Northern Graphite is positioned to deliver natural graphite in a secure, sustainable, and transparent manner for the green economy.

Mozambique was the second-largest producer in 2020, with one-fifth of China’s graphite output.

Top 10 Producers of Natural Graphite 2020E, tonnes

<table>
<thead>
<tr>
<th>Country</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>650,000t</td>
</tr>
<tr>
<td>Madagascar</td>
<td>47,000t</td>
</tr>
<tr>
<td>Mozambique</td>
<td>120,000t</td>
</tr>
<tr>
<td>Brazil</td>
<td>95,000t</td>
</tr>
<tr>
<td>Russia</td>
<td>24,000t</td>
</tr>
<tr>
<td>Canada</td>
<td>10,000t</td>
</tr>
<tr>
<td>India</td>
<td>34,000t</td>
</tr>
<tr>
<td>Norway</td>
<td>15,000t</td>
</tr>
<tr>
<td>Ukraine</td>
<td>19,000t</td>
</tr>
<tr>
<td>Pakistan</td>
<td>13,000t</td>
</tr>
</tbody>
</table>

China accounted for 59% of production and 66% of exports globally.

China’s Dominance in the Graphite Supply Chain

China dominates every stage of the graphite supply chain.

China is the largest producer of both:

<table>
<thead>
<tr>
<th>Product</th>
<th>China</th>
<th>Rest of the World</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthetic Graphite Production</td>
<td>78%</td>
<td>22%</td>
</tr>
<tr>
<td>Battery Anode Material Production</td>
<td>86%</td>
<td>14%</td>
</tr>
</tbody>
</table>

The dependence on graphite supply from China creates the potential for political interference and resource nationalism.

Unsustainable Graphite

Heavy dependence on China makes the supply chain long and vulnerable to shipping disruptions.

Graphite production and processing in China is associated with:

- Water and air pollution due to graphite dust from factories.
- Sulfur oxide (SOx) and nitrogen oxide (NOx) emissions from synthetic graphite plants.
- Environmental and health hazards from toxic chemical usage.

Graphite’s demand is growing rapidly due to its critical role in electric vehicles, energy storage technologies, and fuel cells.

The Rising Demand for Graphite

Graphite demand from batteries is expected to increase 10.5x by 2030.

Graphite Demand from Li-ion Batteries 2020—2030E

<table>
<thead>
<tr>
<th>Year</th>
<th>Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>0.5M</td>
</tr>
<tr>
<td>2021</td>
<td>1.0M</td>
</tr>
<tr>
<td>2022</td>
<td>1.5M</td>
</tr>
<tr>
<td>2023</td>
<td>2.0M</td>
</tr>
<tr>
<td>2024</td>
<td>2.5M</td>
</tr>
<tr>
<td>2025</td>
<td>3.0M</td>
</tr>
<tr>
<td>2026</td>
<td>3.5M</td>
</tr>
<tr>
<td>2027</td>
<td>4.0M</td>
</tr>
<tr>
<td>2028</td>
<td>4.5M</td>
</tr>
<tr>
<td>2029</td>
<td>5.0M</td>
</tr>
<tr>
<td>2030</td>
<td>5.5M</td>
</tr>
</tbody>
</table>

While graphite demand is increasing, it is not expected to slow down in the future.

New mines outside China will be critical in meeting graphite’s rising demand and combating the oncoming supply crunch.

China’s Energy Mix 2019

<table>
<thead>
<tr>
<th>Source of Energy</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>58%</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>8%</td>
</tr>
<tr>
<td>Hydroelectricity</td>
<td>20%</td>
</tr>
<tr>
<td>Petroleum &amp; other liquids</td>
<td>2%</td>
</tr>
<tr>
<td>Nuclear</td>
<td>5%</td>
</tr>
<tr>
<td>Renewable</td>
<td>8%</td>
</tr>
</tbody>
</table>

Sulfur Oxide emissions from synthetic graphite plants.

Towards a Sustainable Graphite Supply Chain

For this reason, both the U.S. and European Union have declared graphite a critical mineral.

The dependence on graphite supply from China creates the potential for political interference and resource nationalism.

Graphite Supply Problem

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A MULTINATIONAL CORPORATION

VISUALIZING THE GRAPHITE SUPPLY PROBLEM

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However, the natural flake graphite market is expected to be in a deficit by 2023 with few new sources under development, particularly outside China.

Graphite is the largest component of lithium-ion batteries, which are in increasing demand.

However, the natural flake graphite market is expected to be in a deficit by 2023 with few new sources under development, particularly outside China.

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