

Update on the Ethylene Oxide Market

Antulio Borneo

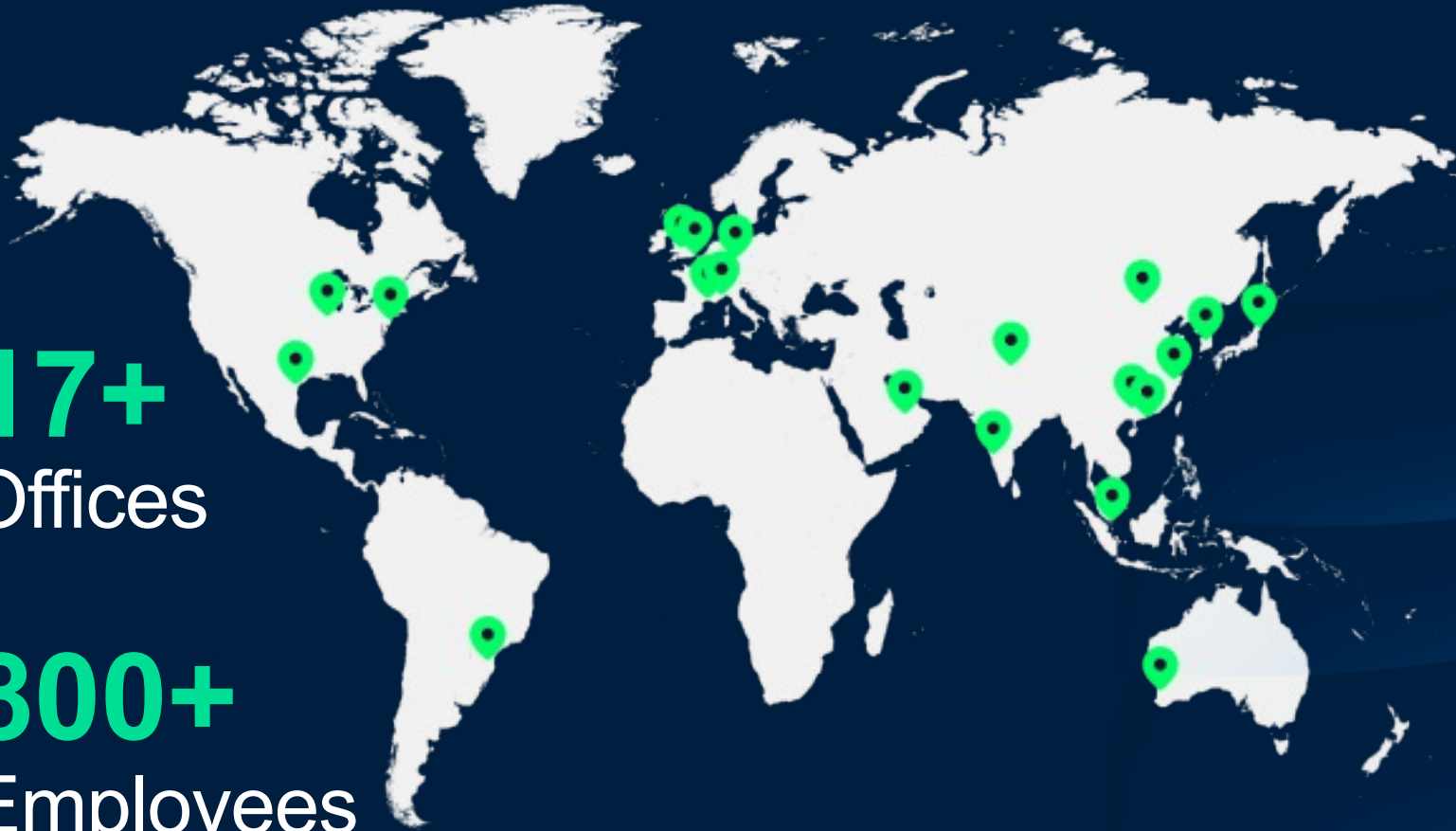
VP – PET Chain (EO/EG/PX/PTA/PET)

April 2023

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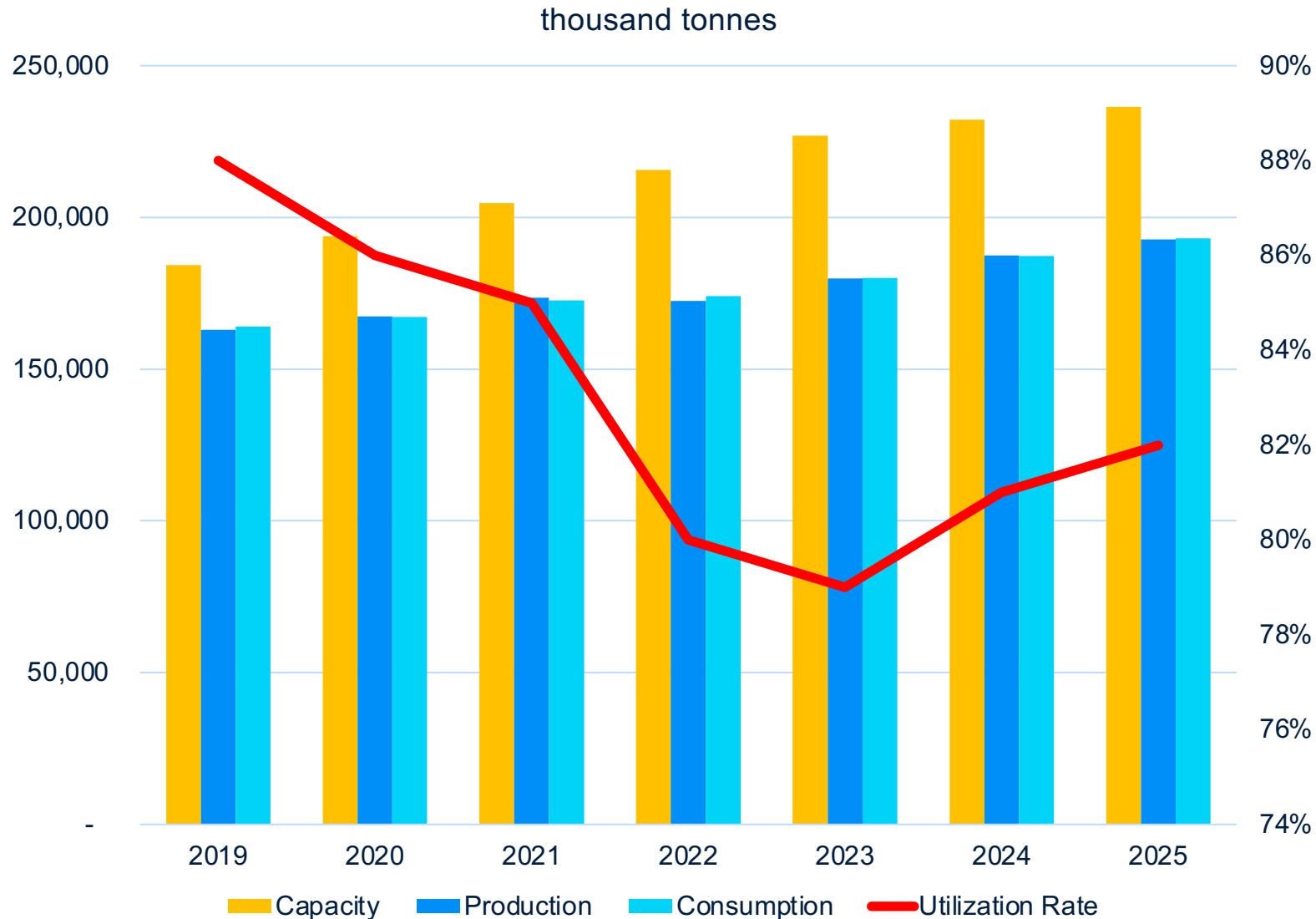


Agenda



- Supply and demand outlook – World & NA
- Examine current dynamics and price drivers
- Viewpoints on industry and key derivatives

Ethylene Global Supply & Demand - World

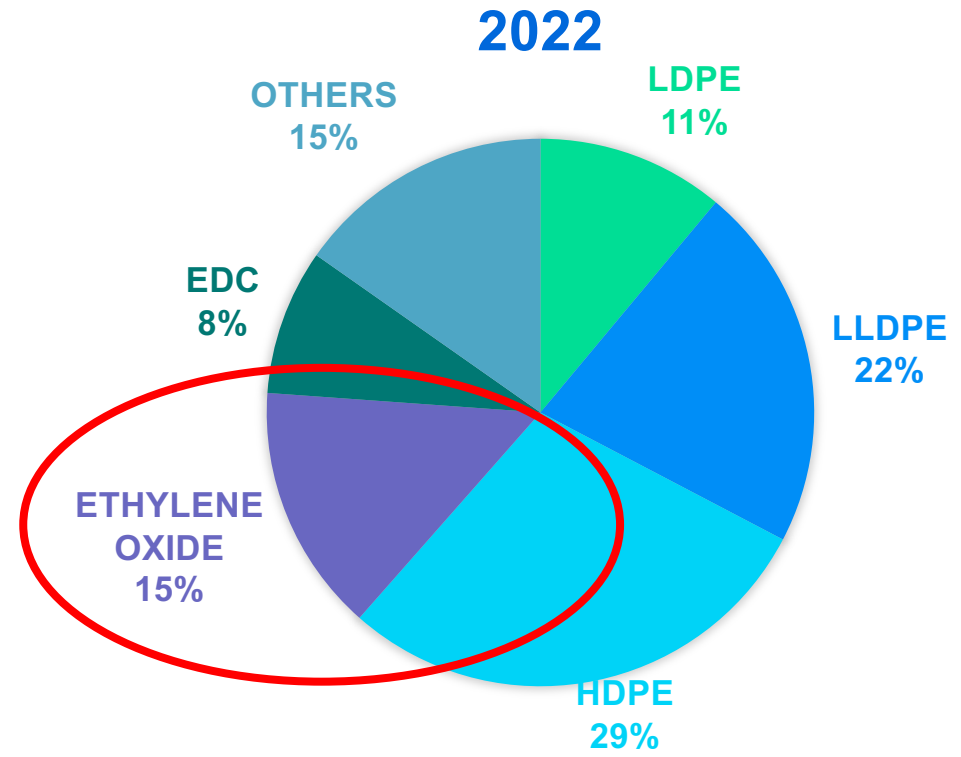
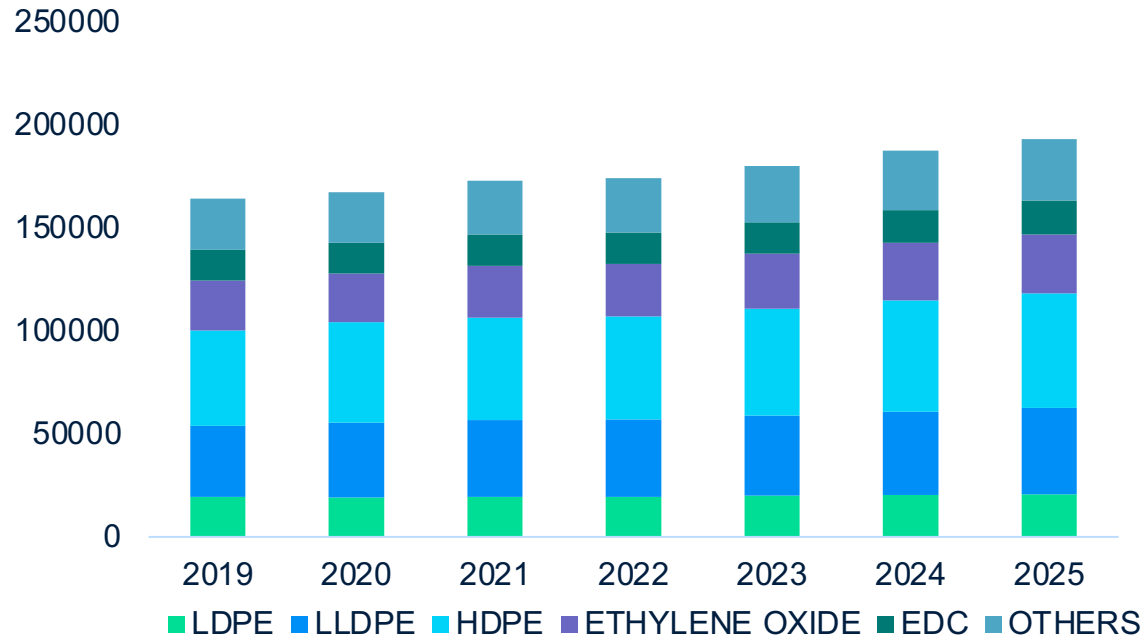


- Strong PE demand supported Ethylene consumption growth during COVID-19.
- Global capacity increases will keep operating rates below pre-COVID levels.

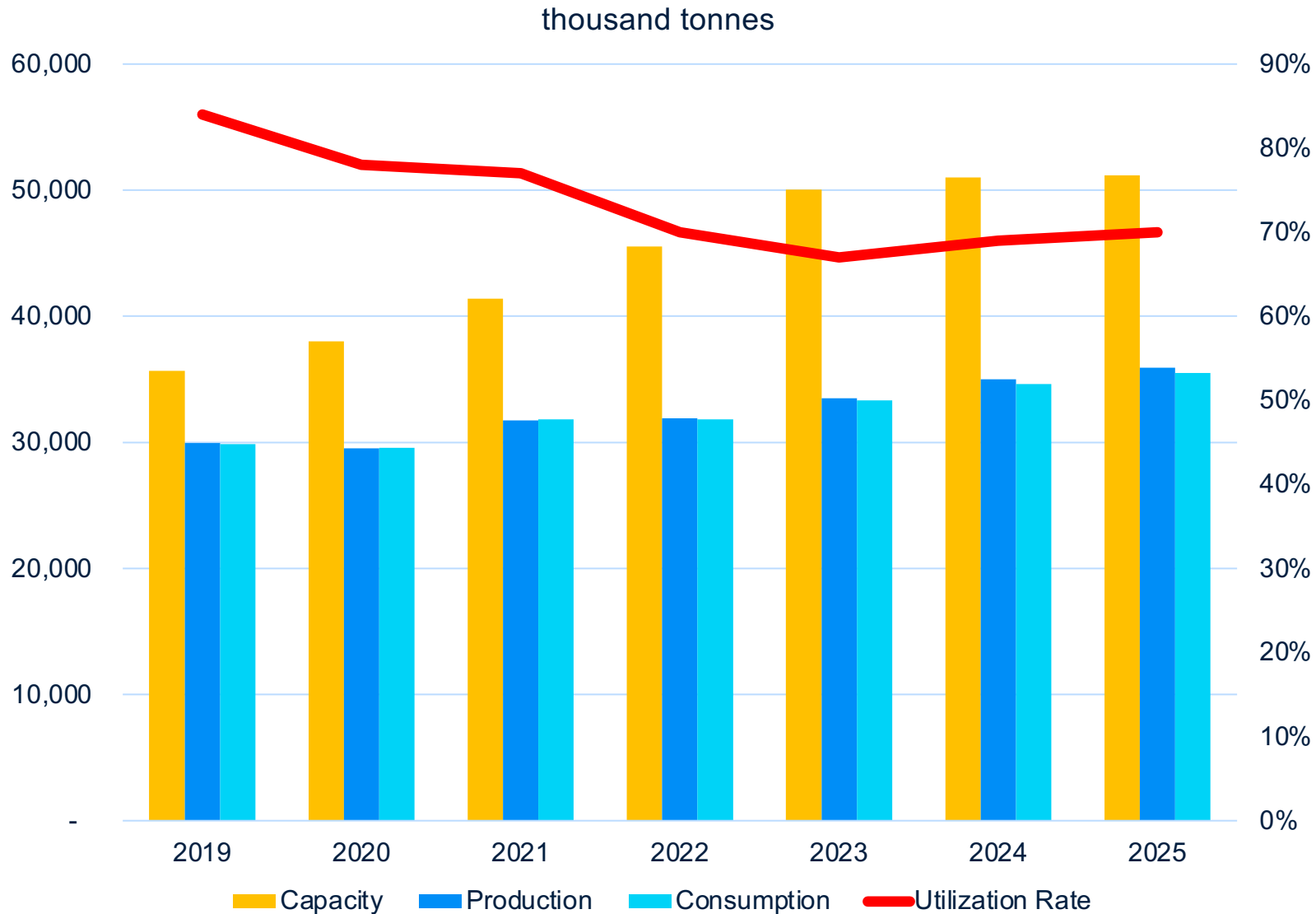
Ethylene by End-Use - World



EO 2022-25 6% CAGR



Ethylene Oxide Supply & Demand - World



- Led by consumption for EG and Surfactants, global EO demand surpassed pre-COVID levels in 2021.
- Increased capacity and lower utilization means increased competition which correlates highly with lower margins.



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North America & US Analysis

Ethylene Oxide North America Capacity By Country

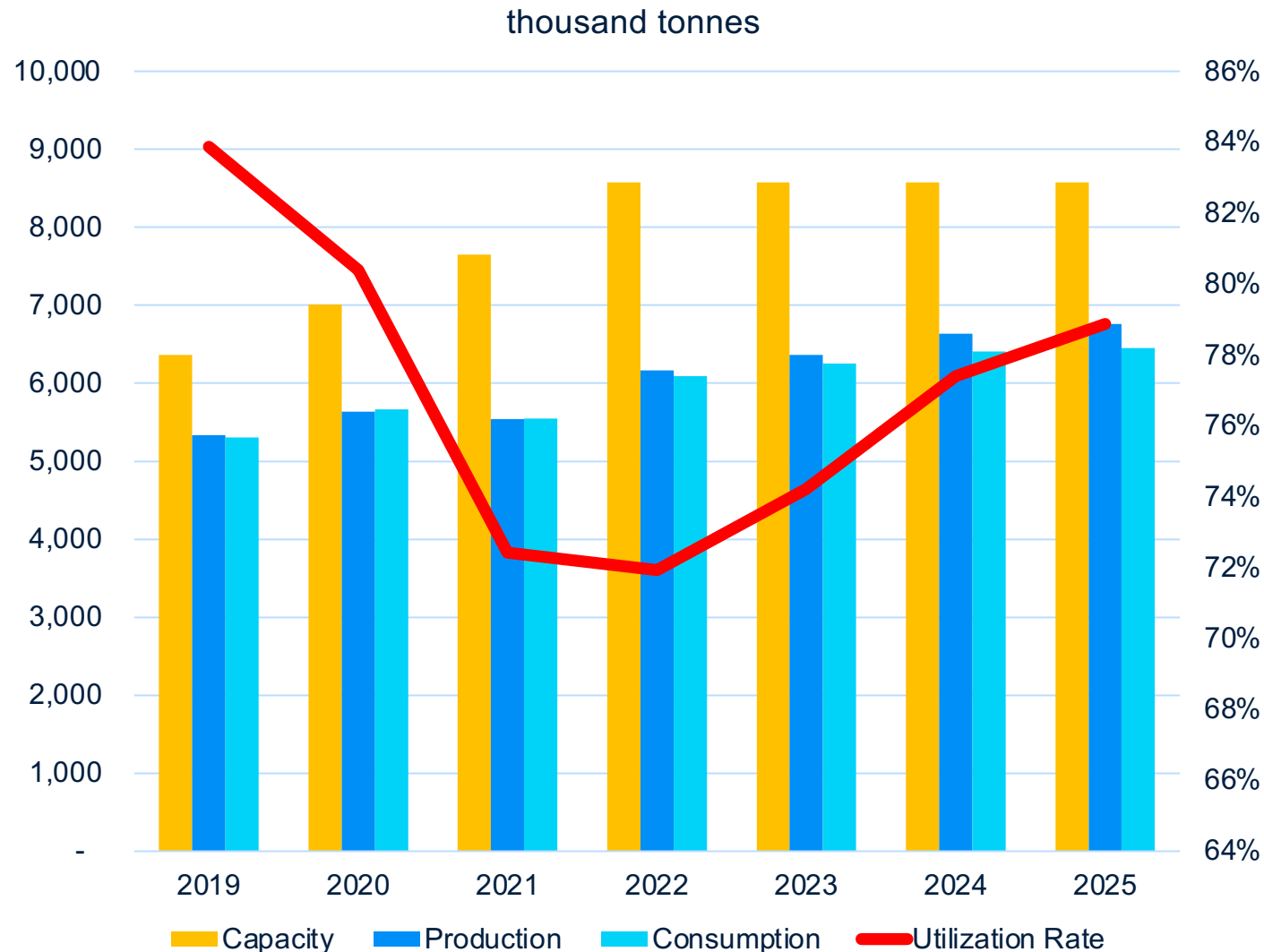


NORTH AMERICA		ETHYLENE OXIDE (Thousand Tonnes)		
CAPACITIES		2015	2020	2025
CANADA		1265	1355	1355
MEXICO		460	540	540
UNITED STATES		3515	5115	6680
TOTAL CAPACITY		5240	7010	8575
TOTAL PRODUCTION		4739	5635	6599
TOTAL CONSUMPTION		4718	5660	6589

NA: 2nd largest
EO producer
globally in 2025

NA: 3rd largest
EO consumer
globally in 2025

Ethylene Oxide North America Supply & Demand

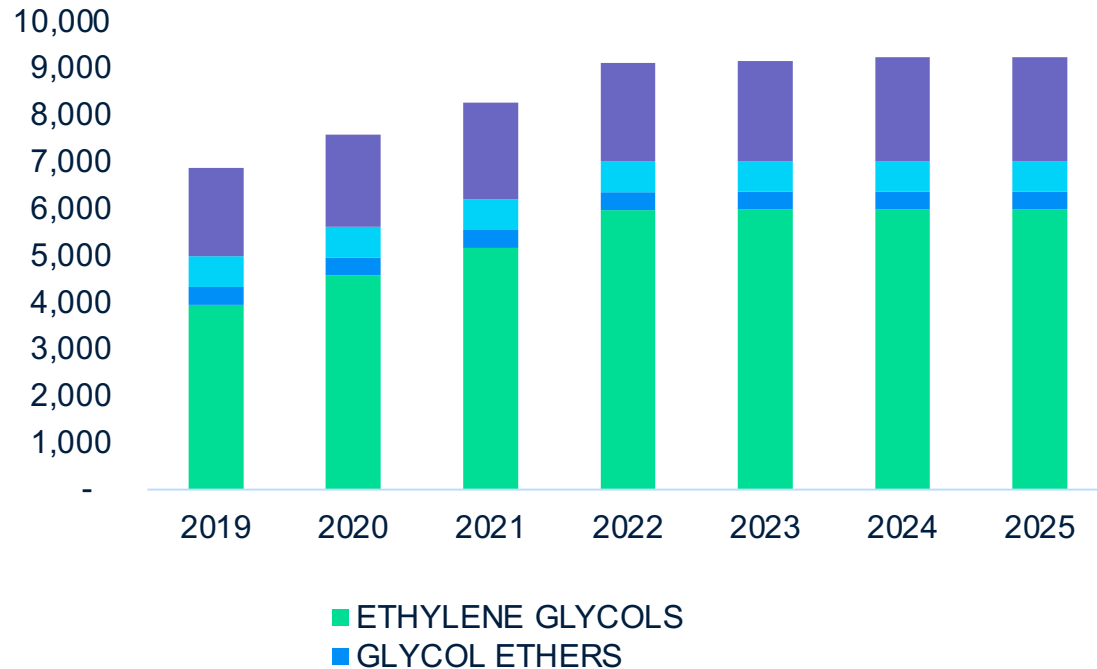


- United States utilization rates lower than pre-COVID levels through 2025
- EG is the high-volume application and is expected to be the growing application 2-3% between 2022-2025.

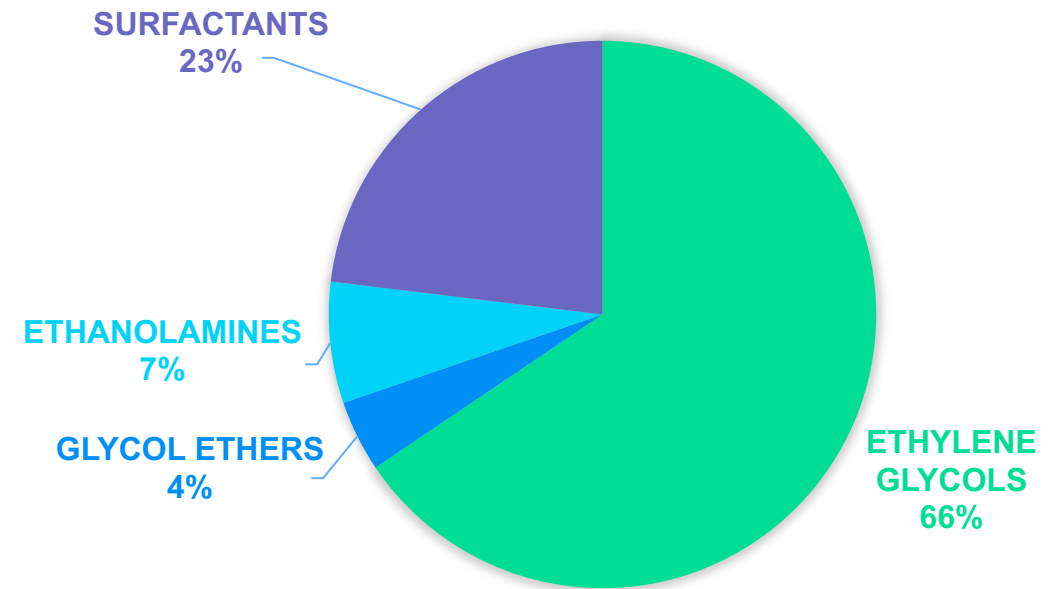
Ethylene Oxide Capacity by End-Use – North America



EO 2021-25 3% CAGR



2022





Update on the Ethylene Oxide Market

Price Drivers

Market Prices

Cost



- Crude Oil
- Feedstock
- Labor
- Overhead
- Logistics
- Government

Margin



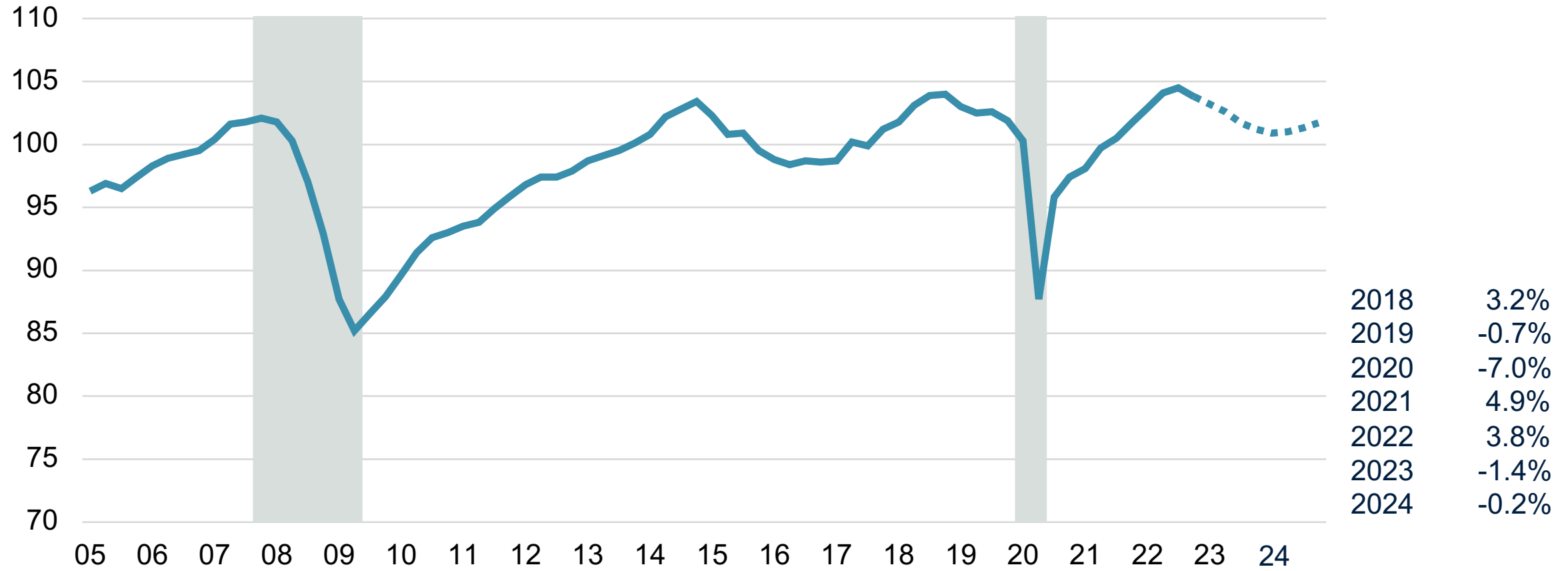
- Competition
- Supply & Demand
- Imports/Exports
- Number participants
- Sentiment
- Weather

Market Price

- Cost
- Margin

Industrial production is waning amid softening end-use demand and inventory correction

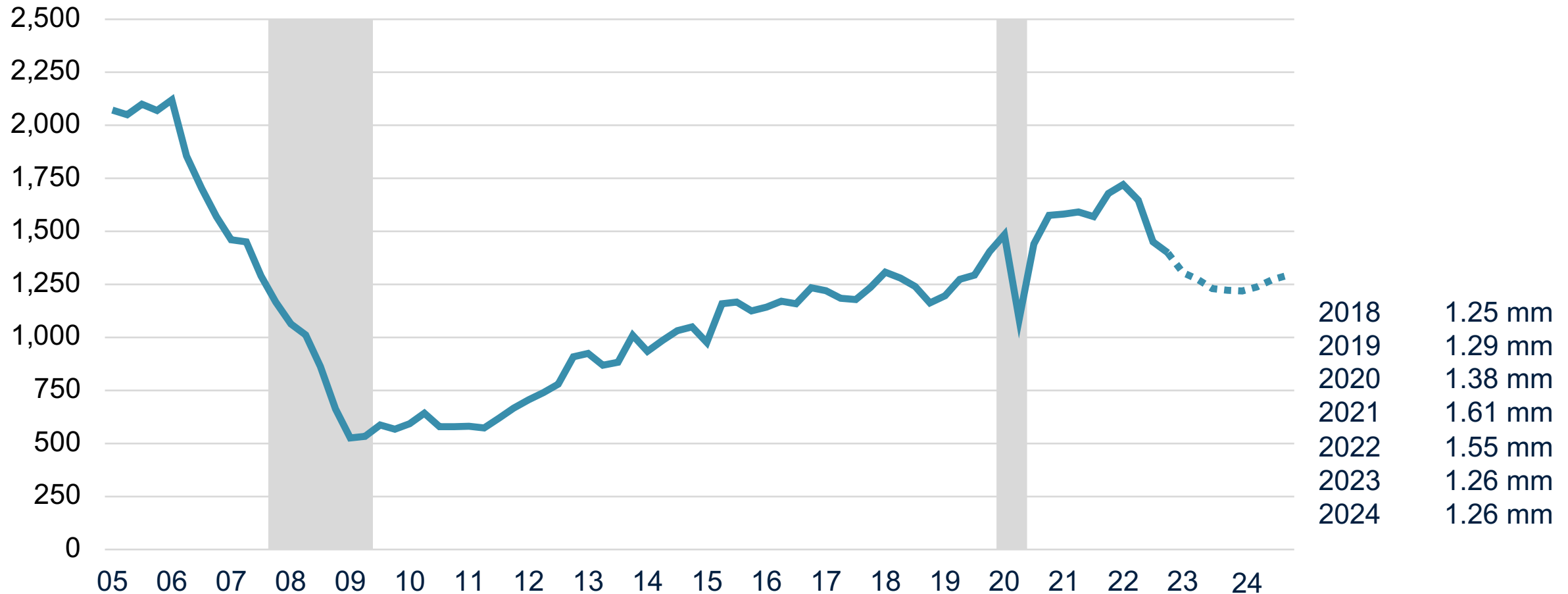
Industrial Production – Index where 2017=100 (SAAR)



Sources: Federal Reserve and ICIS analysis

Rising house prices and interest rates eroded affordability; activity has peaked for this cycle

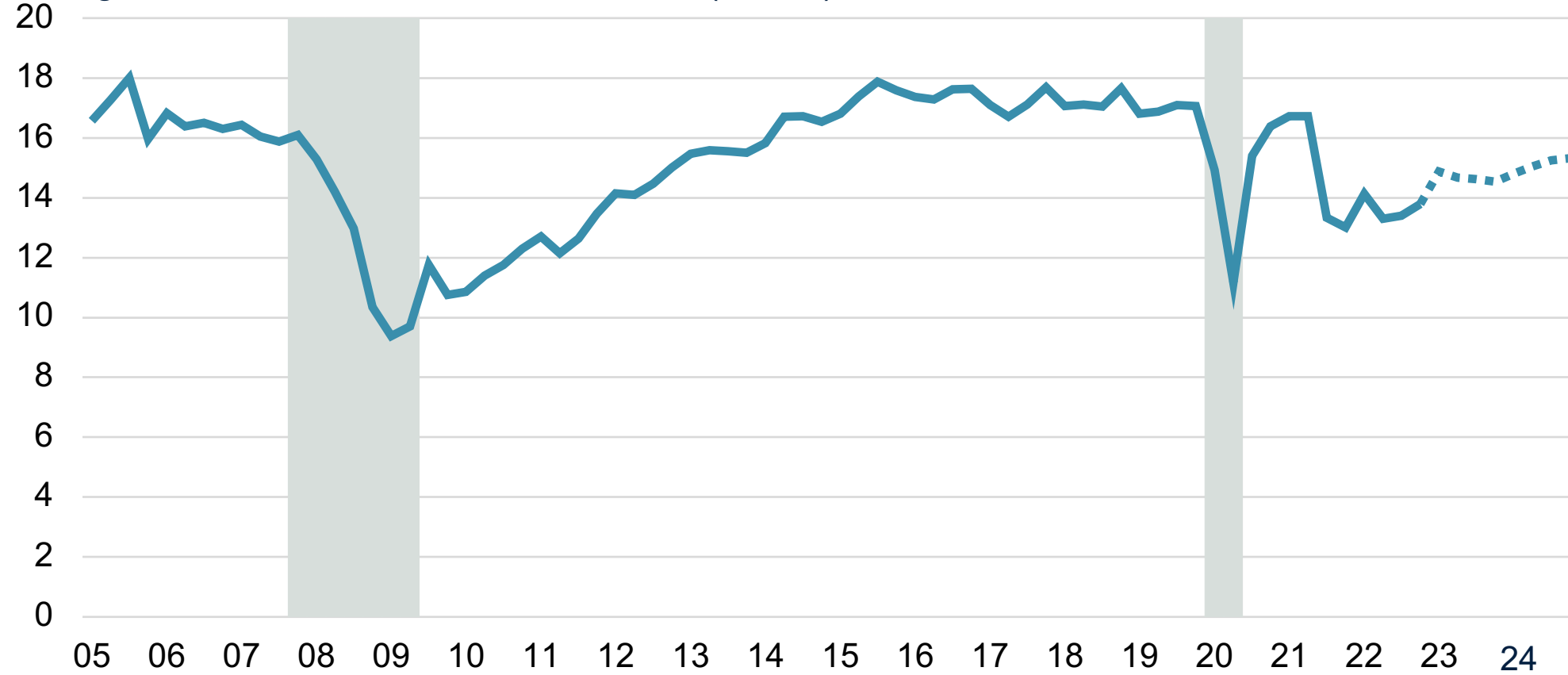
US Housing Starts - Thousands of Units (SAAR)



Sources: Census Bureau and ICIS analysis

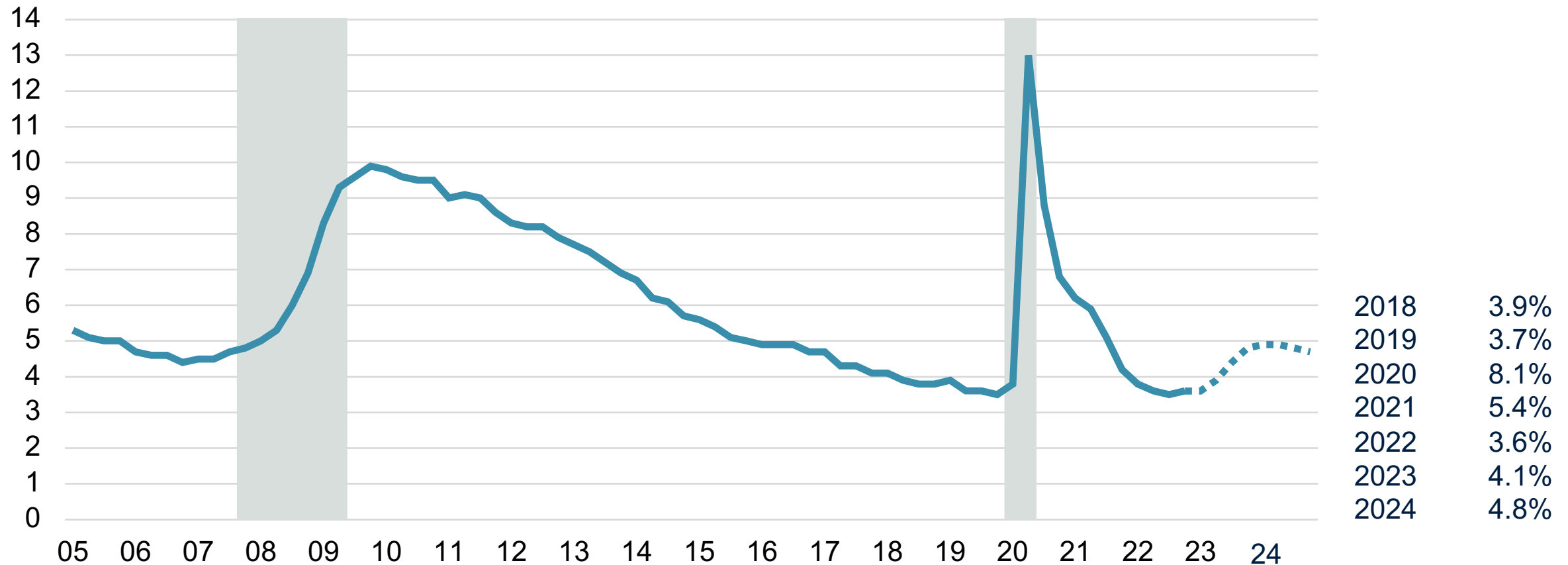
Pent-up demand will support light vehicle sales

US Light Vehicle Sales – Millions of Units (SAAR)



Demographics suggest tight labor markets and relatively low unemployment rate

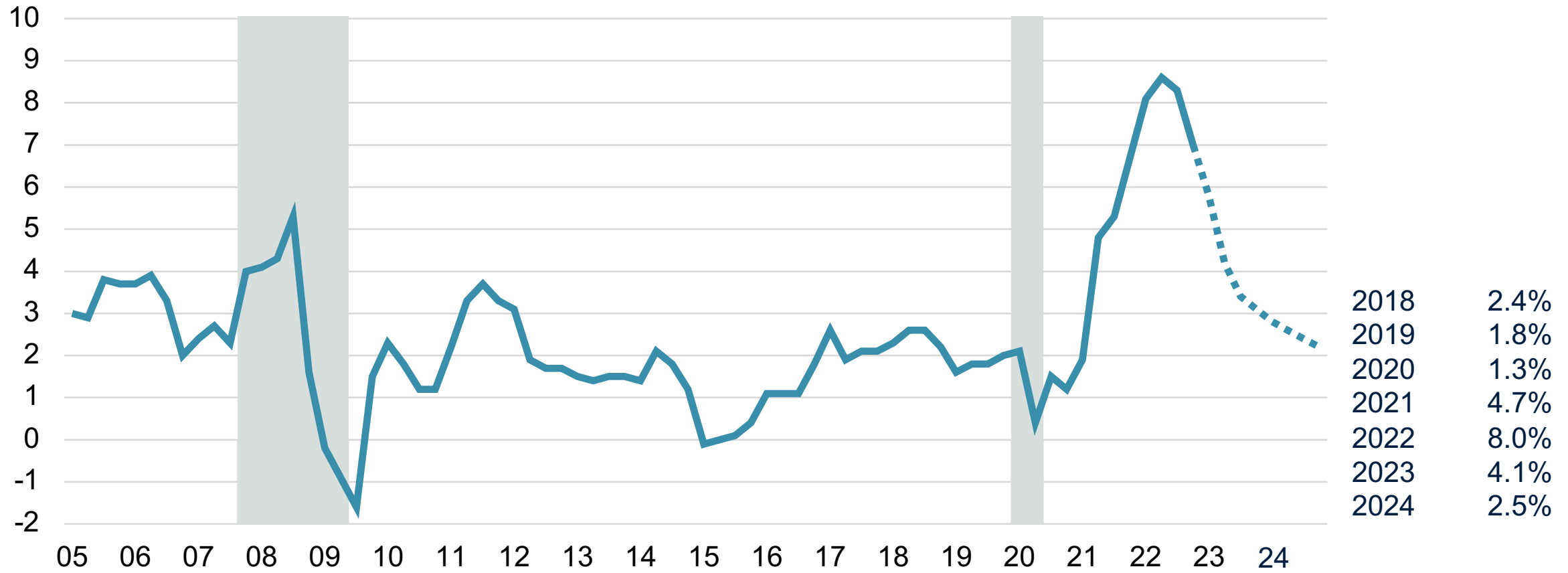
Unemployment Rate (%)



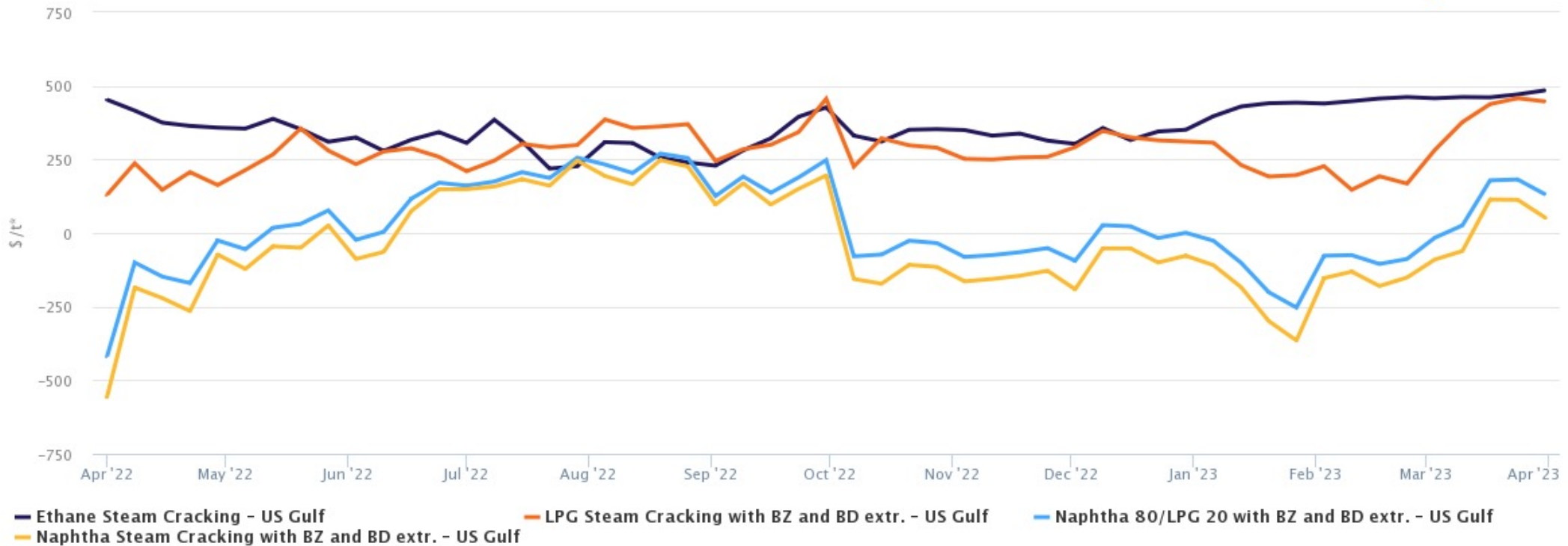
Sources: Bureau of Labor Statistics and ICIS analysis

With supply chain issues and too much monetary/ fiscal stimulus, inflation surged but has peaked

% Y/Y Change in Consumer Prices



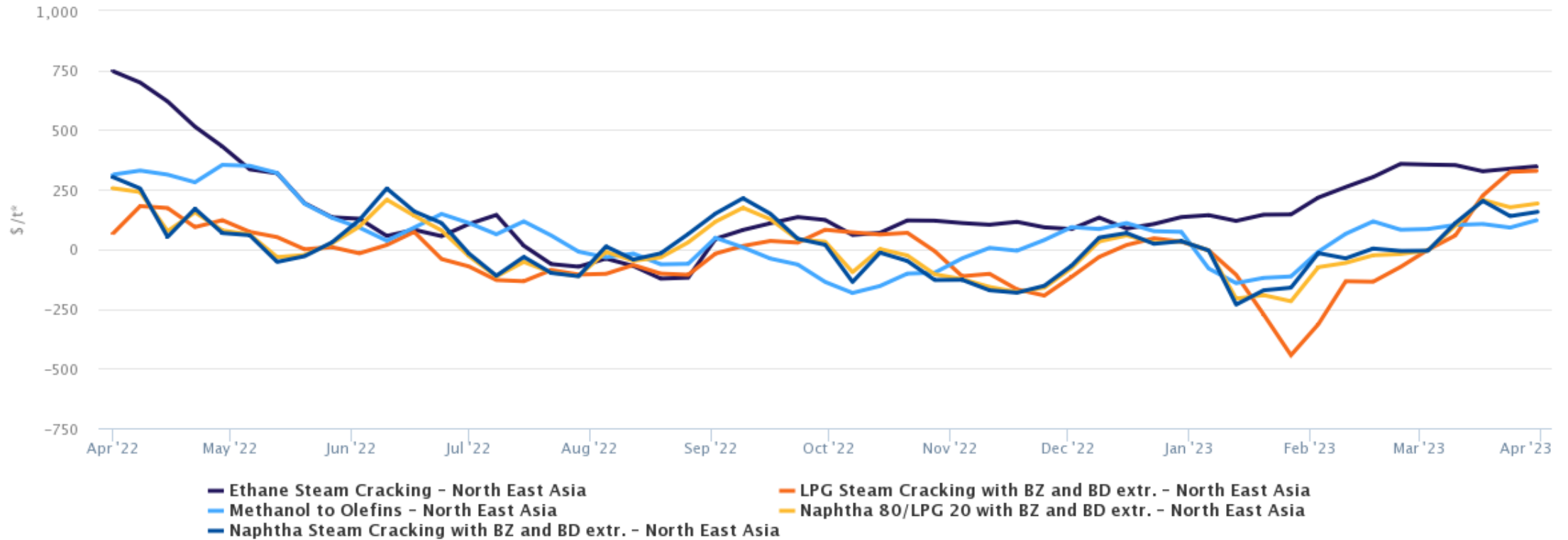
Ethylene Cash Margins - USG



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Ethane cracker still has advantage versus other feeds

Ethylene Cash Margins – NE Asia

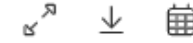


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Most of ethylene is from naphtha

EO & EG – Price History & Forecast

Price Forecast

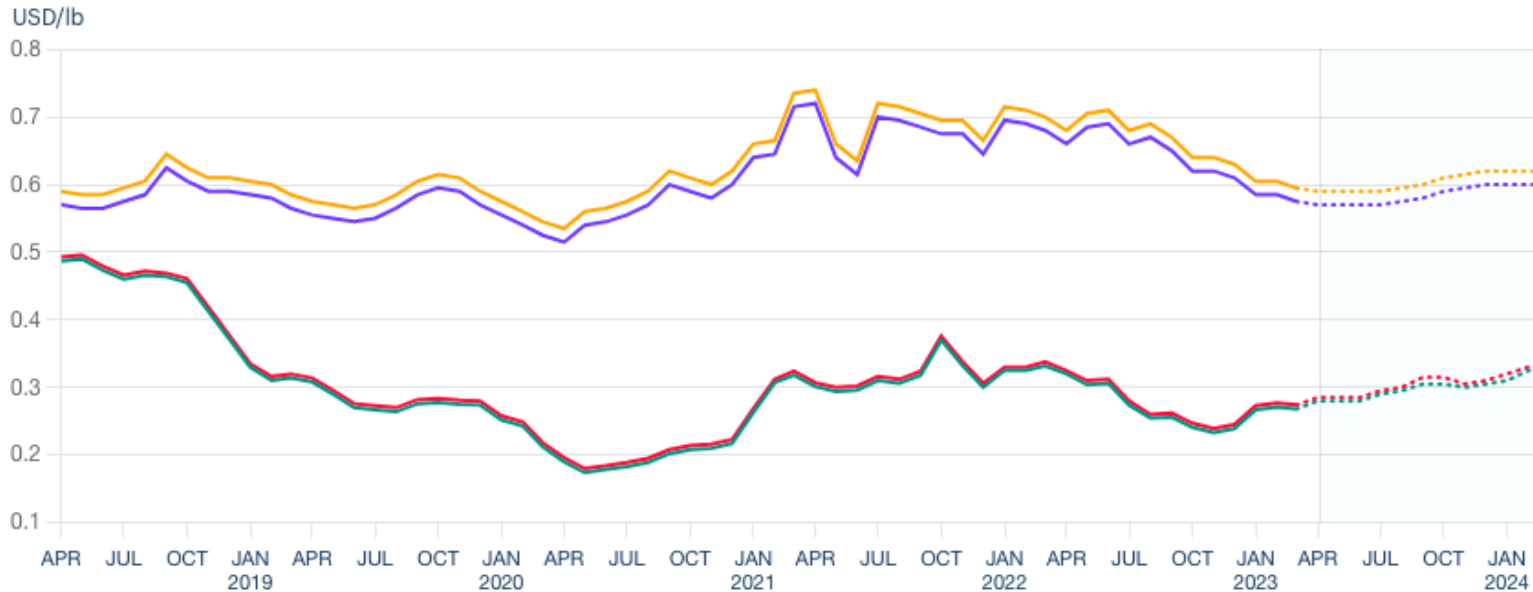


Ethylene Glycol Antifreeze Grade FOB US Large Buyer Month

Ethylene Glycol Fiber Grade Clearing FOB US Large Buyer Month

Ethylene Oxide Formula FOB US Large Buyer Month

Ethylene Oxide Formula FOB US Mid Sized Buyer Month



- EO expected to continue above pre-COVID levels and following C2
- EG price should increase through 2024 however still below pre-COVID levels.



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Industry & Derivatives Viewpoints



Ethylene Oxide

- NP capacity additions 2019-2022 were tied with EG production
- Low operating rates between 2021 and 2022 were due to EG low demand (China)
- EODs increased consumption
 - Indorama's IODs (Integration Huntsman & Oxitenno)
 - Dow Plaquemine (Sep '22)
 - Stepan 2024



Ethylene Oxide Developments

- LyondellBasell looking for strategic options for their EOEG business (Bayport, TX 800 mm lbs. for EO, 700 for EG and 415 for e-series glycol ethers)
- Mitsui
 - Bio EOEG (including bio-PET)
 - FID 2023
 - \$550 million
 - 2025/26

NA Estimated GAGR 2022-2025



E Glycols

- 2.0-2.5%

Glycol Ethers

- 2.5-3.0%

Surfactants & EA

- 2.5-3.0%



Summary

- NA integrated producers have advantaged costs
- Mitsui only new capacity in near future
- PEO, EODs more sustainable margins if compared to EG
- Additional supply will come from productivity gains

Thank you

