rössing and Khan Formations of the Damara Supergroup.	Graphite flakes	Occurrence	Unknown	Unknown

Table 5

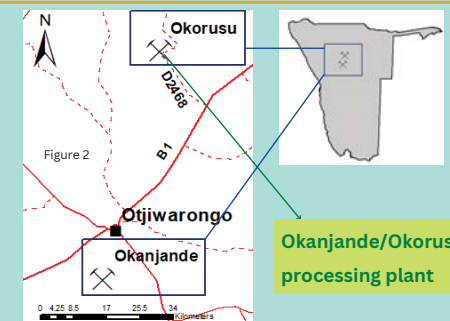
Project	Deposit type	Host Geology	Ore minerals	Status & Production	Reserves	Resources
Capricon Graphite				Occurrence		

Table 6

Project	Deposit type	Host Geology	Ore minerals	Status & Production	Reserves	Resources
Roselis Graphite				Occurrence		

Value addition in Namibia: Old Okorusu Mine

The Okanjande/Okorusu processing plant had been retrofitted to process graphite-bearing material with expected increase in throughput, recovery and improve the flake size distribution.



Okanjande/Okorusu processing plant