Industrial Minerals review 2021

by Mike O'Driscoll*

Testing times sustain market turmoil, but outlook positive

2020–21 was all about coping with COVID-19 and responding to the pandemic's ramifications and the subsequent recovering market demand. While 2021–22 has seen a continuation of this trend, also thrown into the mix has been the tragic Russia-Ukraine conflict which has compounded the situation further.

In short, the industrial minerals industry is experiencing another period of intense challenge faced with shortages in supply availability combined with ongoing logistical issues. On the positive side, however, demand remains strong, and growth markets, particularly for critical raw materials appear to be soaring, while prospects for industrial mineral development are receiving a boost. All of the latter, of course, are tempered by the increasing development and adoption of environmental technology and protocols in decarbonization and energy conservation.

Russia-Ukraine war: ceramic clay impact

At the time of writing we are on day 110 since Russia invaded Ukraine, with sadly still no end in sight. As a result, industrial mineral supply chains and markets in Europe continue facing widespread disruption and uncertainty.

A significant knock-on effect has been severe disruption to an already stressed logistics sector across Europe and beyond, experiencing increasing shipping prices.

The ramifications of the conflict have impacted several important industrial mineral markets. Ukraine hosts a range of important industrial mineral resources and has long been an important consumer of minerals for its refractories, steel, glass, cement and ceramics manufacturing.

The stand-out minerals which are produced and exported in volume are kaolin (particularly the important ceramic ball clays of the Donbas region), the titanium minerals ilmenite and rutile, and zircon — one of Europe's few sources of these minerals. There is also noteworthy production of fused alumina, silicon carbide (centered in Zaporizhzhia), graphite (Zavallya) and kyanite (by-product of titanium-mineral mining at Vilnohirsk) — these minerals are of great interest to the refractories market, and for graphite, also the emerging lithium-ion battery market — though their export volumes have been on small to moderate scales.

Of all the minerals produced in Ukraine, it is the ceramic clay supply sector which is going to have the most severe impact on European (and perhaps other) consumers.

Ukraine is one of the world's leading suppliers of high-quality ceramic clays, also called ball clays. The majority of deposits (some 360 Mt of kaolinite resources) are concentrated in the Donbas region, near Donetsk in eastern Ukraine. These clays are highly suitable for porcelain tile production as they exhibit high plasticity, high whiteness and low water absorption after firing.

Some of Europe's leading ceramic mineral supply groups have established operating subsidiaries in the Ukrainian clay sector, such as Sibelco, Imerys and AKW.

Although U.S. Geological Survey (USGS) data indicate kaolin production in Ukraine to be 1.6 Mt/a, the country's ball clay production has been reported at levels of 4 Mt/a. Indeed, almost 5 Mt of ball clay was exported by Ukraine in 2019, ranking it as the world no. 1, accounting for 81 percent of all such exports. The main export destinations, mostly through the port of Mariupol but also via the Olbia and Mykolaiv ports, are the dominant ceramic tile producing centers of Spain and Italy, and also Poland and Turkey.

Clearly, and of critical concern for the tile market, ceramic tile manufacturers in these countries have now had their supply of unique ball clay terminated for the foreseeable future.

In Spain, for example, recent years saw ceramic tile manufacturing transition from mostly red tile bodies, using domestic clays, to white tile bodies, significantly depending on imported white-firing ball clays mainly from Ukraine (70 percent of requirements).

With Ukraine clay stocks in tile plants in the European Union (EU) anticipated to run out in June, the market is scrambling to find alternative clay sources.

And as a footnote: just two days before the Feb. 24, 2022 Russian invasion, the USGS released its updated (from 2018) "2022 U.S. Critical Minerals List." Potash was one of the industrial minerals removed from the list. Almost 40 percent of world potash production originates from Russia (20 percent) and Belarus (17 percent) — thus many consumers in Europe, MENA (Middle East and North Africa) and elsewhere are now impacted by supply constraints. Interestingly, potash also does not make the EU's latest critical raw materials list.

This simply underlines the important caveat advised by Steven M. Fortier, director, USGS National Minerals Information Center: "Mineral criticality is not static, but changes over time."

China: ongoing supply disruption

While the COVID-19 pandemic may have eased in parts of the world, China remains

affected, mainly owing to the government's zero-tolerance policy, which enforces immediate lockdowns in response to any rise in cases.

Unsurprisingly, this has led to widespread disruption in mineral production and exports to world markets owing to continuing intermittent mine, plant and port lockdowns.

In addition, now in the second year of China's 14th Five-Year Plan (2021–2025), President Xi Jinping's antipollution drive moves on unabated, with ongoing resource conservation and environmental controls to meet government goals resulting in mine/plant inspections, disruptions, and temporary and permanent shutdowns.

The now annual October–March winter shutdown is a major disruption to all energy-intensive operations, such as all mineral processing, calcination and fusion.

For example, from January to mid-March 2022, plants within 600 km of Beijing were required to close, forcing mineral processors at the important export port of Tianjin to work only at night, and no production, just bagging.

The upshot of the above is that Chinese mineral output and export flow has been interrupted as ports have been incredibly congested, and at time of writing (mid-June), were just starting to open up.

The suspension of port activities has also led to poor loading management (causing delays at Western discharge ports), unsuitable vessels, and extended voyage times of 140-plus days. In April 2022, it was reported that 24.3 percent of all container vessels waiting outside ports globally were waiting outside China ports.

There is no doubt that China will remain an important force in industrial mineral supply to world markets, and its domestic mining sector is busy reforming and modernizing with green mining and the upgrading of plants with new processing technology.

But maybe we are seeing the end game for easy low-cost Chinese mineral supply. The adverse factors of the last few years are shaping a future likely to see more of a balanced consumption of minerals between China and non-China sources, as global mineral consumers and traders finally appreciate the risks associated with having all of their supply eggs in the one China supply basket.

Mineral development boom

A positive consequence of the China situation has been the lease of life it has given to industrial mineral project developers outside China, especially those minerals for which China had been normally dominant in supply.

In the magnesia market, world leader RHI Magnesita has committed to expanding investment and operations in Brazil, as well as creating a dolomite production hub in Europe. Other players in Brazil, IBAR Nordeste and Magnesium do Brasil are also looking to recoup market share with expansions, while Grecian Magnesite has opened a new underground mine.

Nonmetallurgical bauxite supply, almost monopolized by China, is now seeing two new sources come on-stream: First Bauxite LLC, Guyana (strengthened by its recent acquisition of US Ceramics providing calcination plants) and Bautek Minerais Industriais Ltda, Brazil.

Graphite demand is clearly being driven by the electric-vehicle lithium-ion-battery evolution, but again, consumers are wanting to look outside China and finding a lot of action, especially in eastern Africa and Madagascar, but also Australia, Asia, Scandinavia and the Americas.

With its investment in Bissett Creek, ON, and recent acquisition of Imerys graphite operations of Lac des Iles, Quebec and Okanjande, Namibia, Northern Graphite could be on course to be North America's leading graphite producer and the world's third largest producer outside China.

The future is looking good for industrial mineral development and, in general, consuming markets are buoyant. The real challenges will be in trying to maintain logistic supply lines at reasonable rates for at least another year of turmoil in the shipping market, tactfully educating customers as to the prevailing supply situation, as well as developing and employing, as economically as possible, new (and ultimately perhaps legally required in the not-too-distant future) carbon emission reduction, "green" mining and recycling practices for a sustainable future. ■

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Editor's note: The articles provided by the U.S. Geological Survey (USGS) in this section are based on data included in the USGS Mineral Commodity Summaries 2022 (https://www.usgs.gov/centers/national-minerals-information-center/mineral-commodity-summaries). The USGS Mineral Commodity Summaries are published on an annual basis; this report is the earliest government publication to furnish estimates covering nonfuel mineral industry data. Data sheets contain information on the domestic industry structure, government programs, tariffs, and five-year salient statistics for more than 90 individual minerals and materials.

Throughout this review, measurements are expressed as metric units unless the author provided conversions.