Guinea's Golden Decade of Bauxite Export Growth

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https://doi.org/10.71659/icsoba2024-kn009

Abstract

Over the past decade, annual bauxite exports from Guinea have increased from 18.5 million tonnes (dry) in 2013 to 111 million tonnes (dry) in 2023, representing a compound annual growth rate (CAGR) of approximately 20 %. Almost all of the additional tonnes mined and exported from Guinea over the ten-year period have been destined for China, despite the enormous geographic distance between the two countries. Guinean bauxite is characterized by its high gibbsite content and low reactive silica content, which makes it highly desirable for alumina production, typically using low-temperature (LT) Bayer processing. Chinese domestic bauxite is characterized by its high diaspore content and high silica content, which requires high-temperature (HT) Bayer processing. This paper seeks to explore the drivers behind China's voracious appetite for imported bauxite, its ability to adapt existing refining capacity from HT to LT Bayer processing and how Guinea has managed to position itself as the country of choice for Chinese bauxite importers.

Keywords: Bauxite, Guinea, Bayer, Diaspore, Gibbsite.

1. Introduction

Guinea is home to the world's largest bauxite reserves. Prior to 2016 however, they remained largely untapped, with exports registering a modest 18 million tonnes (dry), or around 5 % of global supply (~350 million tonnes dry) in 2015. More recently, exports of bauxite from Guinea have surged, driven by the voracious appetite of China's alumina refining sector.

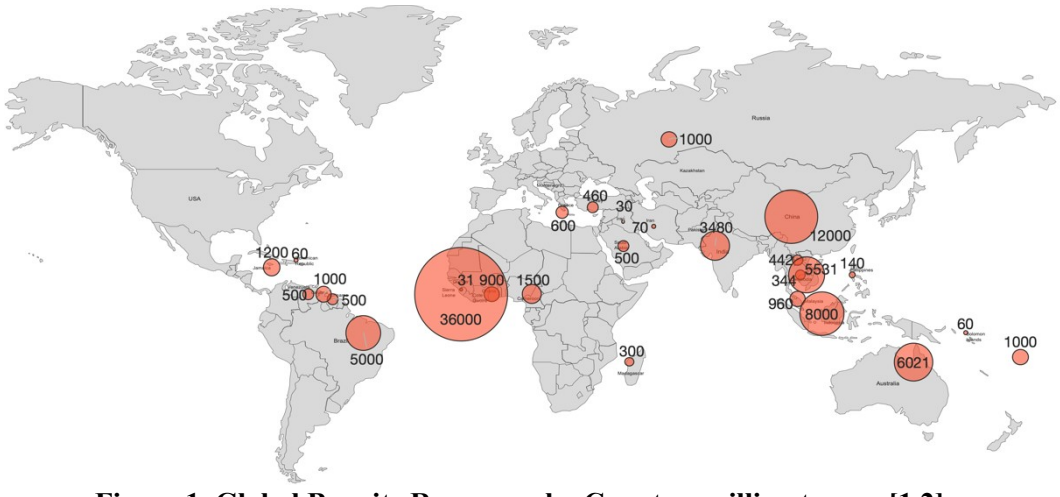

Figure 1. Global Bauxite Resources by Country, million tonnes [1,2].

Prior to 2015, Guinean bauxite was exported almost exclusively to countries where alumina refineries processed bauxite according to either vertical ownership arrangements (between Guinean miner and refiner) or long-term supply agreements, which typically stretched back decades.

Beginning in 2015, a new generation of bauxite miners emerged in Guinea, mostly backed by Chinese investment, which ushered in a new era for the country's bauxite mining sector and signalled the start of major upheaval in global bauxite consumption patterns.

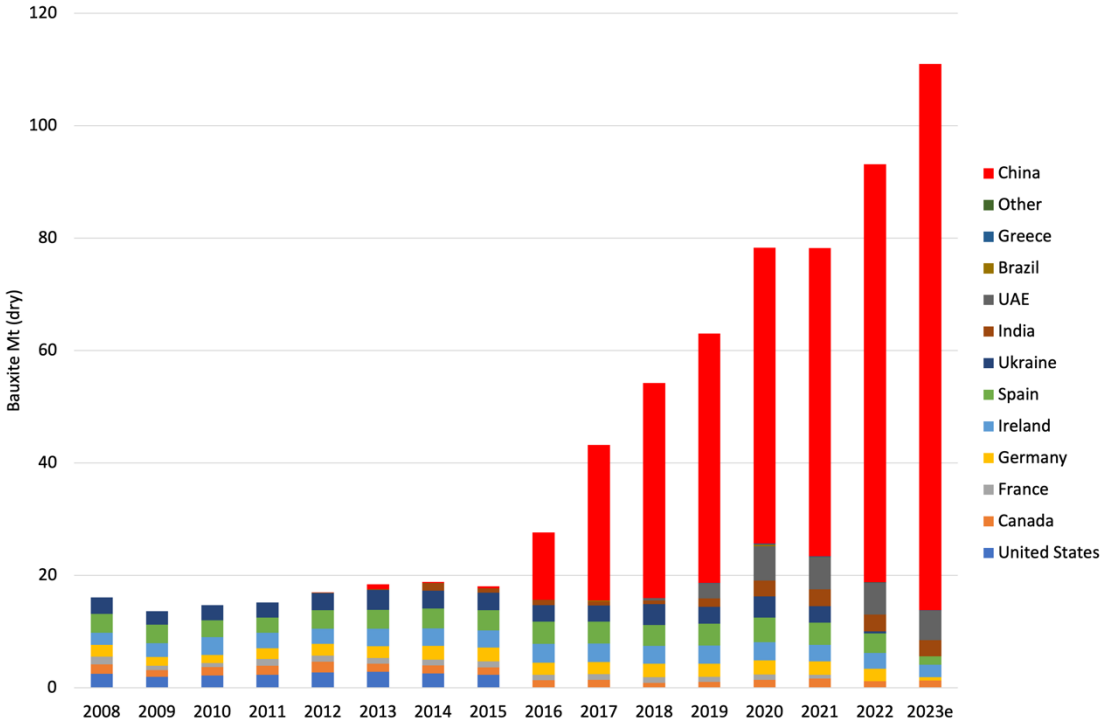

Figure 2. Guinean Bauxite Exports by Destination Country, 2008 to 2023 (tpy dry).

2. Demand for Imports from China

Ahead of the enormous growth surge in Guinean bauxite exports, Chinese refiners had embarked on a mission to develop high-volume, low-cost bauxite operations offshore to feed its growing demand for alumina and primary aluminium, both a consequence of China's rapid industrialisation program. Over time, strong demand growth collided with falling domestic grades, which added further demand for imports.

Indeed, over the period 2008 to 2014 alone, Chinese alumina refining capacity had grown at a compound annual growth rate (CAGR) of around 12 %, resulting in demand for an additional 55 tpy of bauxite by 2014. Chinese refiners initially sourced bauxite from Indonesia, a country geographically close and endowed with sufficient bauxite reserves to support China's growing demand for decades. However, in January 2014, Indonesia introduced a minerals export ban, which stopped all bauxite exports to encourage growth of its own domestic alumina refining sector.

Given the high costs associated with building alumina refineries in Indonesia relative to China (at the time), Chinese refiners looked elsewhere for imported bauxite, landing next in Malaysia. From the outset, however, Malaysian bauxite exports were challenging, given their inferior grade and quality, as well as the uncertainty surrounding the size of reserves, which fell well short of those in Indonesia.

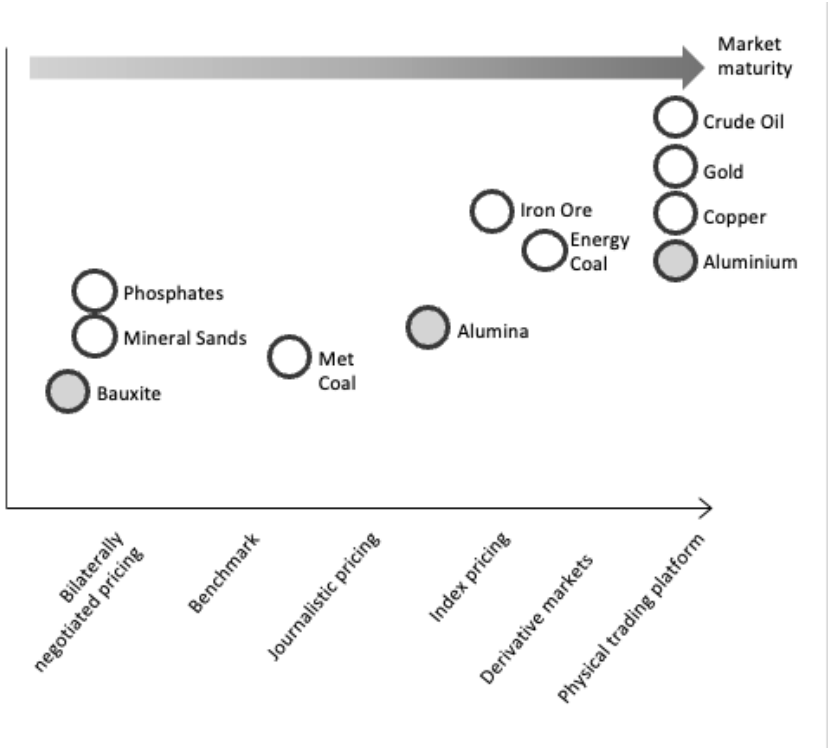

Figure 6. Evolution of Commodity Markets.

6. Conclusions

Over the past decade, global bauxite supply and demand fundamentals have undergone a seismic shift, driven by China's rapid industrialisation and on-going depletion of its domestic reserves. Combined, these two factors have driven double digit growth in bauxite imports.

Over the past five years, Guinea has emerged as the dominant bauxite supplier to China, with exports surging from 18.5 million tonnes (dry) in 2013 to 111 million tonnes (dry) in 2023, at a compound annual growth rate (CAGR) of around 20 %.

As China's domestic bauxite reserves have depleted, existing alumina refiners dependent on local supply have adapted to processing imported bauxite by making a series of process and equipment modifications, which have kept them commercially viable over the period.

Despite the significant variation in bauxite grades and qualities, growth in globally-traded bauxite volumes has led to an increase in market transparency, which is likely to result in pricing mechanisms evolving to become more reflective of a maturing commodity market.

7. References

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