



## Seeking Opportunities in Metals of the Future

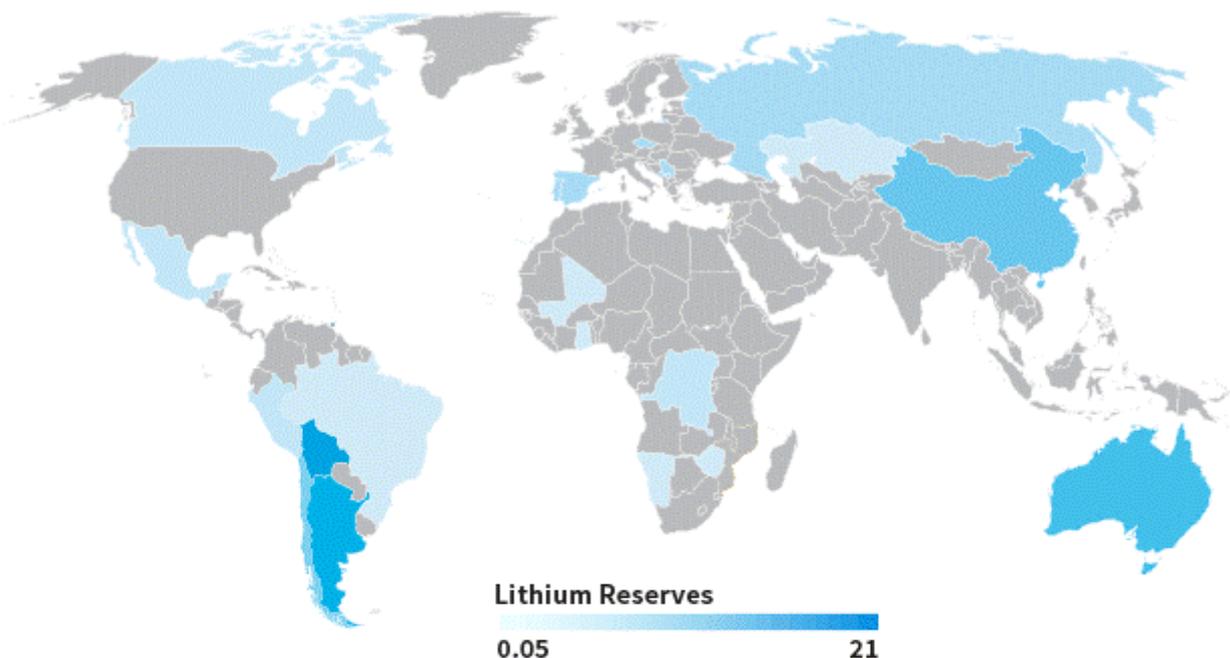
September 1, 2022

Metal exporters in emerging markets (EMs) may be underappreciated given the increased demand for clean transportation created by regulation and consumer preferences—and this could bolster the outlook for frontier markets with burgeoning mining investments.

As we explained in a [previous blog post](#), the contribution of emerging and frontier markets to global trade in clean-energy metals has steadily grown in recent years. In 2020, EMs were the source of 44.3% of exports of big-five transition metals, which are those metals heavily needed in renewable energy infrastructure, mainly in electrification activities: copper, nickel, aluminum, cobalt, and lithium. This was up from 42.6% in 2016. The chart below illustrates.



## EM Production and Reserves of Transition Metals Are Up



2021 National Share of Estimated World Production	Copper	Nickel	Lithium	Cobalt
Mexico	3.4	-	-	-
Panama	2.1	-	-	-
Peru	10.5	-	-	-
Chile	26.7	-	23.9	-
Morocco	-	-	-	1.4
Zambia	4.0	-	-	-
Brazil	-	3.7	7.2	-
Argentina	3.4	-	2.2	-
Kazakhstan	2.5	-	-	-
Russia	3.9	9.3	-	4.5
China	8.6	4.4	16.2	1.3
Papua New Guinea	-	-	-	1.8
Indonesia	-	37.0	-	1.2
Philippines	-	13.7	-	2.6
	100%	100%	100%	100%

Sources: USGS, BP, IMF, national sources, and William Blair, as of April 2022.

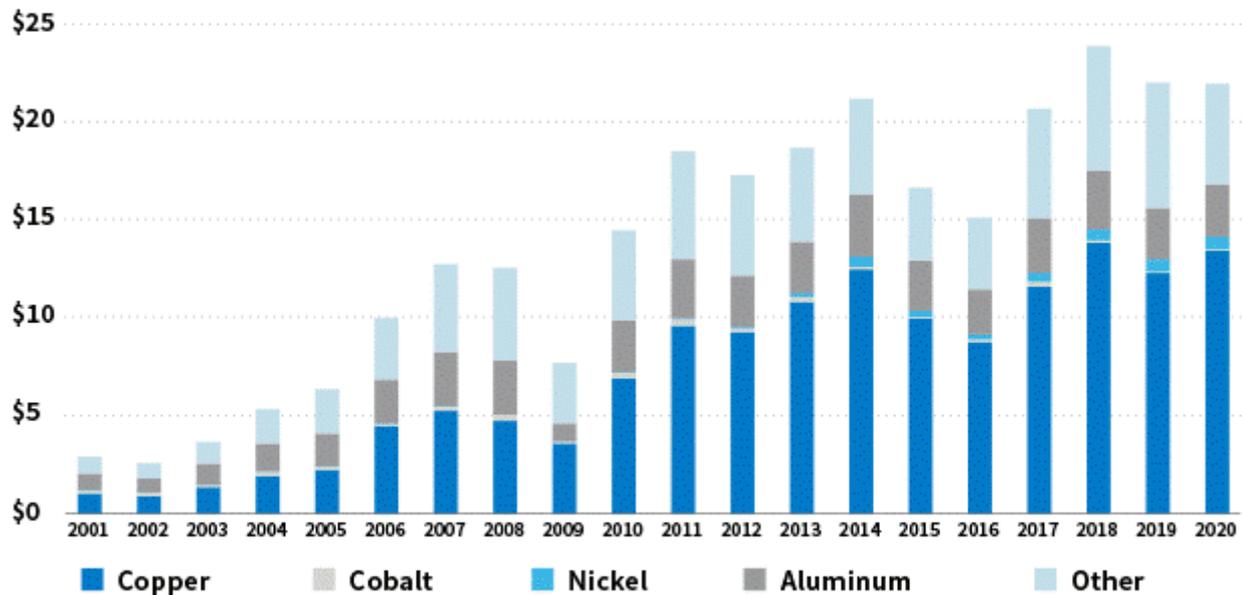
China is an important source and destination of the metals of the future, consuming about half of all major base metals in 2022, according to Standard & Poor’s. The other largest global exporters of these metals include Chile, Russia, and Indonesia.

Notably, the value of transition metal exports by frontier markets grew by 45% over the past five years, with production emerging in new countries such as Namibia, Côte d’Ivoire, and Pakistan. Clean energy metal mining projects are becoming more valuable, which is likely to drive the search for new reserves and mining projects. Over and above the support the hunt for metals provides to prices and terms of trade, it also offers the potential for

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increased export proceeds and foreign direct investment inflows to key emerging and frontier markets.

## Frontier Market Exports of Transition and Other Base Metals Growing (In Billions)



Source: UN Comtrade, as of April 2022. Frontier Markets include the 36 countries that are eligible for the JP Morgan Next Generation Emerging Markets (NEXGEM) Index.

But let’s look at the opportunities we see in key regions: Latin America, Sub-Saharan Africa, and Asia.

### Latin America: Dominates Global Copper Supply With Significant Potential in Lithium

The copper mining industry is a critical component of both the Chilean and Peruvian economy, contributing meaningfully to exports (62% to 63% of total) and fiscal revenue (5% to 6% of total). And production is developing in both emerging and frontier markets.

Copper production started in Panama in 2019, and its contribution to fiscal revenues and exports is set to expand further in line with new tax arrangements, growing volumes, and supportive prices. We believe Panama’s annual copper ore exports are likely to grow from \$1 billion (11% of goods exports) in 2020 to more than \$4 billion in coming years as production ramps up at a new mine, which will be one of the largest in the world.

Critically, as Panama’s copper export volumes increased and copper prices moved higher, the country’s current account shifted from a deficit to a surplus, sharply improving the performance of the external sector and allowing for considerable accumulation of international reserves.

Meanwhile, Bolivia, Argentina, and Chile dominate global lithium reserves, with 56% of identified lithium resources in what the U.S. Geological Survey calls the “lithium triangle.” The contribution of lithium carbonate exports to overall exports is currently small (0.3% and 0.9% of total 2021 exports for Argentina and Chile, respectively). However, it has potential to grow significantly under the right policy mix.



## Contribution of Metal Mining Sector in Key Latin American Countries

	Mining Industry (% of GDP)	Employment in Mining Sector (Thousand PPL)	Employment in Mining Sector (% of Employed)	Mining Taxes (% of Fiscal Revenue)	Mining Exports (Billions)	Mining Exports (% of Total)	Main Metal Mining Exports
Argentina	3.3%	31.3	0.3%	—	\$ 4.9	6.3%	Gold, Silver
Brazil	4.7%	237.0	0.6%	6.0%	\$ 73.4	26.1%	Iron Ore, Gold
Chile	14.7%	236.9	2.7%	5.9%	\$ 57.8	62.0%	Copper
Mexico	1.5%	396.5	0.4%	0.8%	\$ 9.6	1.9%	Copper, Iron
Panama	0.1%	5.1	0.3%	5.3%	\$ 2.8	27.6%	Copper
Peru	12.6%	102	2.0%	—	\$ 39.6	62.8%	Copper, Gold

Sources: Central banks, national statistics offices, and ministries of finance, as of December 2021. Chilean mining taxes covers large-scale private mining company (GMP-10) taxes paid and contribution of publicly owned mining companies to public treasury. Argentina mining exports include mining metals and lithium. Brazil mining taxes includes mineral royalty taxes (CFEM) as reported by the Brazilian Mining Association (IBRAM). Mexico employment data covers quarrying and electricity. Mining exports from Mexico include non-oil extractive industry exports, while mining taxes are estimated.

### Sub-Saharan Africa: Home to Largest Cobalt Producer With Meaningful Output of Copper

The Democratic Republic of Congo (DRC) is the world's largest producer of cobalt, providing more than 70% of the world's production. Other producers, including Russia and the Philippines, account for less than 4.5% of production.

The processing capacity for both copper and cobalt is largely concentrated in Asia, but the DRC and other countries in the region are seeking to adopt policies that will stimulate a regional battery manufacturing industry. This could enable an integrated value chain to emerge across Gabon, Angola, Zambia, the DRC, and Mozambique given the presence of critical inputs in these countries.

Zambia, for example, already has a well-established mining sector that contributes more than 11% to GDP, 28% to government revenues, and almost 80% of export revenues, as the chart below shows.

Manganese is used in lithium-ion battery cathodes. South Africa and Gabon account for about 43% of global manganese ore production. A new project in Gabon is under development, which will increase the mine's annual capacity from 4 million tons to 7 million tons by 2023. Paramount to these efforts will be an overall improvement in infrastructure and the stability in the political legislative and fiscal regime.



## Contribution of Metal Mining Sector in South Africa and Zambia

	Mining Industry (% of GDP)	Employment in Mining Sector (Thousand PPL)	Employment in Mining Sector (% of Employed)	Mining Taxes (% of Fiscal Revenue)	Mining Exports (Billions)	Mining Exports (% of Total)	Main Metal Mining Exports
South Africa	7.8%	464.0	4.8%	4.8%	\$ 29.8	24.0%	PGM, Gold
Zambia	11.1%	62.2	7.9%	26.0%	\$ 8.6	77.0%	Copper

Sources: Central banks, national statistics offices, and ministries of finance, as of December 2021. South Africa mining industry reflects contribution in 2021. Employment figures cover the third quarter of 2021. Mining taxes include pay-as-you-earn (PAYE) income tax paid by mining employees (2%), company taxes, and royalties reported by the Minerals Council for fiscal year 2019-2020. In Zambia, mining taxes for fiscal year 2021 are proxied from 2021 total revenue numbers based on actual contribution from the first through third quarters. Mining taxes include company income taxes paid by mining companies and mineral royalties. Employment in the mining sector is as reported by Chamber of Mines (percentage of formal employment as reported by the statistics authority in the 2020 labor force survey).

### Asia: Indonesia Betting on Moving Up the Electric Vehicle Value Chain

Nine countries globally account for 75% of global nickel reserves. In the emerging world, two of the four countries with the highest nickel reserves are Asian: Indonesia and the Philippines. (The other two are Brazil and Russia.)

Indonesia's policies toward natural resource development (which have included export bans on ores) have faced criticism given the rapid pace of change in policies over a decade ago. However, Indonesia overall is seen as successful in achieving a well-diversified export base that has moved beyond the exportation of basic commodities to processed goods and increasingly manufactured goods.

The Center for Strategic and International Studies expects Indonesia alone to account for around half of global nickel production growth through 2025, thanks in part to a joint venture with a Chinese firm set to play a key role in the global nickel supply for batteries in the future.

## Contribution of Metal Mining Sector in Indonesia

	Mining Industry (% of GDP)	Employment in Mining Sector (Thousand PPL)	Employment in Mining Sector (% of Employed)	Mining Taxes (% of Fiscal Revenue)	Mining Exports (Billions)	Mining Exports (% of Total)	Main Metal Mining Exports
Indonesia	2.9%	1,443.4	1.1%	—	\$ 0.1	4.4%	Copper

Sources: Central banks, national statistics offices, and ministries of finance, as of May 2022.

In our next post in this series, we will dive into the environmental, social, and governance (ESG) considerations that are raised by increased demand for the metals of the future.

**Metals of the Future Series**

[Rising Demand Supports Commodity Exporters](#)

[Seeking Opportunities in Metals of the Future](#)

[Sustainability Critical in Extractive Industries](#)



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