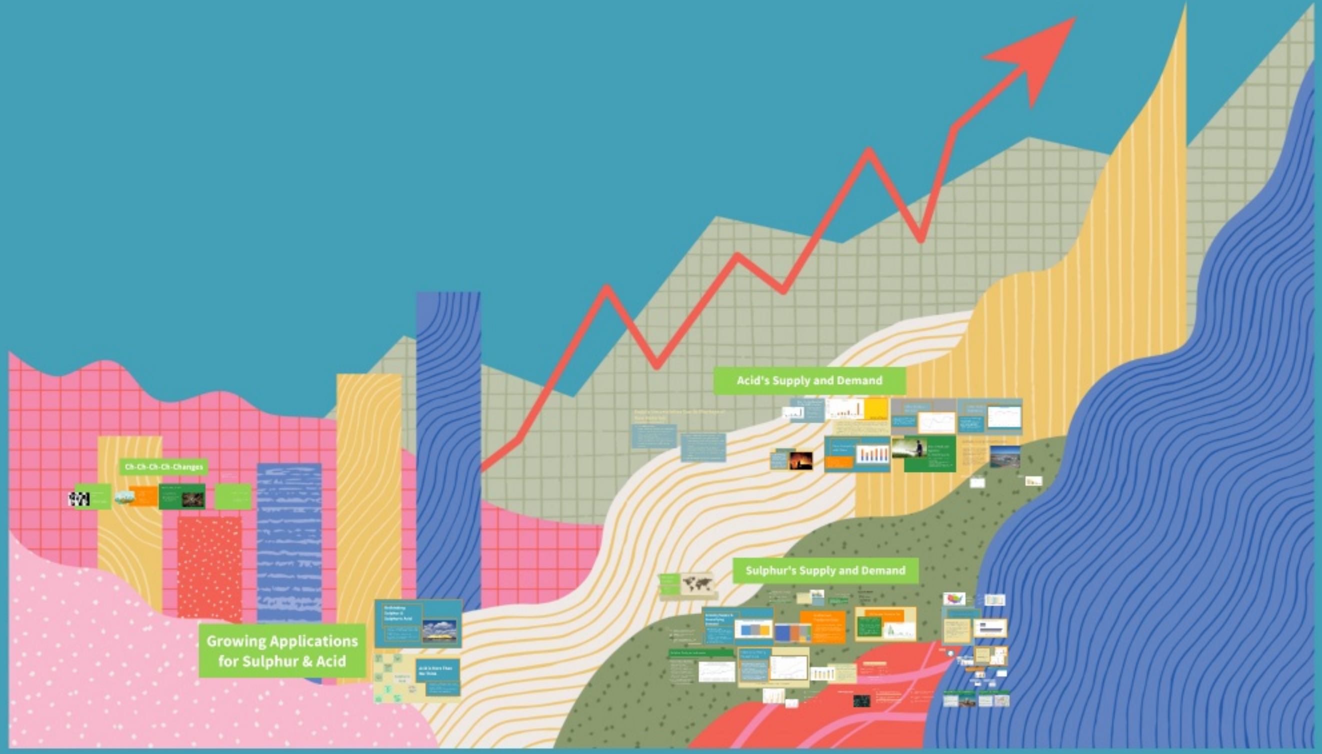
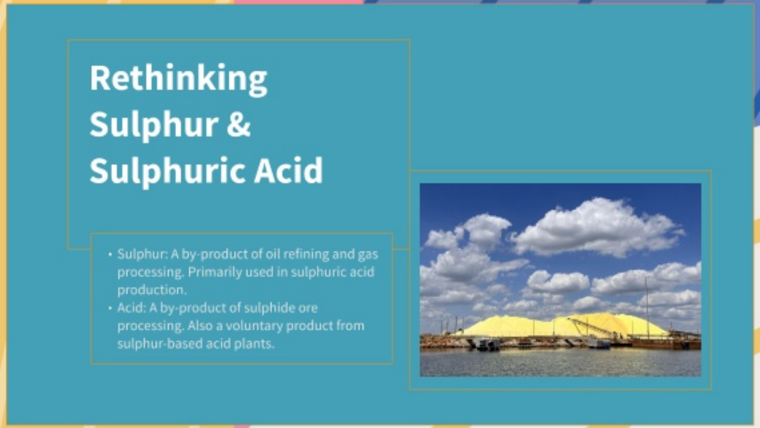
Acid Test:
The Future of Sulphur and Sulphuric Acid

Exploring Global Market Shifts and New Market Drivers



Growing Applications for Sulphur & Acid



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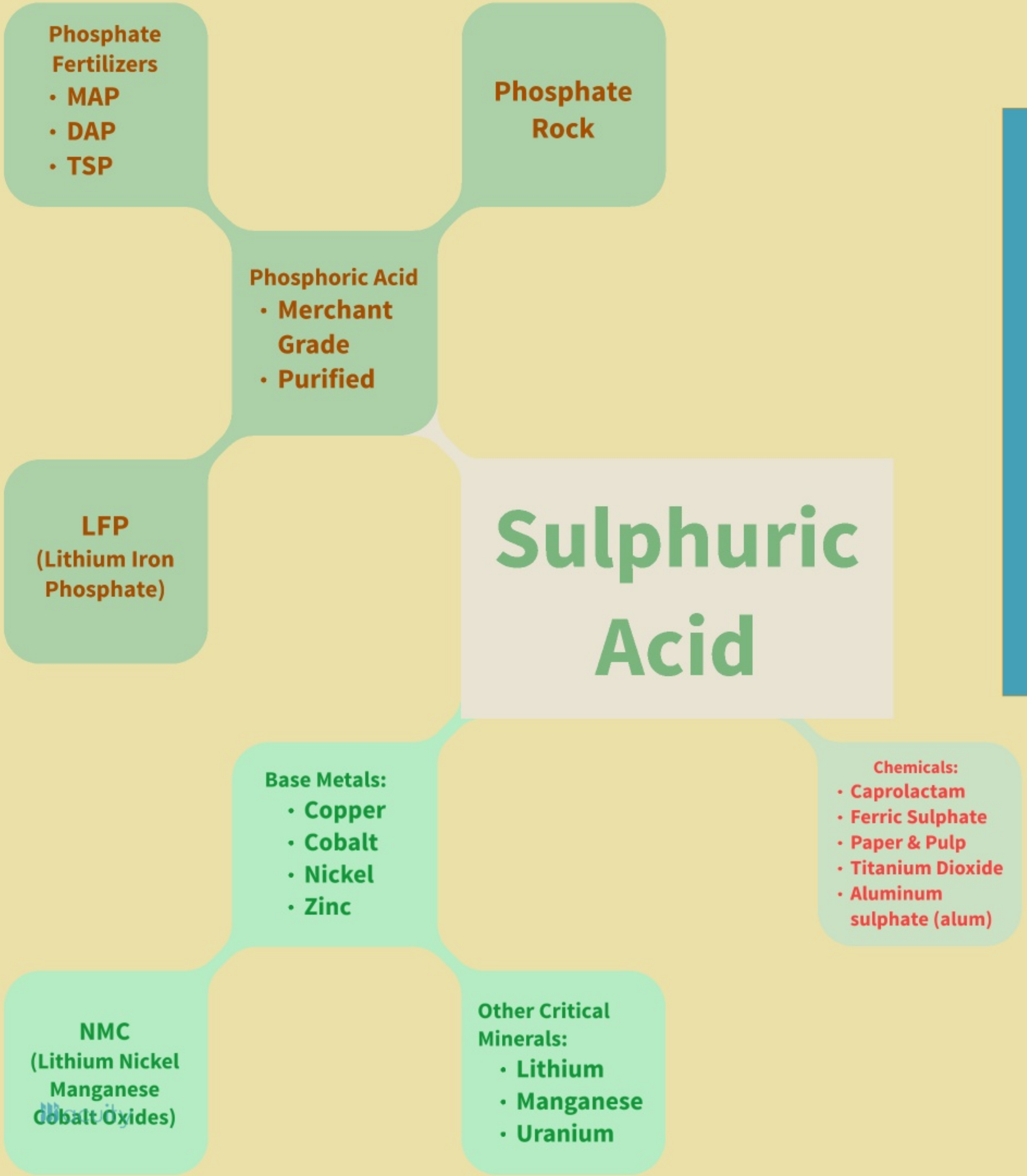


Acid is More Than We Think

- The world is combating climate change, battling energy transition*, and advancing artificial intelligence.
- Sulphuric acid, the "King of Chemicals", is gaining even wider applications.

**Are we moving away from "energy transition" to "energy addition"?*

Phosphate Fertilizers
- MAP
- DAP
- TSP

Phosphate Rock

Phosphoric Acid
- Merchant Grade
- Purified

LFP (Lithium Iron Phosphate)

Sulphuric Acid

Sulphuric Acid

We Th

Chemicals:

- Caprolactam
- Ferric Sulphate
- Paper & Pulp
- Titanium Dioxide
- Aluminum sulphate (alum)

Sulphuric Acid

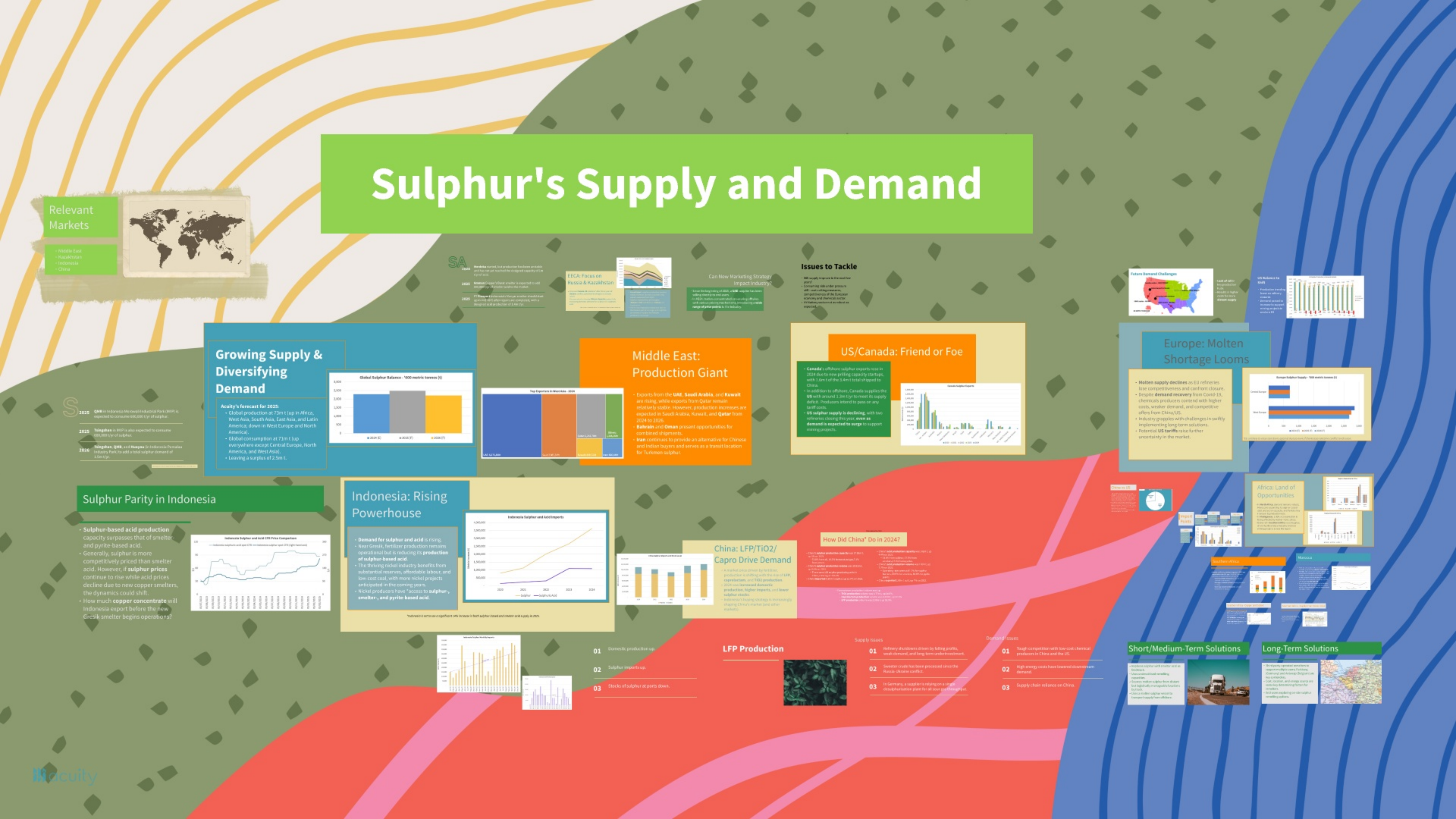
LFP
(Lithium Iron Phosphate)

Base Metals:
- Copper
- Cobalt
- Nickel
- Zinc

Chemicals:
- Caprolactam
- Ferric Sulphate
- Paper & Pulp
- Titanium Dioxide
- Aluminum sulphate (alum)

NMC
(Lithium Nickel Manganese Cobalt Oxides)

Other Critical Minerals:
- Lithium
- Manganese
- Uranium


Sulphur's Supply and Demand
Relevant Markets
Growing Supply & Diversifying Demand
Acuity's forecast for 2025:
- Global production at 73m t (up in Africa, West Asia, South Asia, East Asia, and Latin America; down in West Europe and North America).
- Global consumption at 71m t (up everywhere except Central Europe, North America, and West Asia).
- Leaving a surplus of 2.5m t.
Global Sulphur Balance - '000 metric tonnes (t)
Top Exporters in West Asia - 2024
Middle East: Production Giant
- Exports from the UAE, Saudi Arabia, and Kuwait are rising, while exports from Qatar remain relatively stable. However, production increases are expected in Saudi Arabia, Kuwait, and Qatar from 2024 to 2026.
- Bahrain and Oman present opportunities for combined shipments.
- Iran continues to provide an alternative for Chinese and Indian buyers and serves as a transit location for Turkmen sulphur.
Issues to Tackle
Can New Marketing Strategy Impact Industry?
EECA: Focus on Russia & Kazakhstan
US/Canada: Friend or Foe
- Canada's offshore sulphur exports rose in 2024 due to new prilling capacity startups, with 1.6m t of the 3.4m t total shipped to China.
- In addition to offshore, Canada supplies the US with around 1.3m t/yr to meet its supply deficit. Producers intend to pass on any tariff costs.
- US sulphur supply is declining, with two refineries closing this year, even as demand is expected to surge to support mining projects.
Canada Sulphur Exports
Future Demand Challenges
Europe: Molten Shortage Looms
- Molten supply declines as EU refineries lose competitiveness and confront closure.
- Despite demand recovery from Covid-19, chemicals producers contend with higher costs, weaker demand, and competitive offers from China/US.
- Industry grapples with challenges in swiftly implementing long-term solutions.
- Potential US tariffs raise further uncertainty in the market.
Europe Sulphur Supply - '000 metric tonnes (t)
Central Europe
West Europe
Sulphur Parity in Indonesia
- Sulphur-based acid production capacity surpasses that of smelter- and pyrite-based acid.
- Generally, sulphur is more competitively priced than smelter acid. However, if sulphur prices continue to rise while acid prices decline due to new copper smelters, the dynamics could shift.
- How much copper concentrate will Indonesia export before the new Gresik smelter begins operations?
Indonesia Sulphur and Acid CFR Price Comparison
Indonesia: Rising Powerhouse
- Demand for sulphur and acid is rising.
- Near Gresik, fertilizer production remains operational but is reducing its production of sulphur-based acid.
- The thriving nickel industry benefits from substantial reserves, affordable labour, and low-cost coal, with more nickel projects anticipated in the coming years.
- Nickel producers have *access to sulphur-, smelter-, and pyrite-based acid.
Indonesia Sulphur and Acid Imports
Sulphur
Sulphuric Acid
China: LFP/TiO2/ Capro Drive Demand
- A market once driven by fertilizer production is shifting with the rise of LFP, caprolactam, and TiO2 production.
- 2024 saw increased domestic production, higher imports, and lower sulphur stocks.
- Indonesia's buying strategy is increasingly shaping China's market (and other markets).
How Did China* Do in 2024?
Africa: Land of Opportunities
China vs US
01 Domestic production up.
02 Sulphur imports up.
03 Stocks of sulphur at ports down.
LFP Production
Supply Issues
01 Refinery shutdowns driven by falling profits, weak demand, and long-term underinvestment.
02 Sweeter crude has been processed since the Russia-Ukraine conflict.
03 In Germany, a supplier is relying on a single desulphurisation plant for all sour gas throughput.
Demand Issues
01 Tough competition with low-cost chemical producers in China and the US.
02 High energy costs have lowered downstream demand.
03 Supply chain reliance on China.
Short/Medium-Term Solutions
Long-Term Solutions
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Growing Supply & Diversifying Demand

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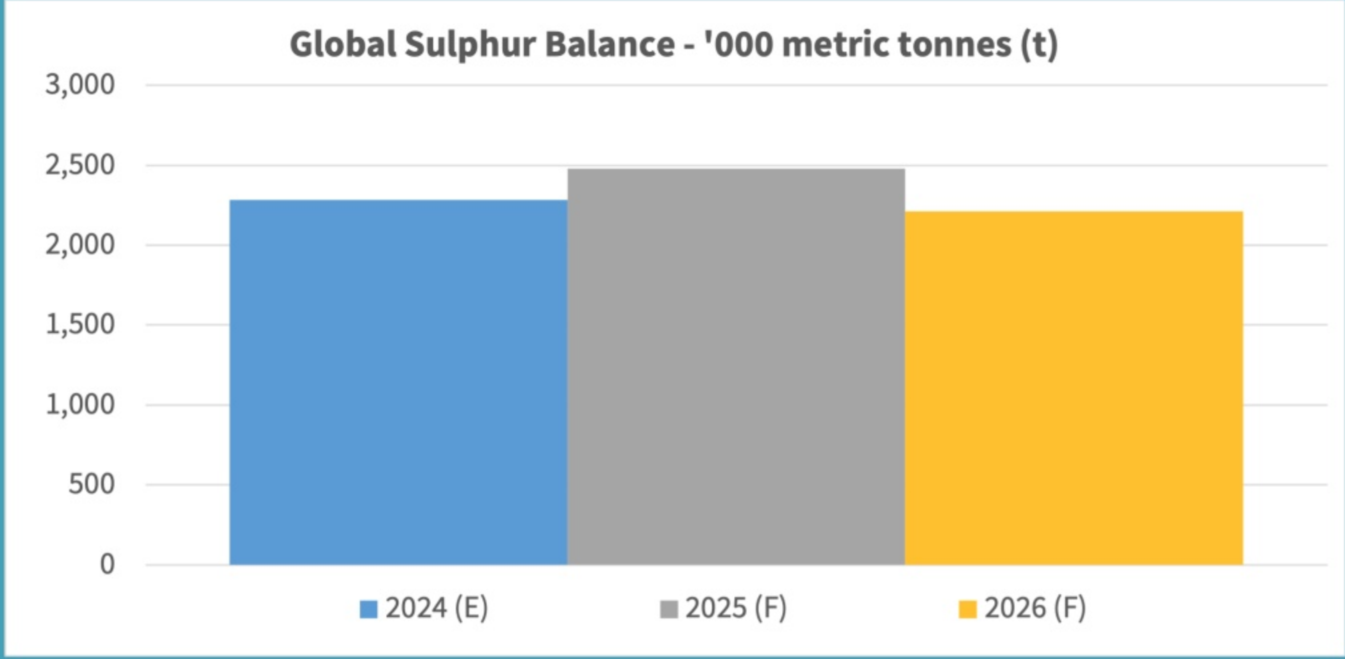
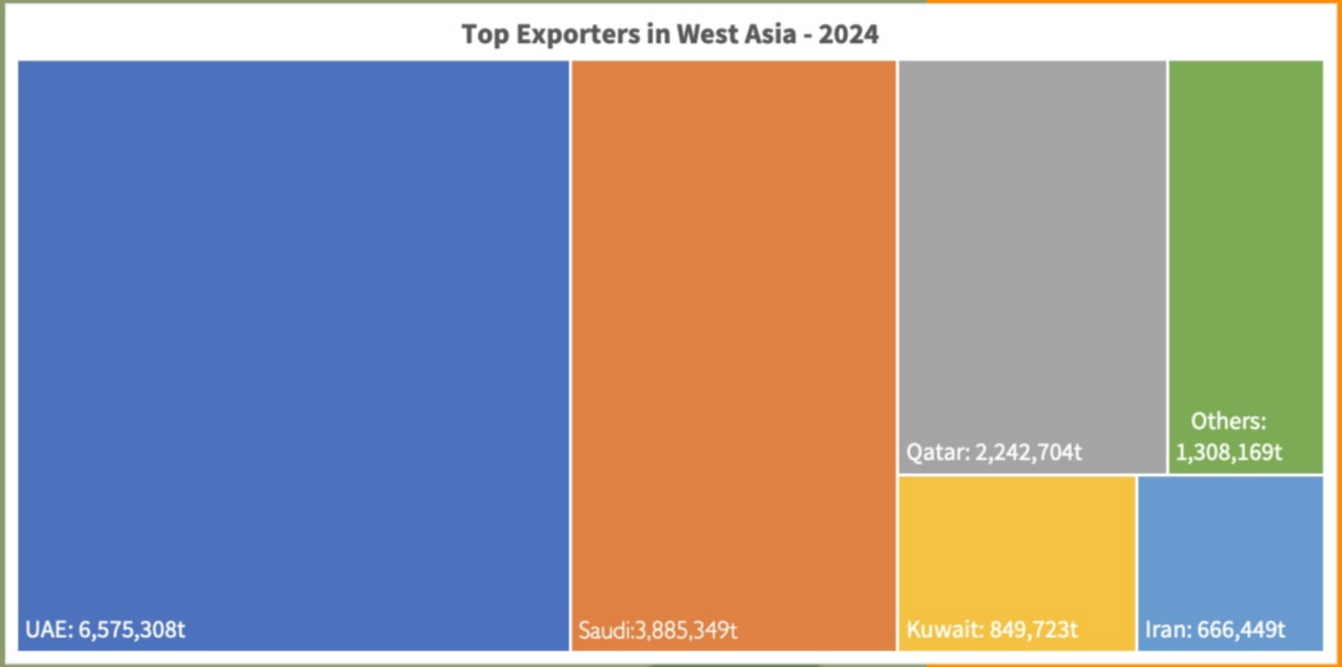


Middle East: Production Giant



- Exports from the **UAE**, **Saudi Arabia**, and **Kuwait** are rising, while exports from Qatar remain relatively stable. However, production increases are expected in Saudi Arabia, Kuwait, and **Qatar** from 2024 to 2026.
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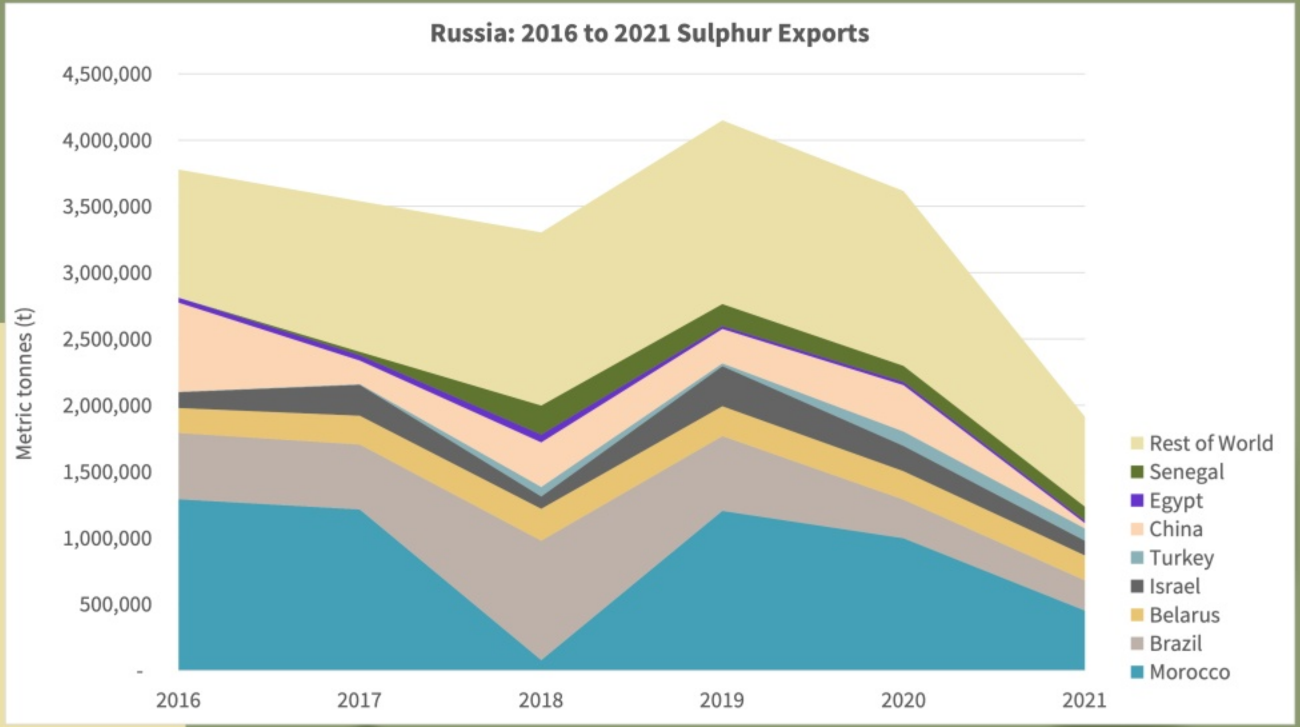
EECA: Focus on Russia & Kazakhstan



- Improved **Russia**-**US** relations* after three years of **Ukraine** conflict; potential Washington sanctions relief?
- Moscow aims to develop **lithium deposits**, potentially increasing domestic demand for sulphur and sulphuric acid.

**But not the EU, who adopted its 17th sanctions package against Russia in May.*

- **Kazakhstan**'s sulphur production remains stable; however, no more crushed lump exports expected from 3Q25.
- Sulphur exports through Georgian (**Batumi**, **Poti**) and Russian (**Taman**, Ust Luga) ports.
- The EU has imposed a transaction ban on the Russian port of Ust Luga, although the movement of sulphur for fertilizer production is exempt.

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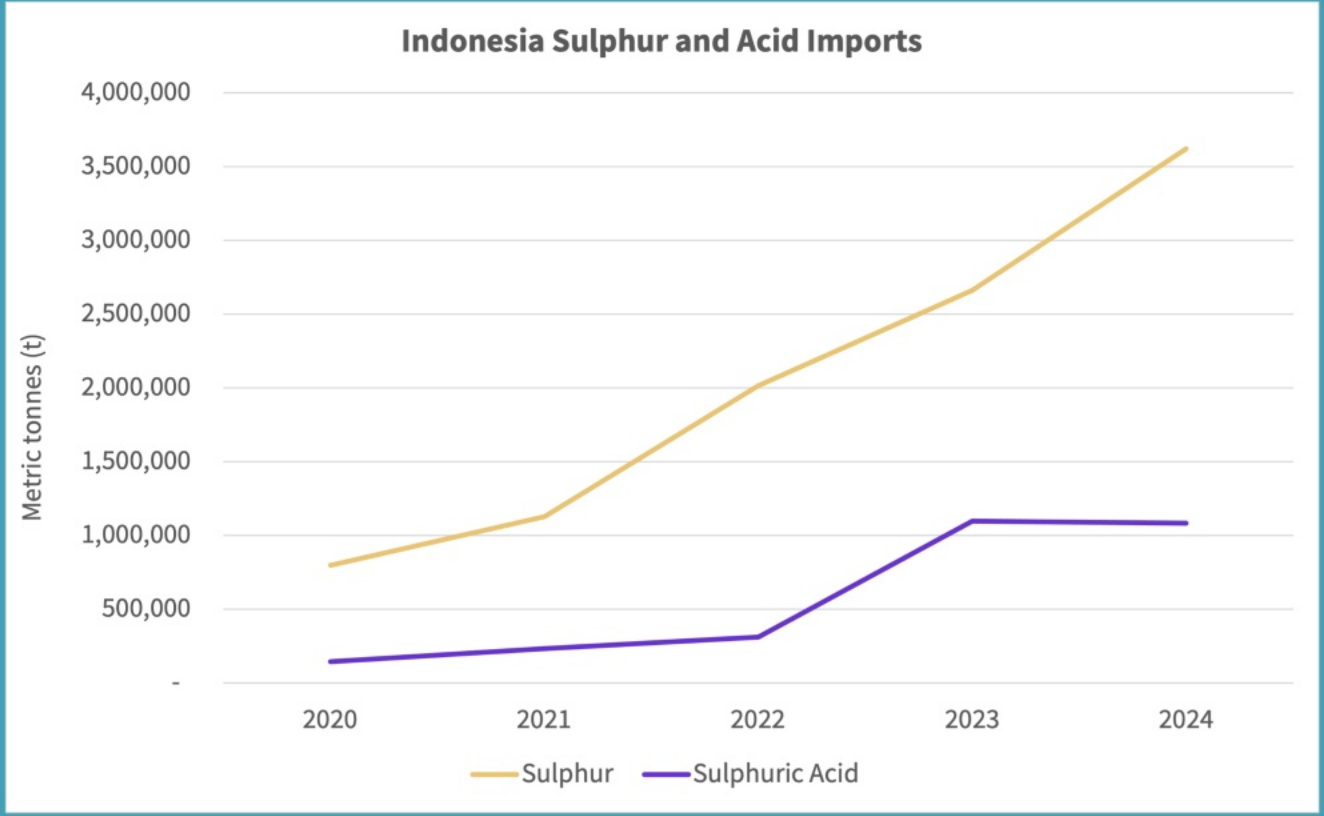
Indonesia: Rising Powerhouse

- **Demand for sulphur and acid** is rising.
- Near Gresik, fertilizer production remains operational but is reducing its **production of sulphur-based acid**.
- The thriving nickel industry benefits from substantial reserves, affordable labour, and low-cost coal, with more nickel projects anticipated in the coming years.
- Nickel producers have *access to **sulphur-, smelter-, and pyrite-based acid**.



**Indonesia is set to see a significant 14% increase in both sulphur-based and smelter acid supply in 2025.*

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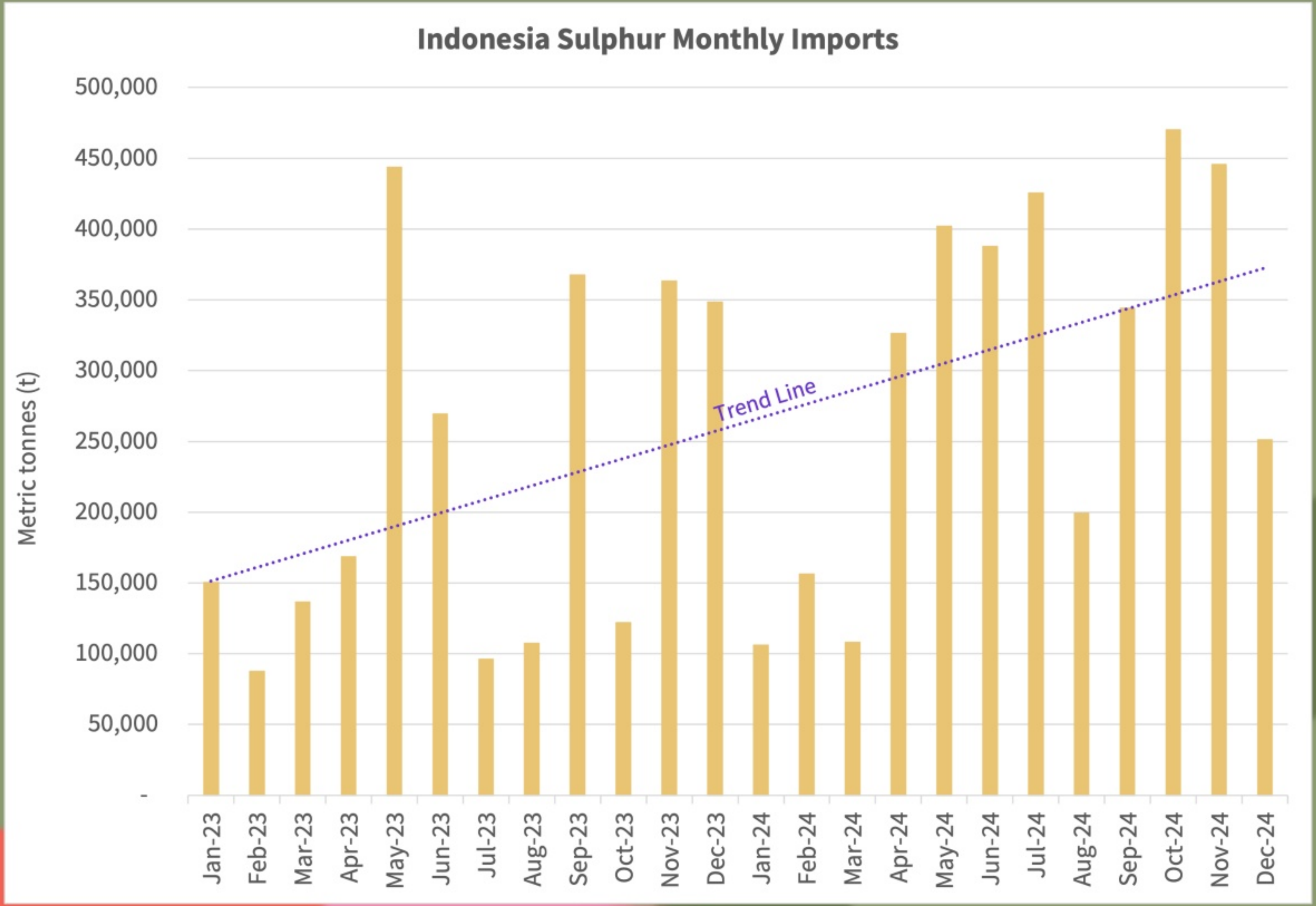
Indonesia Sulphur Monthly Imports
Metric tonnes (t)
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
-
Trend Line
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
Jul-23
Aug-23
Sep-23
Oct-23
Nov-23
Dec-23
Jan-24
Feb-24
Mar-24
Apr-24
May-24
Jun-24
Jul-24
Aug-24
Sep-24
Oct-24
Nov-24
Dec-24


Indonesia Acid Monthly Imports
Metric tonnes (t)
250,000
200,000
150,000
100,000
50,000
-
Trend Line
Jan-23
Feb-23
Mar-23
Apr-23
May-23
Jun-23
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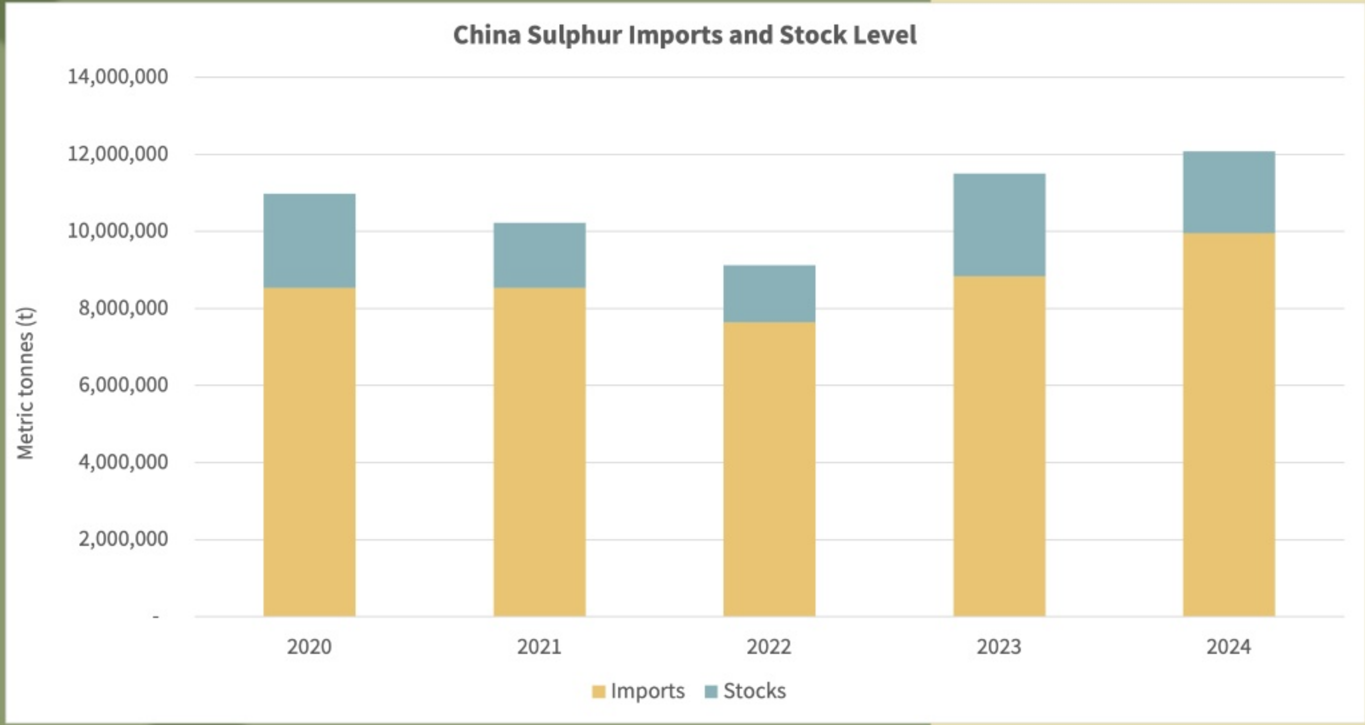
China: LFP/TiO2/ Capro Drive Demand



- A market once driven by fertilizer, production is shifting with the rise of **LFP**, **caprolactam**, and **TiO2 production**.
- 2024 saw **increased domestic production**, **higher imports**, and **lower sulphur stocks**.
- Indonesia's buying strategy is increasingly shaping China's market (and other markets).

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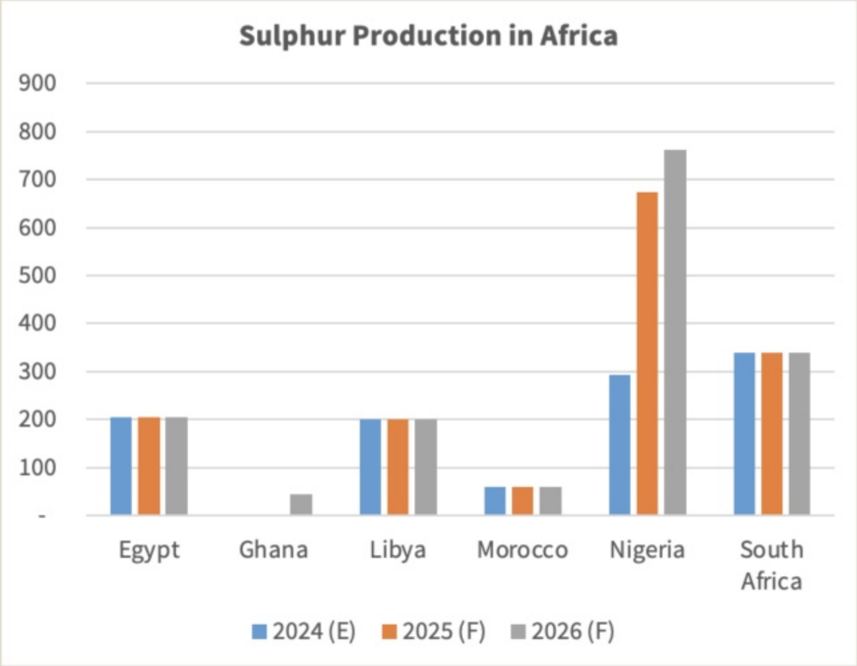
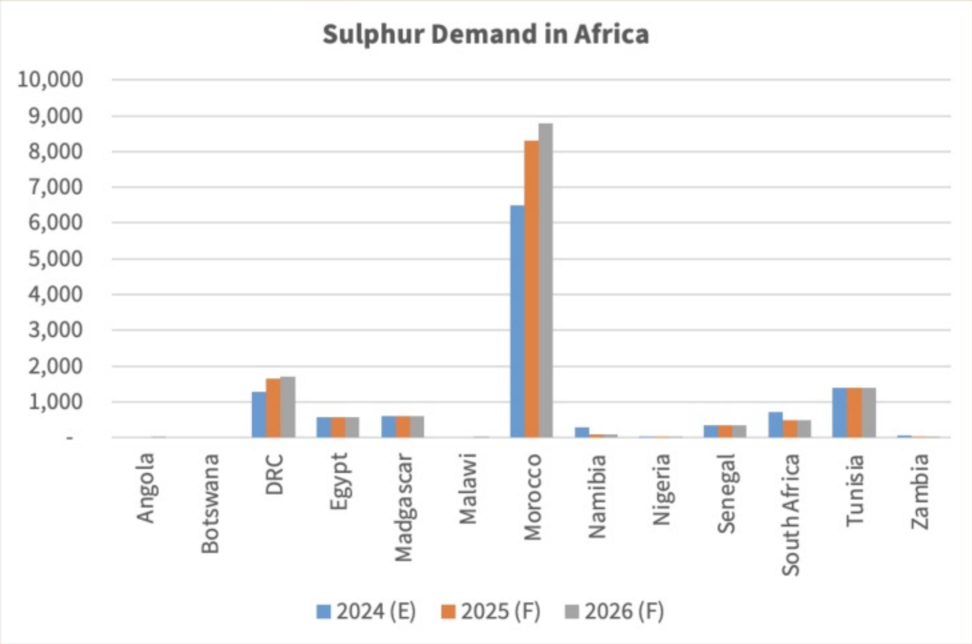
Africa: Land of Opportunities

- In **North Africa**, demand remains robust; Morocco is expanding its sulphur-based acid production capacity, and Tunisia may increase its production rate.
- In **Madagascar**, sulphur consumption is being affected by weaker nickel prices.
- Demand in **Southern Africa** is set to grow, driven by the metals industry and new mining projects across the region.





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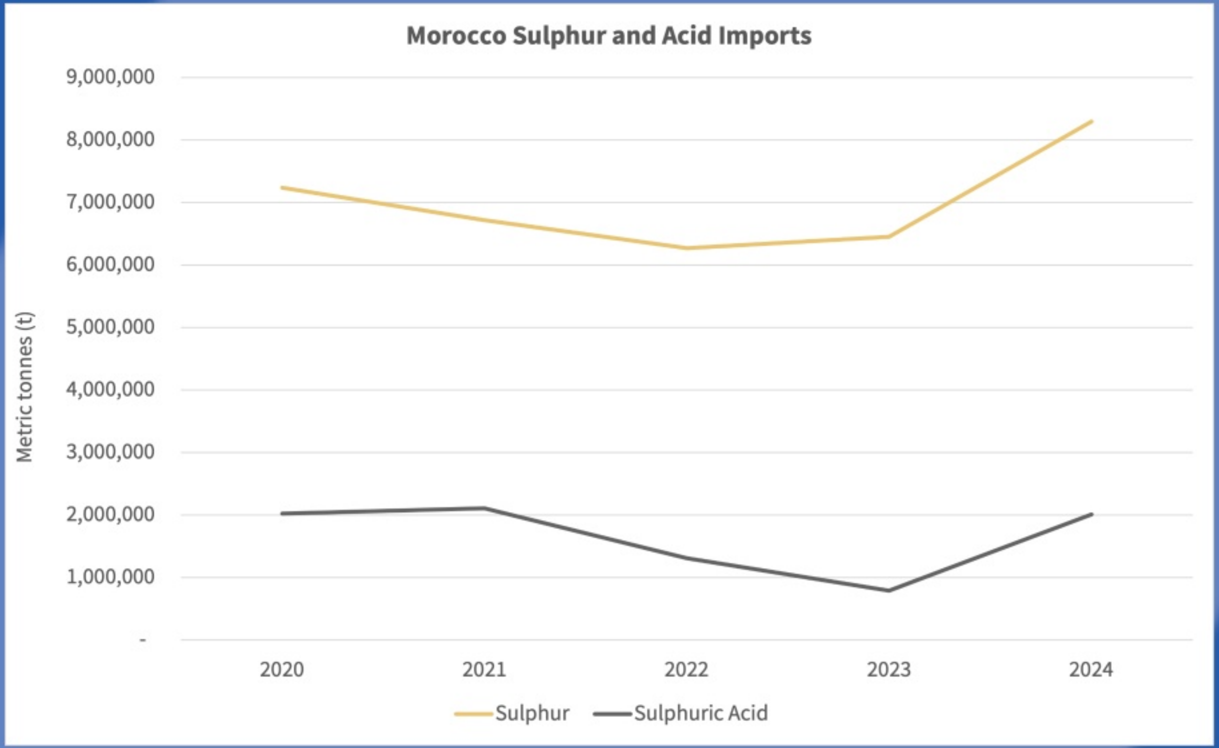
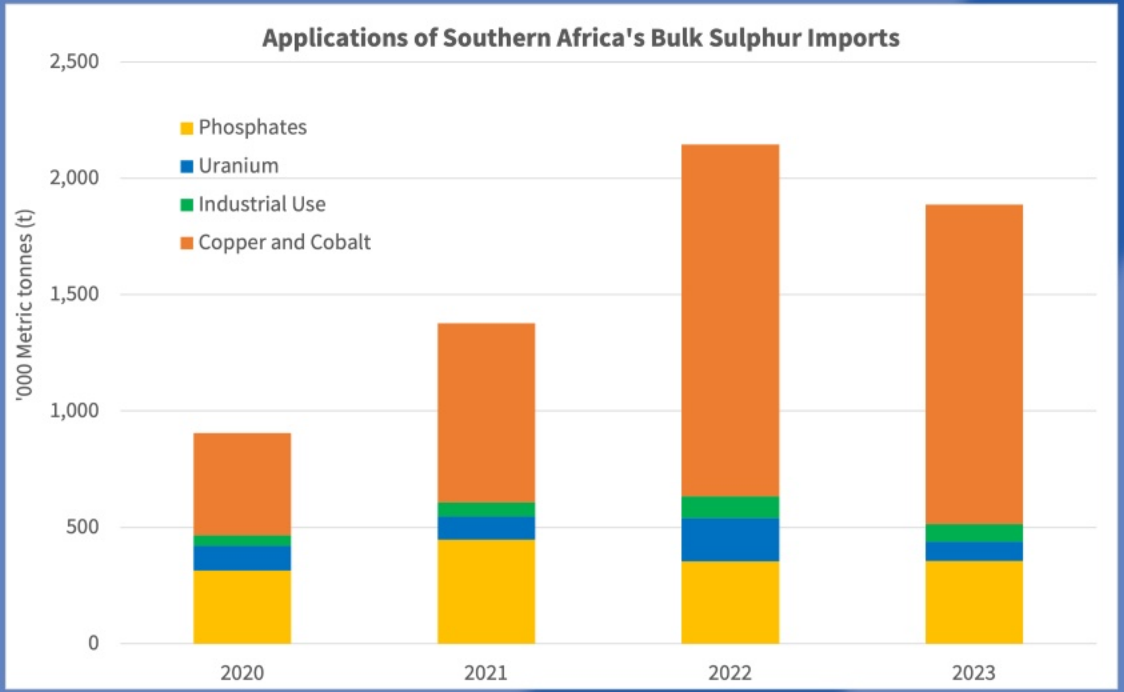
Morocco

- Fertilizer production in Morocco is still expanding, supporting **sulphur consumption**.
- The **US** continues to have countervailing duties on imports of phosphates from Morocco. If this changes, market impact expected.
- Multiple projects aim to produce cathode materials for EV batteries, including NCM and LFP, supporting **acid demand**.
- Morocco leverages vast resources (phosphate rock, cobalt, lithium), a free trade agreement with the US, proximity to Europe, and relatively low labour costs.



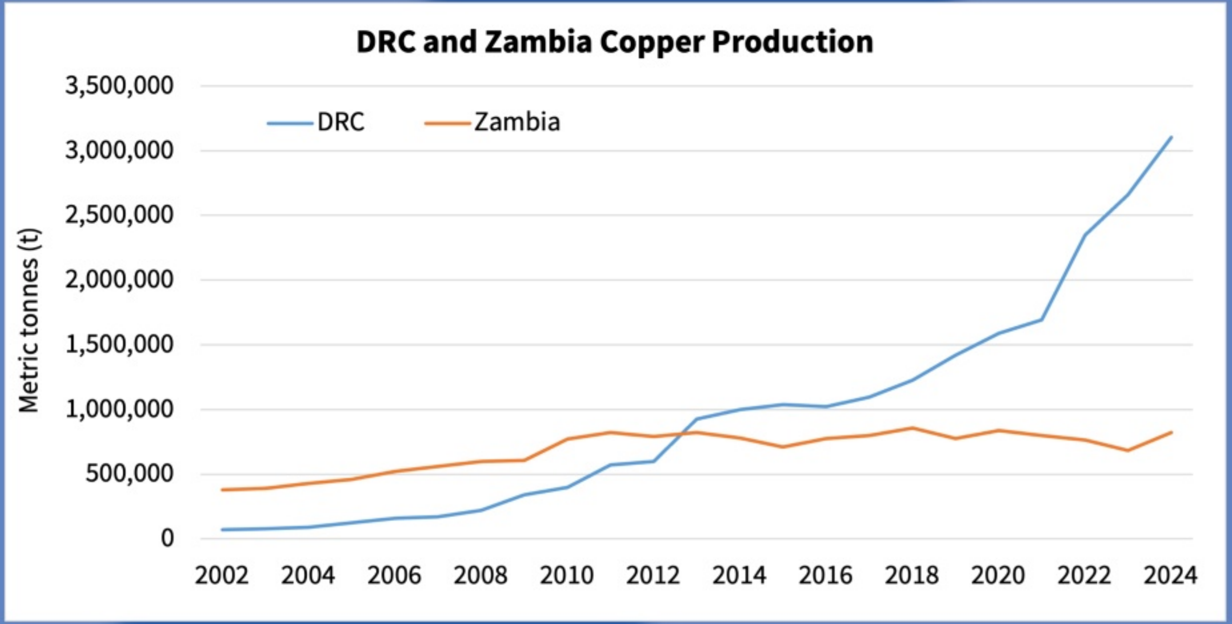
Southern Africa

- **Southern Africa's sulphur imports in 2025 are expected to rise 4% yoy** (+80,000t), despite Kamoa's acid plant start-up, driven by:
  - **Continued DRC demand** to offset lower Zambian acid exports.
  - **Stronger uranium prices** boosting sectoral acid use.
  - **Growing industrial demand** as recent expansions ramp up.



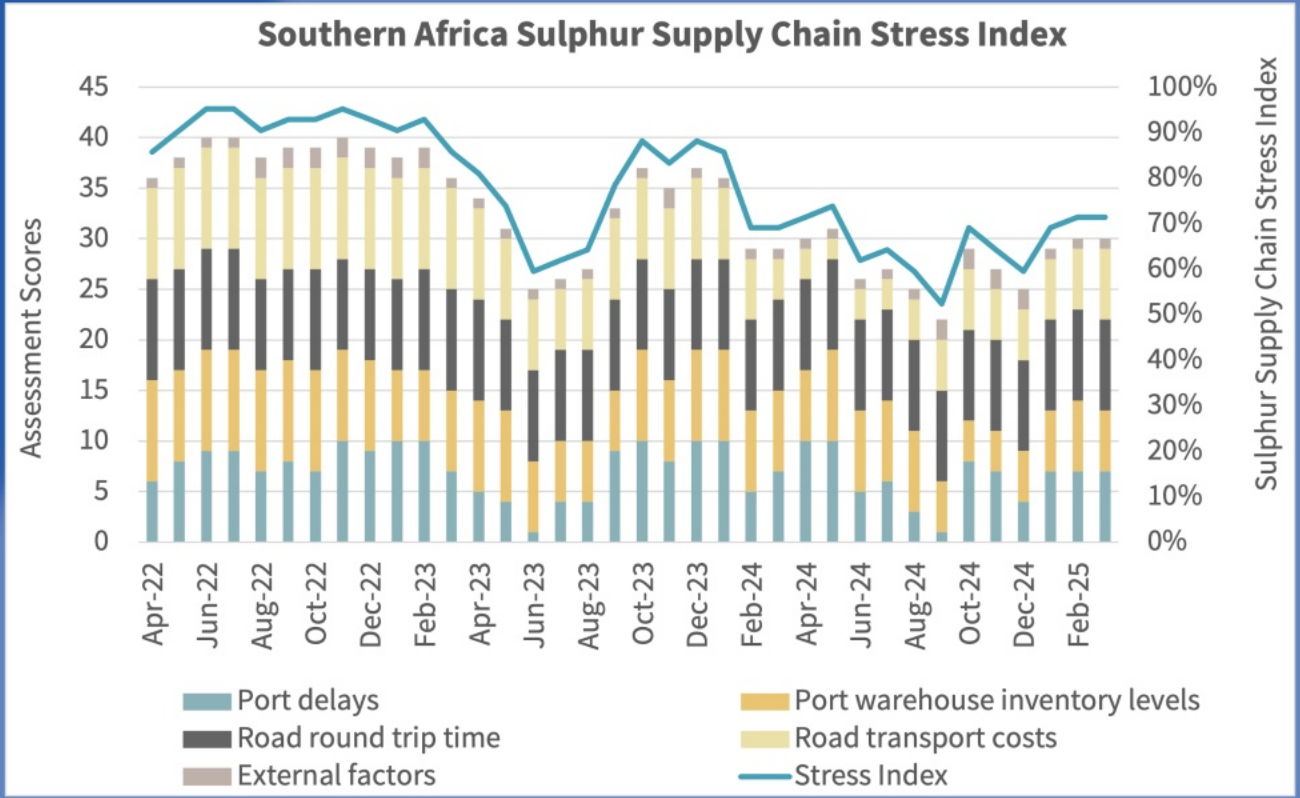
Southern Africa - Copper and Cobalt

- The **DRC exported over 3.5m t of copper in all forms** in 2024. Acuity data shows exports have nearly doubled over the past four years, with further increases likely from mine expansions and new operations.
- **Cobalt production in 2024 rose 35% yoy**, largely due to CMOC's ramp-up at TFM and KFM, where cobalt output doubled.
- **Zambia's copper production grew** for the first time since 2020, reaching 820,000t. Acuity expects further growth in 2025.



Southern Africa - Supply Chain Stress Index

- The **Acuity Sulphur Supply Chain Stress Index** has remained below 80% since 2024.
- Berthing delays at ports persist.
- Transport rates in the region are currently stable.



Import Points

Richards Bay

With the conveyor belt issue resolved, more sulphur imports are expected to flow through this route.

Beira

Imports have declined due to berth congestion driven by fertilizer imports and spodumene and chrome exports.

Dar es Salaam

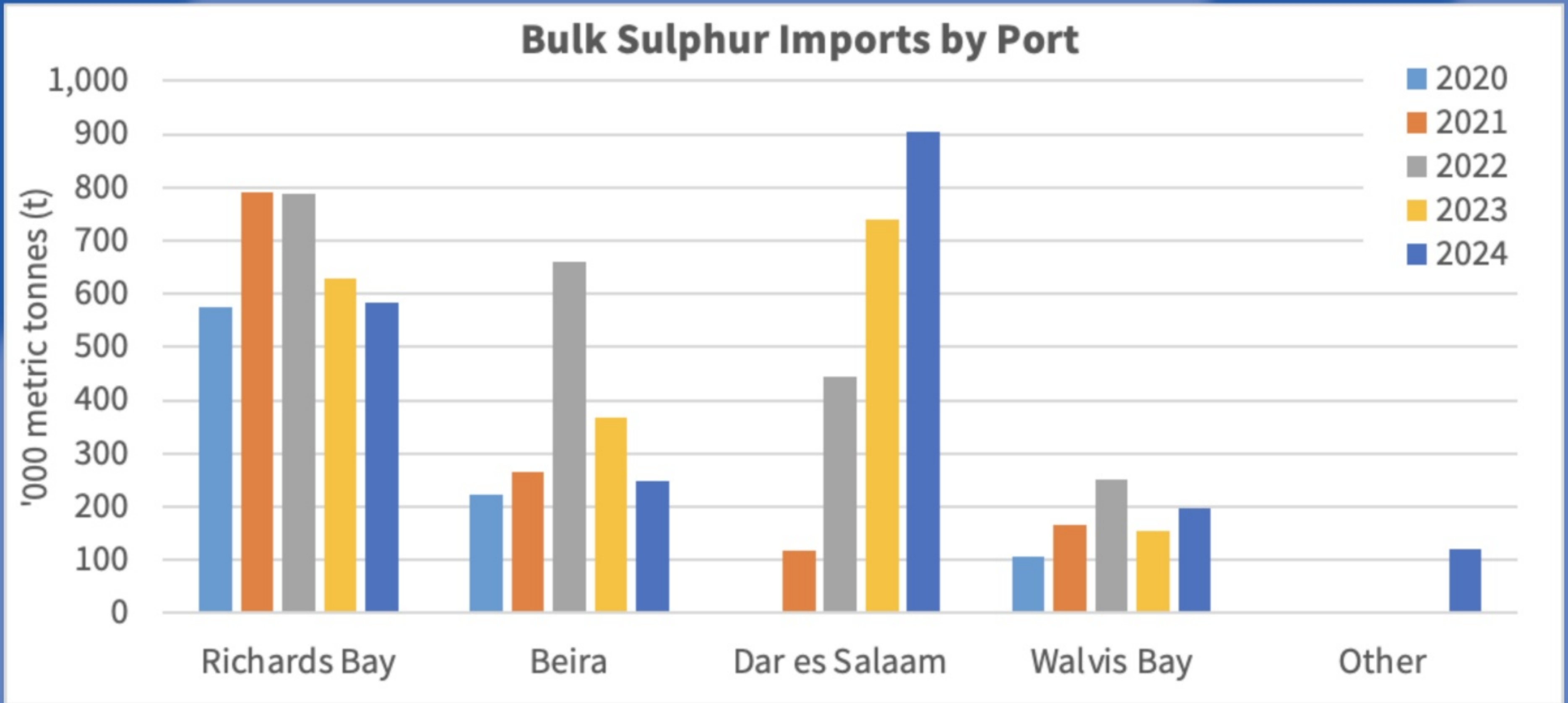
Dar es Salaam is expected to remain the key hub for sulphur imports.

Walvis Bay

Offers a convenient entry point for Zambia and the DRC, provided sufficient copper backloads are secured.

Lobito

The expansion of activities on the Lobito Atlantic Railway, including the addition of wagons and locomotives, requires backloads to ensure economic viability.



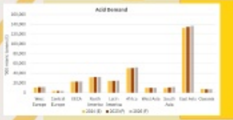
Acid's Supply and Demand

Supply Uncertainties Due to Shortage of Raw Materials

- **Acuity's 2025 forecast**:
  - Global production at 329m t (increasing in all regions except for Central Europe, North America, and west Asia, which are all expected to remain flat).
  - Global consumption projected at 308m t (rising overall but remaining flat in Central Europe and West Asia, and declining in Oceania).

- **Supply could be less than expected** due to:
  - Limited availability of copper and zinc concentrates, which reduces treatment costs and profitability, potentially affecting smelter output.
  - Lower than expected molten sulphur production in Europe, leading to underutilised sulphur-based production capacities in the region.
- **Demand could be higher than expected** due to underestimated consumption.

Rise in Sulphur-Based and Smelter Acid Production



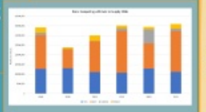
West of Suez

- In **Europe**, the only notable change in production capacity is in Norway in 2025. Monitoring copper and zinc smelters' output here is key, as curtailments are already happening. European demand has weakened compared to levels before the Russia-Ukraine conflict. **Turkey** is an active exporter of acid, but it comes with export licencing issues.
- In **Africa**, demand is growing in countries such as the DRC, Namibia, and Zambia. The acid requirements in the land-locked DRC and Zambia are interdependent; for example, a decrease in **Zambian** acid output could be offset by an increase in sulphur-based acid production in the **DRC**. Rossing Uranium in **Namibia** has been importing from Europe and Asia.

East of Suez

Peru: Competing with China

- **Peru** exports around 1.1m t/yr to Chile. Supply from China is a threat with it replacing Peru as top supplier to Chile in 2024.
- **New supply** long awaited while all production from this site must be exported.
- Potential for **new demand** in 2027, would significantly drop export availability.

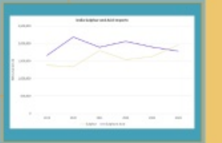


Chile: Steady as She Goes

- There is limited potential for **new supply** in Chile.
- **Stable demand** is expected to for next few years.
- Will we see a move away from **annual pricing** if spot pricing becomes more volatile as the smelter supply landscape in Asia continues to evolve?

India: Falling Acid Needs

- New smelter startups depend on **copper concentrate supply**, as more Indian companies consider building smelters to reduce reliance on copper imports.
- **Sulphur-based acid production** is expanding, lowering import dependence.
- Can India's metals, petrochemicals, and fertilisers industries continue to grow?



Brazil: Reduced Appetite for Acid Imports

- **Firmer sulphur demand** on start up or EuroChem plant.
- Sulphuric **acid import demand** weaker as Mosaic stops importing.
- Potential for import demand to weaken further if **new acid plant** in Aratu region proceeds.

Australia: Losing Competitiveness

- The growth in nickel production in Indonesia has negatively impacted producers in Australia who struggle to compete in terms of costs.
- Idling of nickel assets in Australia has resulted in **weaker sulphur demand** but **firmer acid import** demand in the west coast.
- East coast Australia well supplied by local burners and smelters amid declining acid demand from SSP producers.
- Longer-term, many projects related to the **EV supply chain** are being pursued, but none considered firm.

China/Japan/South Korea

Europe

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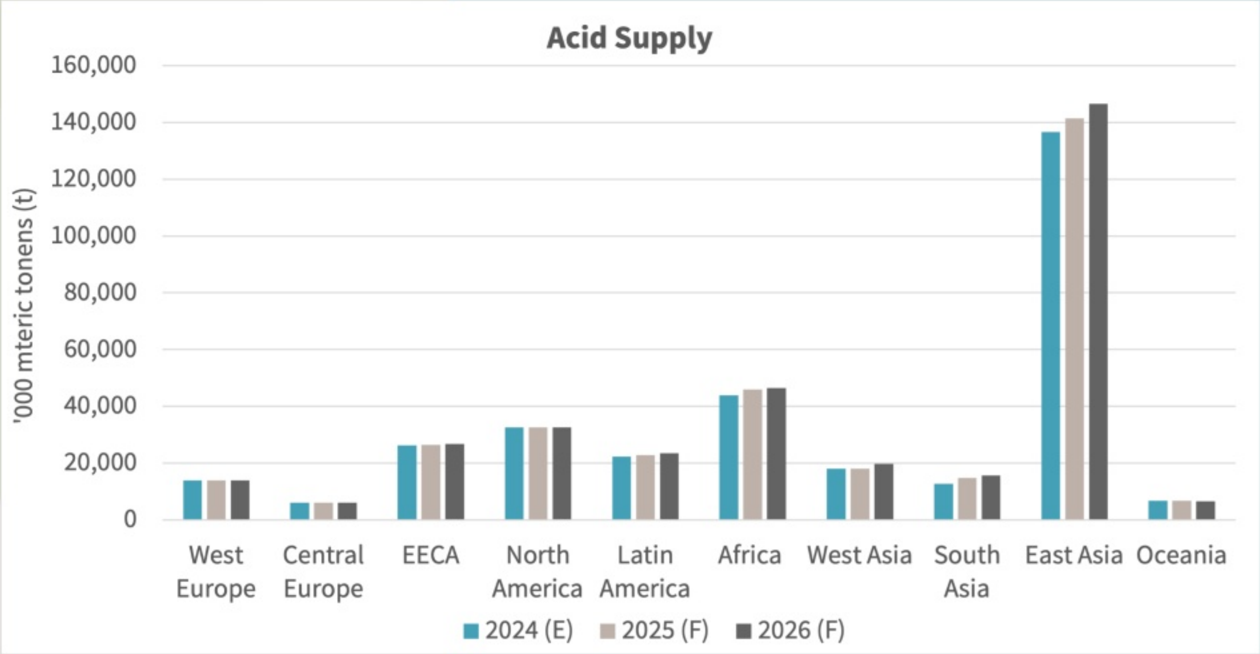
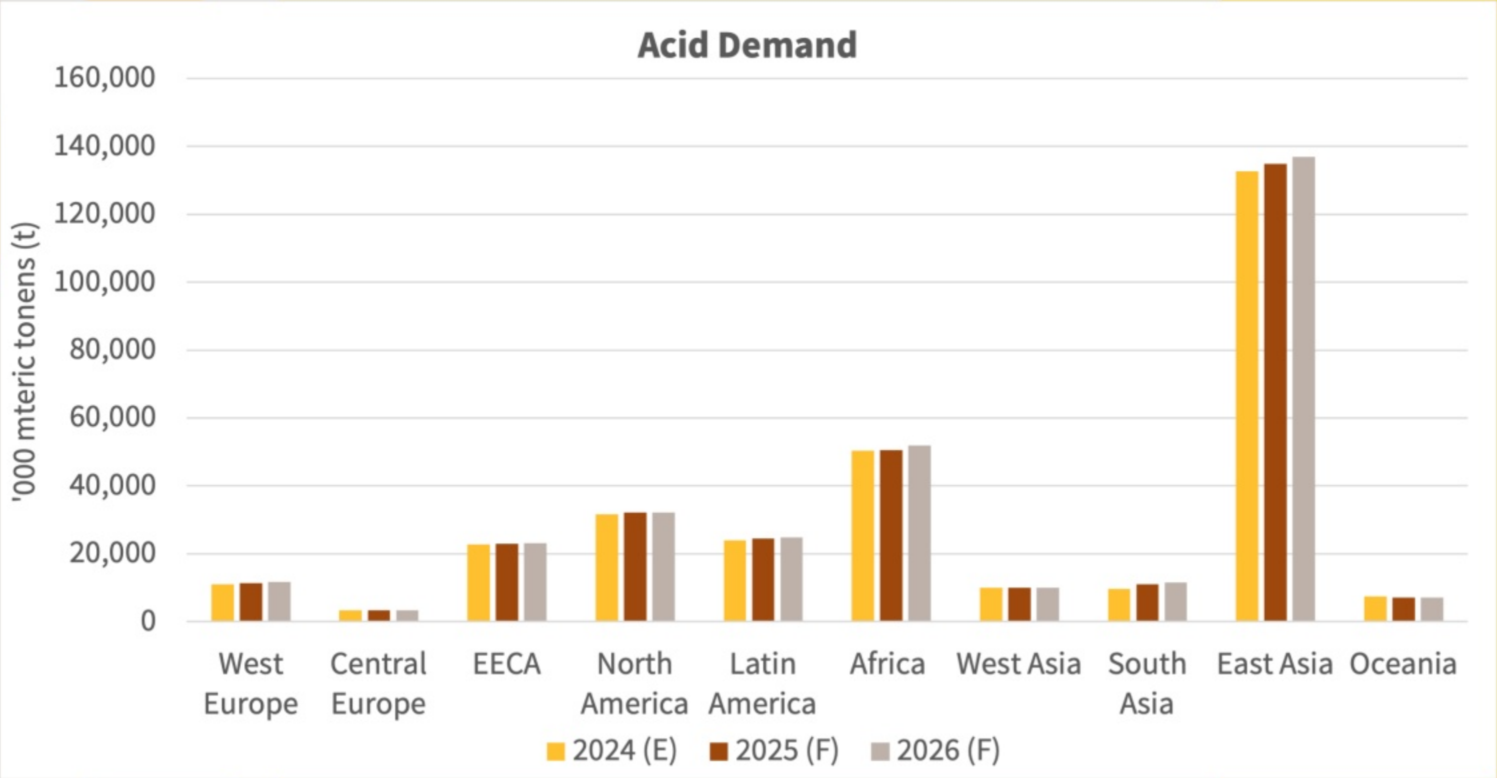


- **Production increases** from sulphur-based acid (strongest in **Morocco** and **Indonesia**) are similar to those from smelter acid (including in **China**, **Indonesia**, and **India**) in 2025.
- Production increase is constrained by the **availability of raw materials** such as copper and zinc concentrates, as well as smelter profitability.
- **Rising sulphur costs** are expected to restrict the seaborne trade of sulphur-based acid.



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East of Suez

- **Delays in new smelter startups** in India and Indonesia, coupled with **closures/ curtailment at smelters** in Japan, the Philippines, and Australia due to market shifts, are affecting production. Despite plans to curb oversupply, China continues to commission **new smelters**.
- **Export competition** with Europe for Latin America, especially Chile, persists, intensifying regional trade.
- **Demand** remains strong in Saudi Arabia, though it has declined in Australia and India. Indonesia imports flattening.

Ch-Ch-Ch-Ch-Changes

Acuity Commodities
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A New World Order

- Supply chains to adopt new strategies amid rising geopolitical risks and economic uncertainties, driven by regional conflicts, trade wars, and shifting alliances.

Energy Transition Failing?

- "Energy transition" or "energy addition"? The debate continues.
- The shift to a low-carbon economy is slowing.
- Oil and gas are here to stay.

EV, LFP, NMC, AI, ETC

- The global scramble for minerals intensifies, with an expanding list of critical resources.
- New alliance partners suggest there will be a rise of strategic partnerships.
- The race for artificial intelligence (AI) dominance accelerates, with China emerging as a key contender.

Food for Thought

The role of trader in the sulphur market vs sulphuric acid market

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