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October 2022 | Vol 18 No 10



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Green agenda drives demand for Industrial Minerals

By Alana van Wouw, market analyst at Crane Ridge

Industrial Minerals, though often an overlooked, are key to creating a steady foundation for construction, manufacturing, and agricultural industries to thrive.

2020-21 was all about coping with Covid-19 and responding to the pandemic's ramifications and the subsequent recovering market demand. In 2021-22 we have seen a continuation of this recovery trend, adversely affected by the conflict in Russia and Ukraine.

The Russia-Ukraine war has had a significant impact on the Industrial Minerals industry as, according to Galos (2010), there are around 40 recognised refractory and ball clay deposits in Ukraine – representing >600 million tonnes in resources and approximately 20 deposits of kaolinite clays with 360 million tonnes in resources under exploitation. Ukraine ball clay production has been reported at levels averaging 4 mtpa. In 2019, the Ukraine ball clay export markets totalled 4,823,361 tonnes (81% world share).

China's mineral supply has been impacted by inconsistency in volumes, quality and prices as the result of ongoing lockdown strategies. Factors affecting supply are attributed to ongoing environmental and other government controls, as well as periodic bans on explosives use in certain areas; mining and exploration licence difficulties; and supply sector reform and consolidation, all of which have been exacerbated by the exhaustion of high-quality reserves.

China's Covid-19 restrictions continue to have adverse effects on logistics and port congestion, resulting in significant increases in freight prices. This, combined with recovery in the domestic market: in both established and new hi-tech manufacturing, has had an additional tightening effect.

Despite all the challenges, the markets have seen a steady growth in non-metallic mineral mining and quarrying, up by 27.90% in the last five years, and manufacturing industries are up by 32.16%, giving an overall increase in non-metallic industries.

Industrial Minerals: Demand and supply dynamics

On a positive note, 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. The main drivers of this increase in development are their use in environmental impact mitigation technology and protocols in decarbonisation through energy conservation.

Mineral development boom

The consequence of the China situation could herald a new lease of life for industrial mineral project developers outside of China, particularly those minerals for which China was dominant in supply.

Based on the Major import's sources 2017-2021 – USGS 2022 data, South Africa could be an up-and-coming country for Industrial Minerals as it hosts several undeveloped deposits.

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.

Industrial Minerals: Factors to watch

All eyes should be on 'green' mining and a sustainable future, when it comes to Industrial Minerals as a great deal of research is underway using Industrial Minerals to improve plant health



and water quality; mitigate toxic spills; clean up industrial brownfields and reverse acid rain damage in forests and wetlands.

A leading example is Canadian Wollastonite, which is currently working with more than a dozen universities researching new applications. Africa has several Wollastonite deposits.

Key developments that could add to a 'greener' approach in the mining industries are the following (source from Canadian Wollastonite):

Synthetic slag conditioning:

The steel industry uses synthetic slag formulations to control temperature, oxidation and waste during the smelting process. Products such as high calcium quicklime and silica sand can be partially replaced with wollastonite and dolomitic rock, and quicklime partially replaced with diopside. This lowers the melting point and requires less flux to achieve the desired viscosity, while reducing the amount of CO₂ normally released by the lime-based ingredients.

Cement production:

The production of conventional cement is energy intensive and releases large amounts of CO₂. Wollastonite and the surrounding calcium magnesium silicate are non-CO₂ emitting, single sources of calcium and silicone oxides. Bench trials results showed the following benefits:

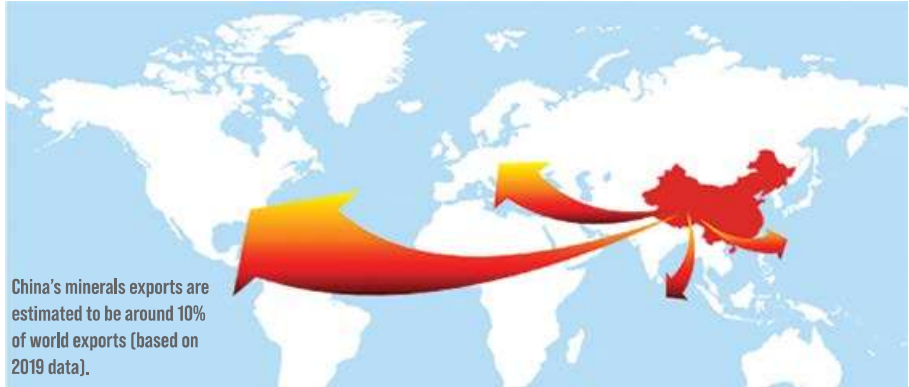
Reduced CO₂: Early trials show a 30% substitution of wollastonite ore results in combined calcination and energy related CO₂ reduction of 24%.

Energy efficient: Cement clinker made with 44% wollastonite in a coal fired process required less fuel because of lower reaction temperatures and resulted in an additional 44 kg CO₂ savings per ton of cement.

Greater performance: Experimental analyses on strength, texture and free lime for wollastonite-based cement showed better results than conventional samples.

Use of Wollastonite for tailing waste management enriched in Mn (II) and Zn (II). A study conducted by, the Department of Mining Engineering, Institute of Technology, Banaras Hindu University, Varanasi-221005, India has indicated that wollastonite may be used as an efficient adsorbent for the treatment of Mn (II) and Zn (II) bearing waste streams.

Wollastonite has a good adsorption capacity for Mn (II) and significant adsorption for Zn (II). This is evident in the existing system due to the formation of monolayer coverage of the adsorbate species at the outer surface of mineral particle. The data obtained may prove important for use in designing and fabricating a treatment plant for tailing waste management where the effluent is enriched in



28 April 2022: 24.3% of all container vessels waiting outside ports globally are waiting outside China's ports (Windward)



Africa has several Wollastonite deposits as indicated on the map.

manganese and zinc contaminants.

In conclusion, Industrial Minerals are developing into a robust industry and economic advances and political pressure to go 'green' will ultimately place this industry in the spotlight. ■