

# Styrene monomer:

Understanding the changed landscape from the post-disruption market.

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Familiar picture? Is this us these past two years?

Oversupply

Soft demand

Negative margins

Inventory drawdown



# Agenda

History: Industry pain

Current: China's market disruption

Looking ahead: The new world

To wrap it all up



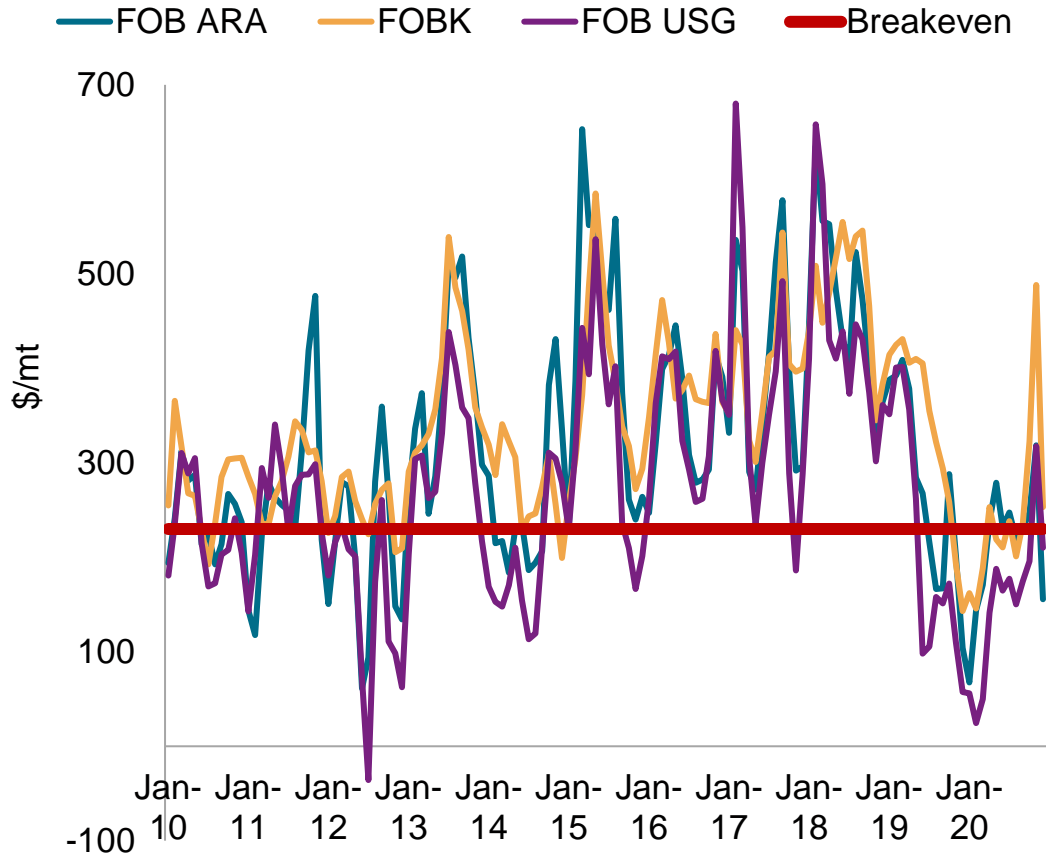


# Industry pain: how did we get here?



# Styrene became tight through the 2010s

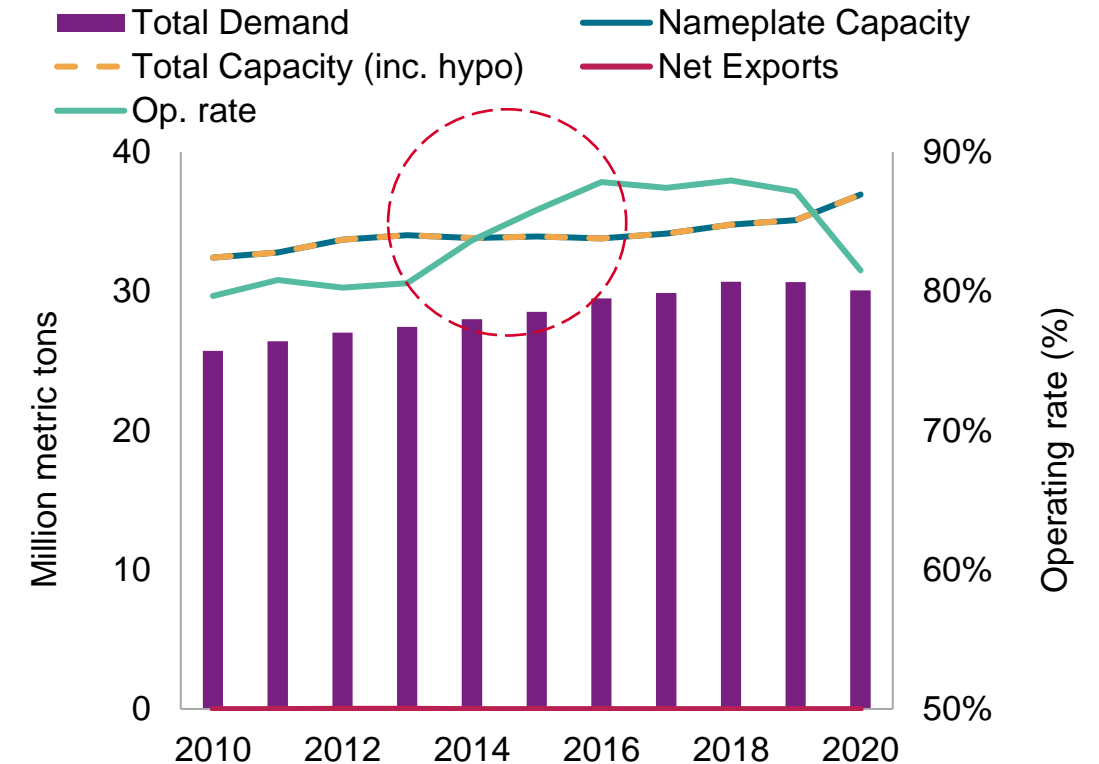
Frequent negative margins discourage new investments



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

# Margins, operating rates soared post-2015

## World SM supply and demand

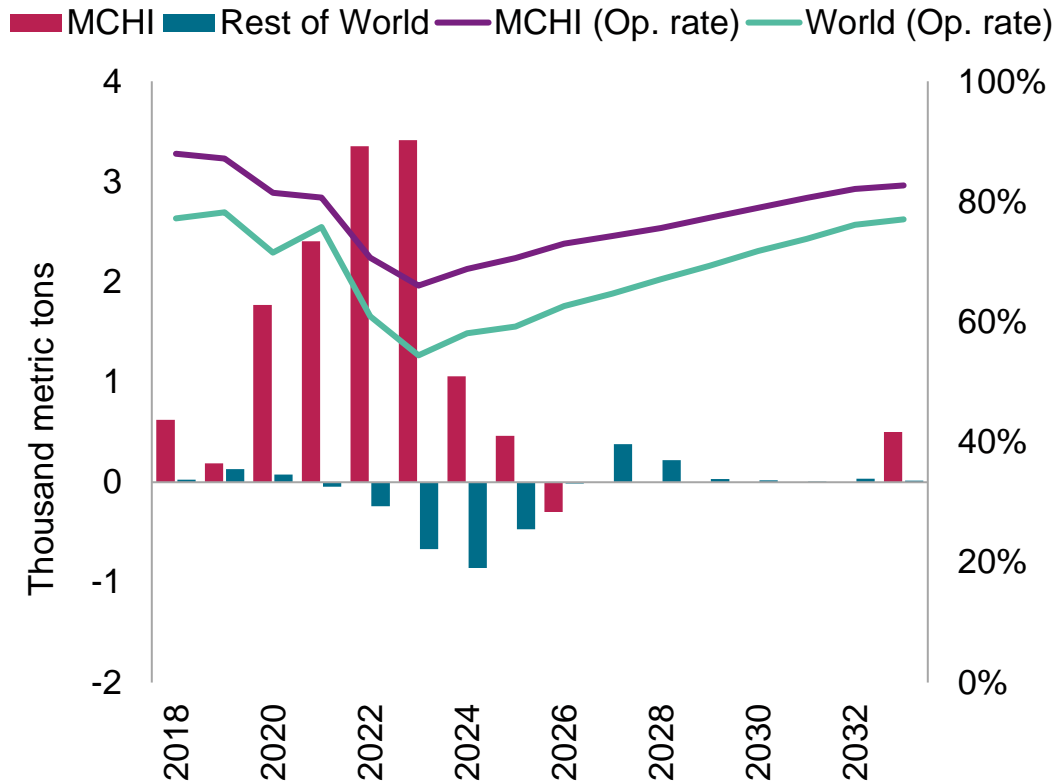


Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

# Suddenly, oversupply hits in new decade

2020-25: China adds >15mn mt/yr

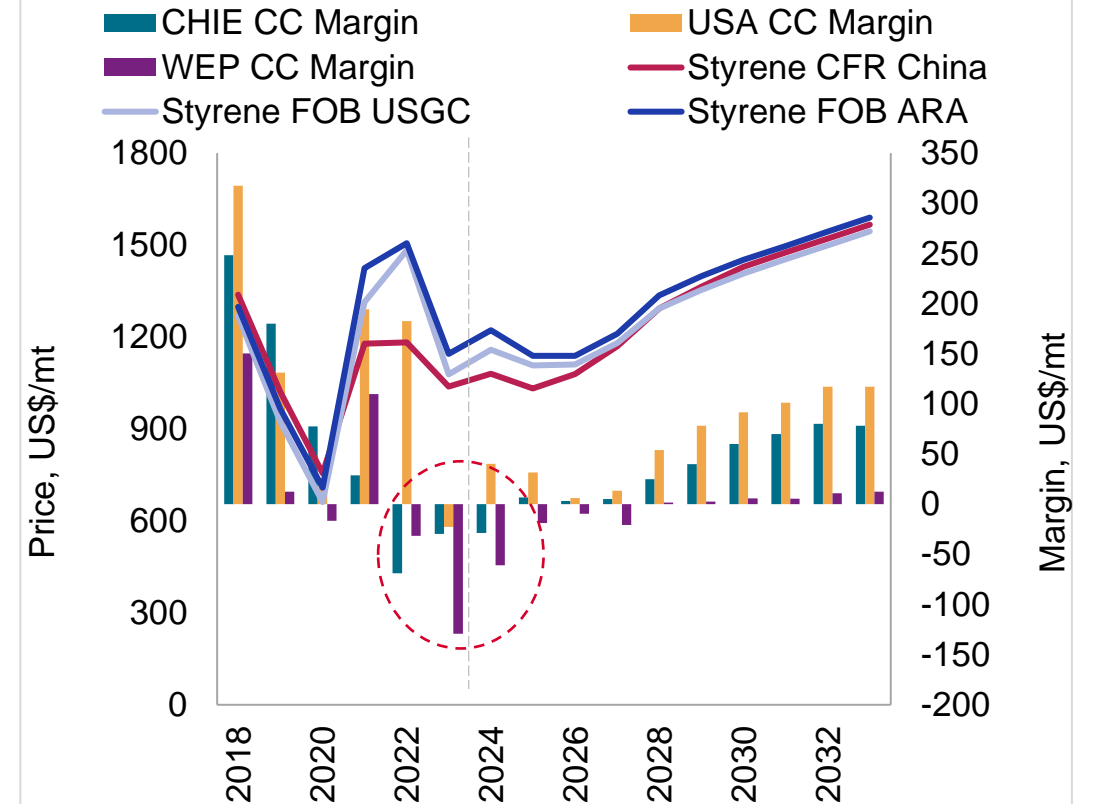
## SM Capacity Growth vs Operating rate



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

Margins plummet, Asia prices lowest

## SM global spot prices and cash margins



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.



# China's market disruption

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# China's capacity surge caused major upheavals

- China dethrones US as largest producer
- China's capacity exceeds demand since 2020
- Margins, operating rates plummet, rationalization
- China no longer #1 importer, trade flows change
- Arbitrage flips, Asian prices lowest
- No cfr China annual contract in 2024







# Looking ahead: the new world

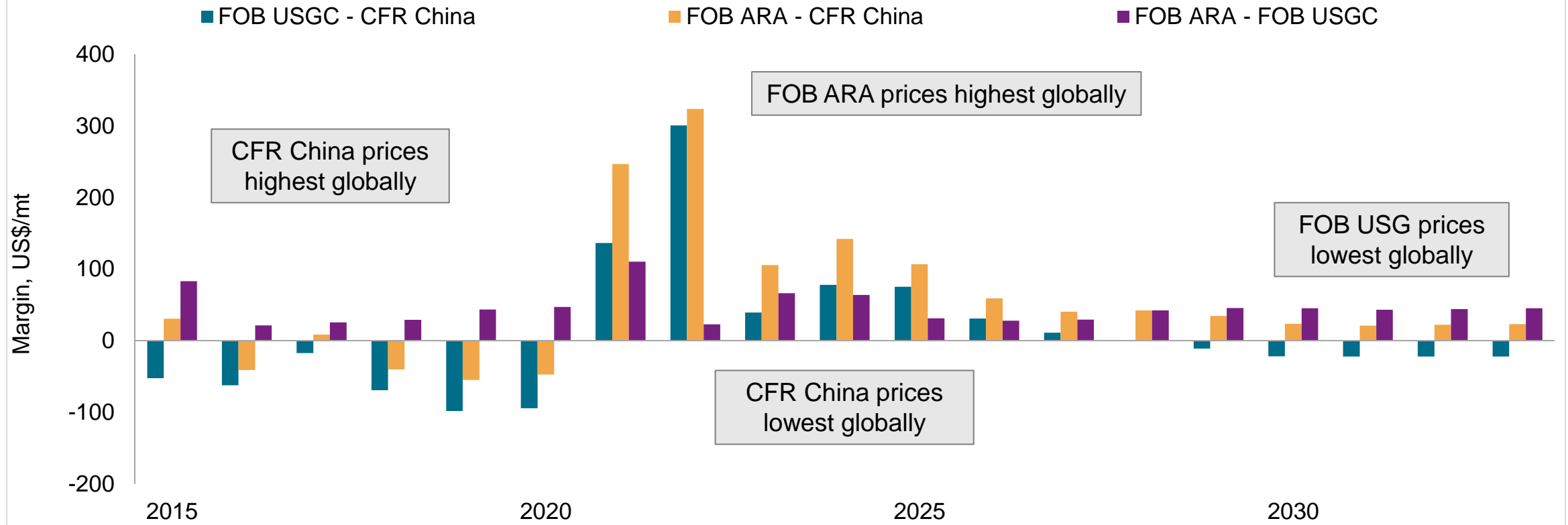
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# Reverse arbitrage: the new normal

- Old: West-to-East arbitrage
- New: East-to-West arbitrage
- Same: US-to-West Europe arbitrage

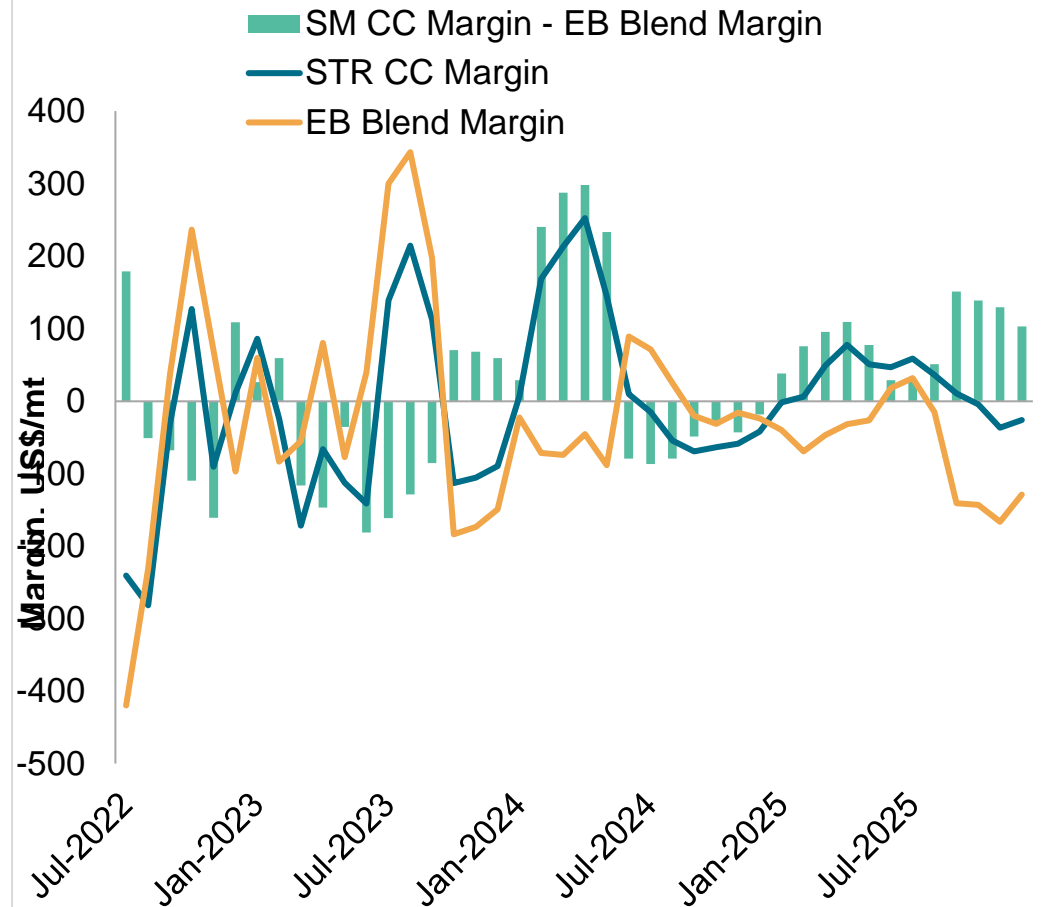
## SM global spot spreads



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

# Ethylbenzene (EB) enters mogas blend pool

## US SM cash margin vs EB blend margin - monthly



Date Compiled April 2024

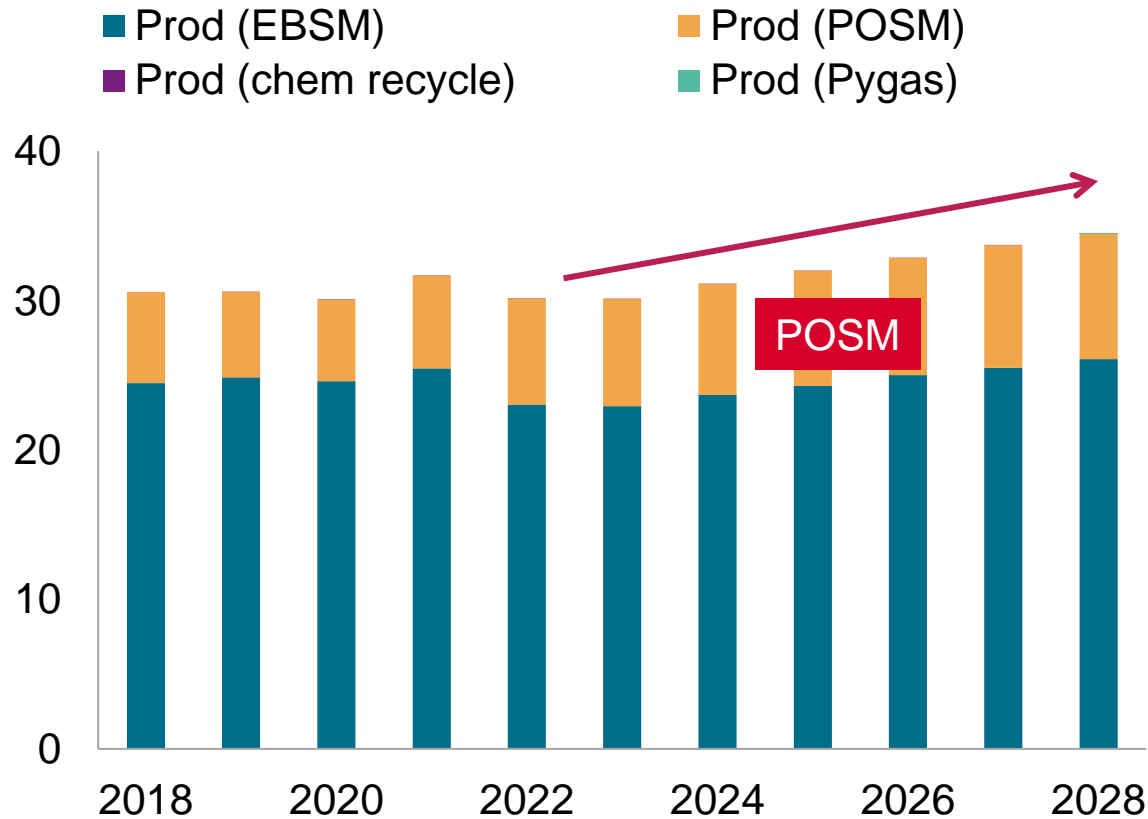
Source: S&P Global Commodity Insights.

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# Co-production of styrene from propylene oxide (POSM) gaining ground in styrene production

## World SM Supply (Million metric tons)



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

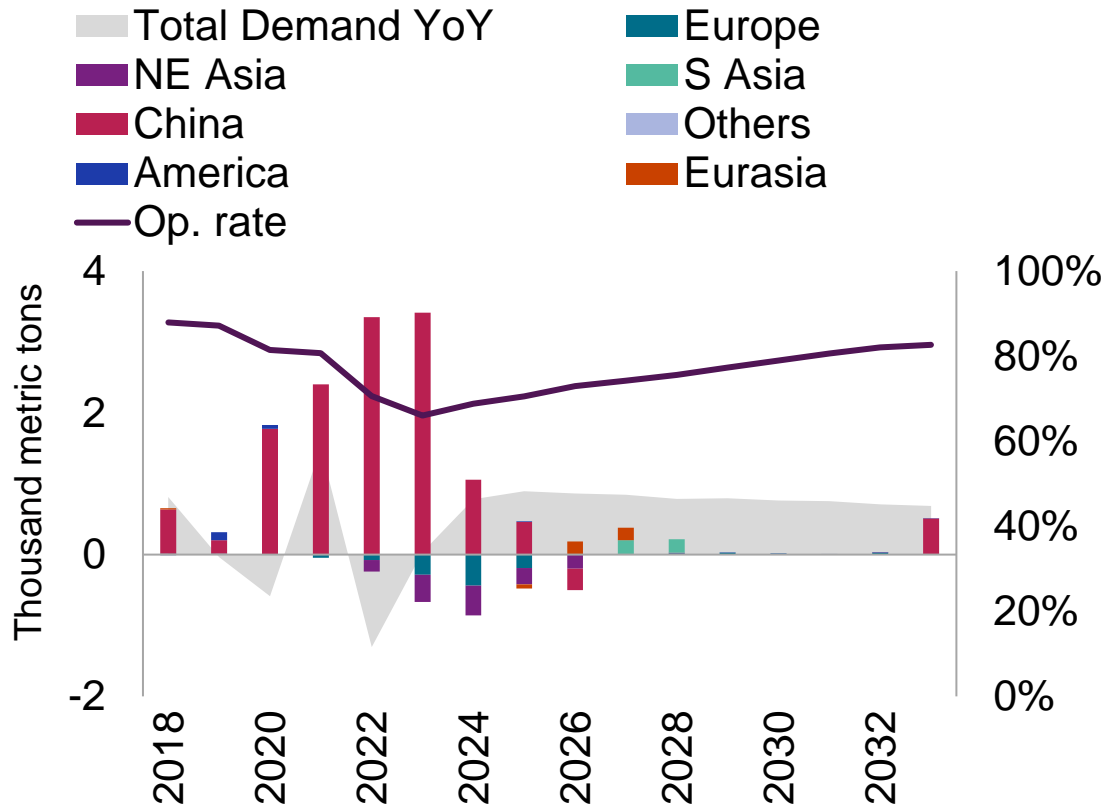
- Hydrogenation of ethylene and benzene still main route of styrene production
- POSM route gaining ground in China:
  - China may impose ban on chlorohydrin-based production by end-2025
  - New tech: Hydrogen Peroxide Propylene Oxide – lower energy requirements, water as by-product but expensive
  - Robust PO demand growth
  - China now has own POSM technology
- Recycling of PS lack scale



# Styrene returns to growth post-2025

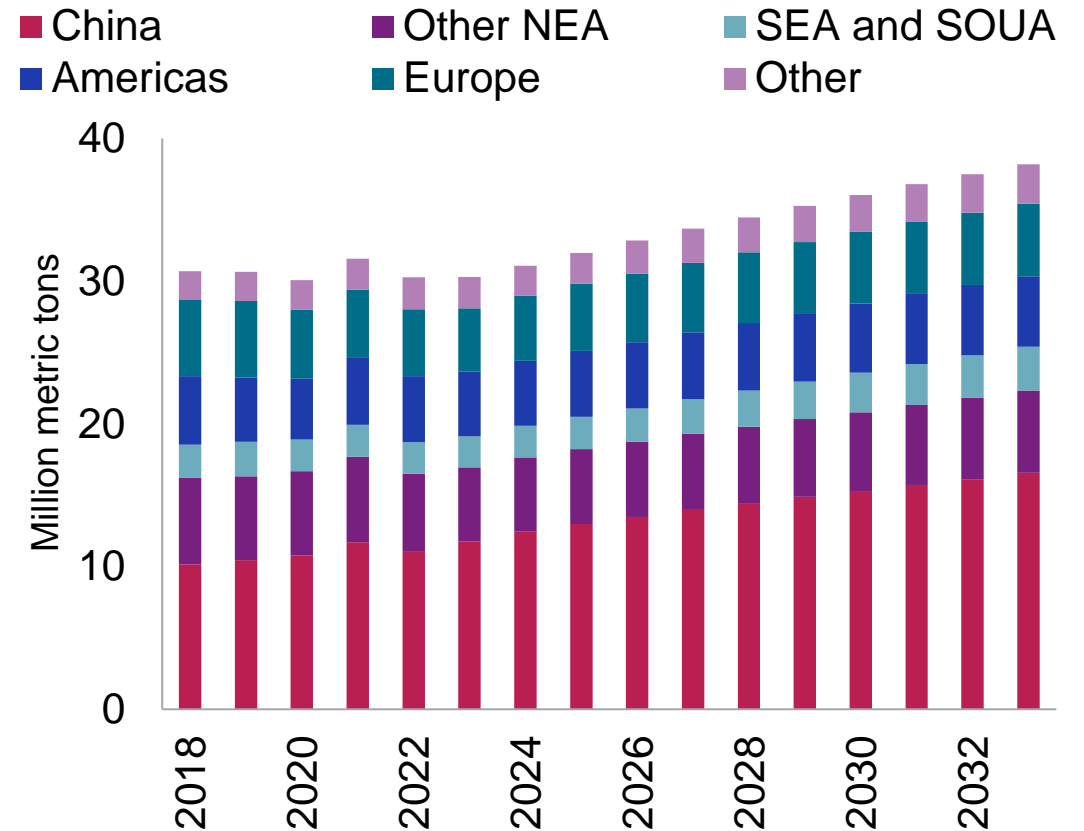
Chinese demand still drives styrene despite massive capacity

## SM capacity vs demand increase



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

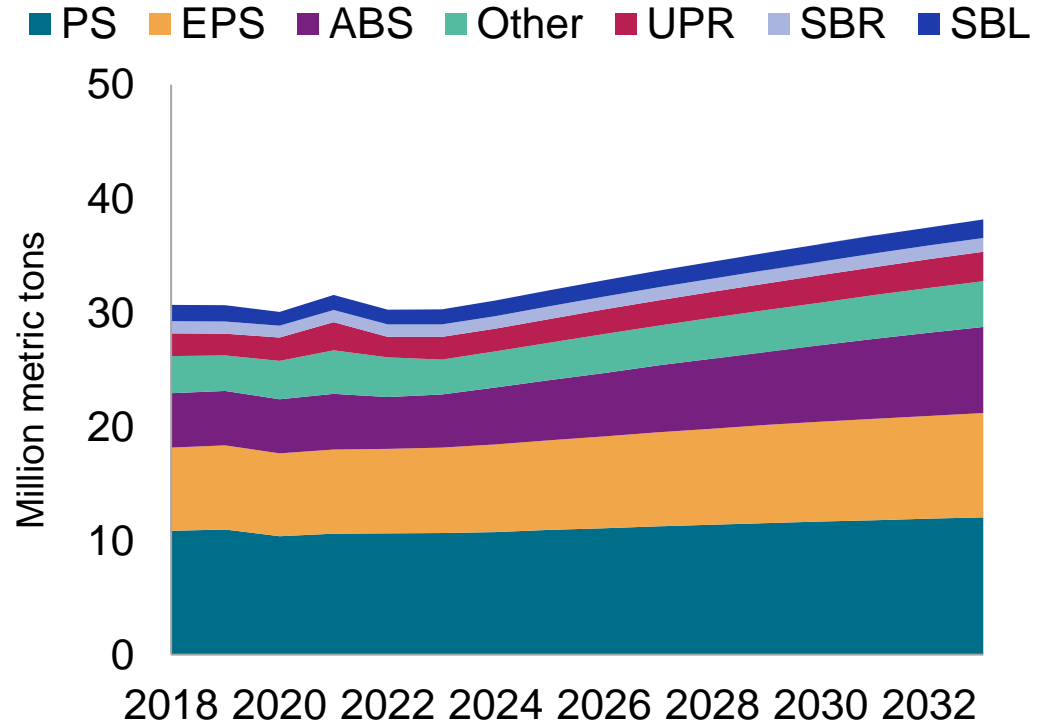
## SM demand by region



Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.

# Emerging technology push ABS to drive styrene growth

## World SM demand by derivative

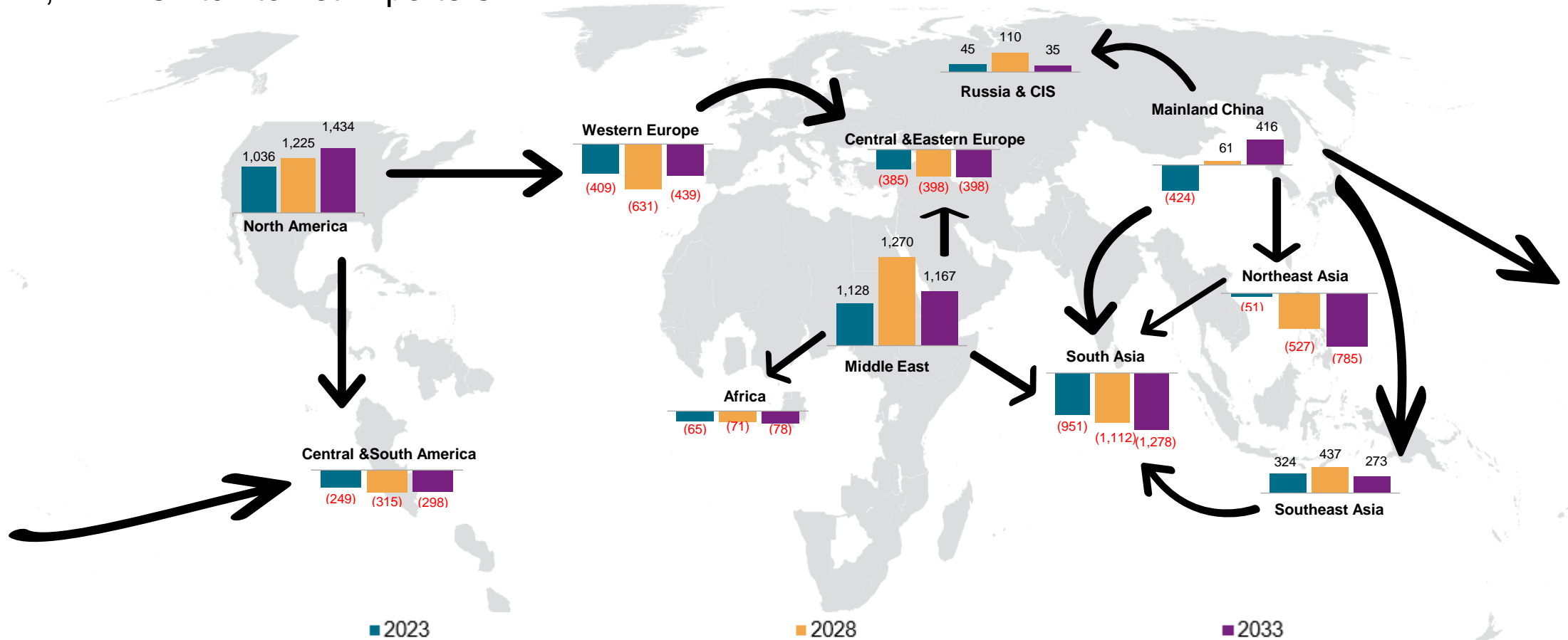


Data compiled Feb. 2024.  
Source: S&P Global Commodity Insights.



# South Asia overtakes Mainland China as #1 styrene importer...

NEA, WEP switch to net importers



+ denotes net export, (-) denotes net import.

Source: S&P Global Commodity Insights.

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# To wrap it all up



# The new world summarized

China exports to drive east-to-west arbitrage

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US supply still key to west hemisphere even as Chinese volumes trickle in

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Center of styrene shifts to South Asia

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Growing regions to rely on imports of styrene derivatives, rather than invest

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Styrene remains ethylbenzene's main use

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Asia price benchmark to change again



*With a good perspective on history, we can have a better understanding of the past and present, and thus a clear vision of the future*

.— Carlos Slim