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# **Global Polyethylene: Outlook for Excess and Scenarios for Success**

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Chemical Market Analytics

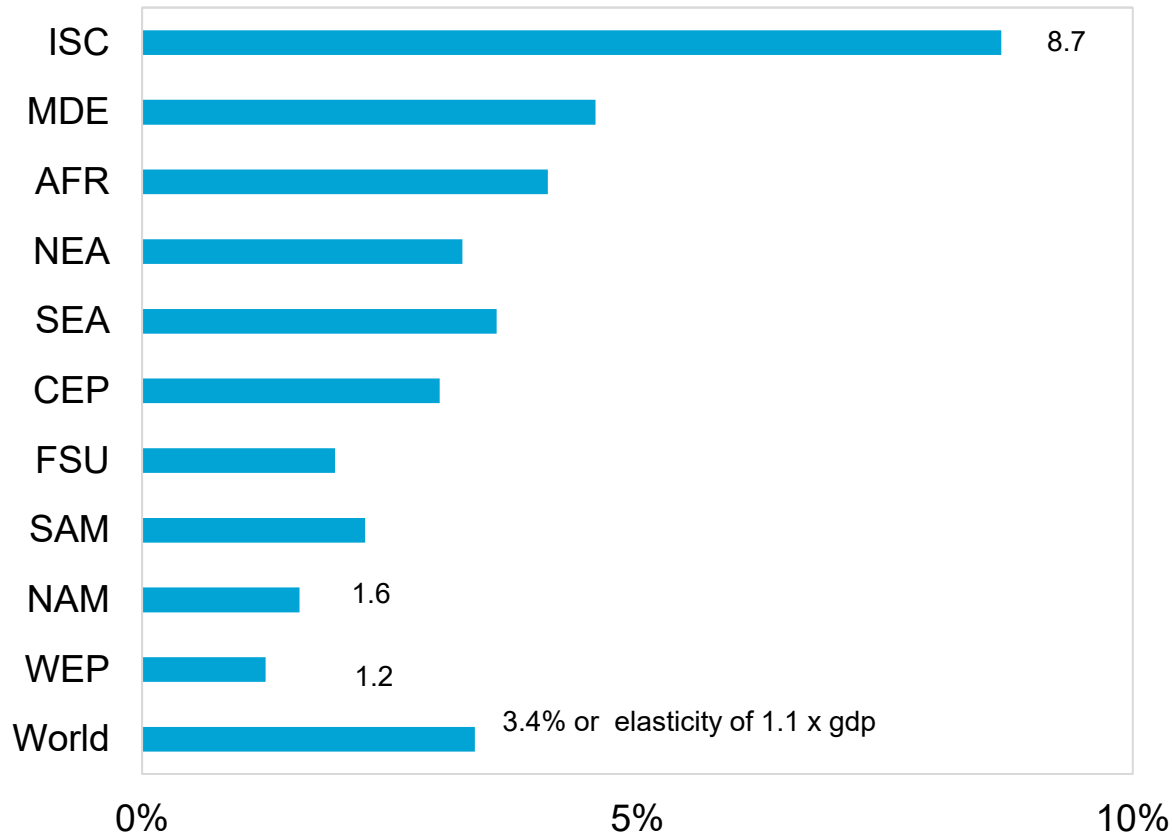
# Polyethylene forecast: “Lower longer”

- Global demand growth slows
- Weakened near term GDP
- Step change China growth
- Record capacity build
- China increases self-sufficiency
- Global op rates in multi-year trough
- Drive to circularity trims demand
- High-cost producers cut production and or capacity
- 15 MMT+ reduction needed to run at 88%

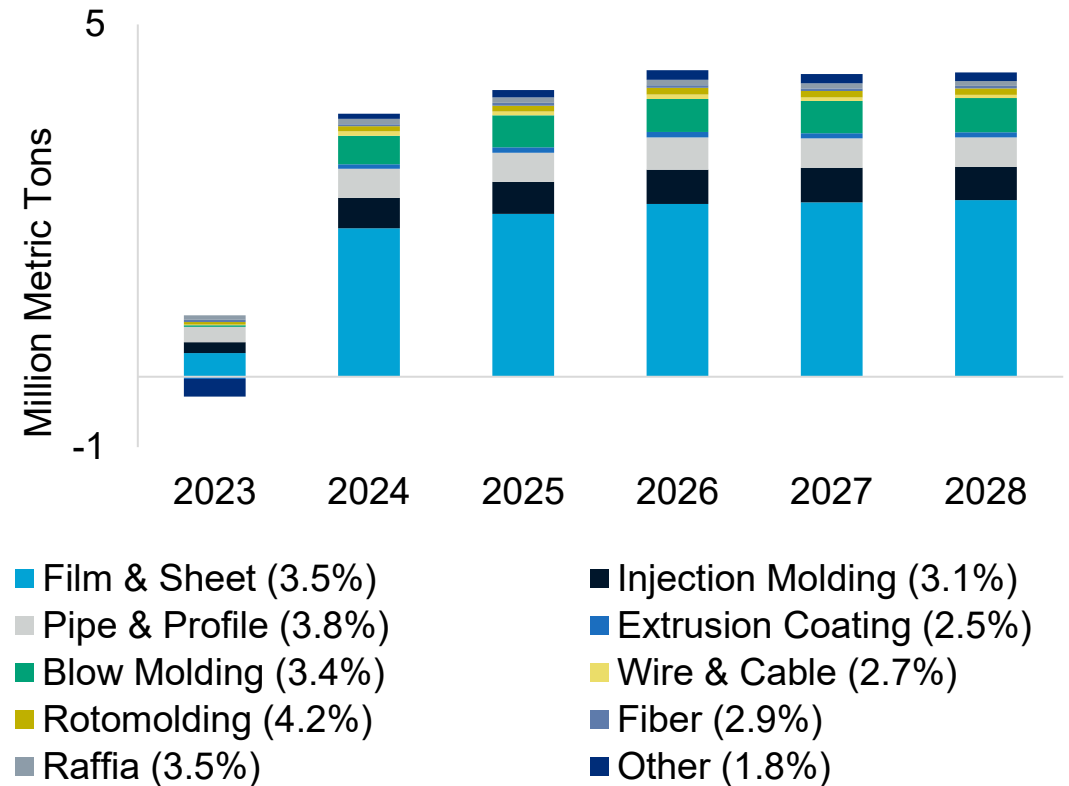
*Too much capacity chasing too little demand*

# Demand growth.... By region and segment

PE Demand CAGR 2023-2028



Global PE Demand Growth by Segment



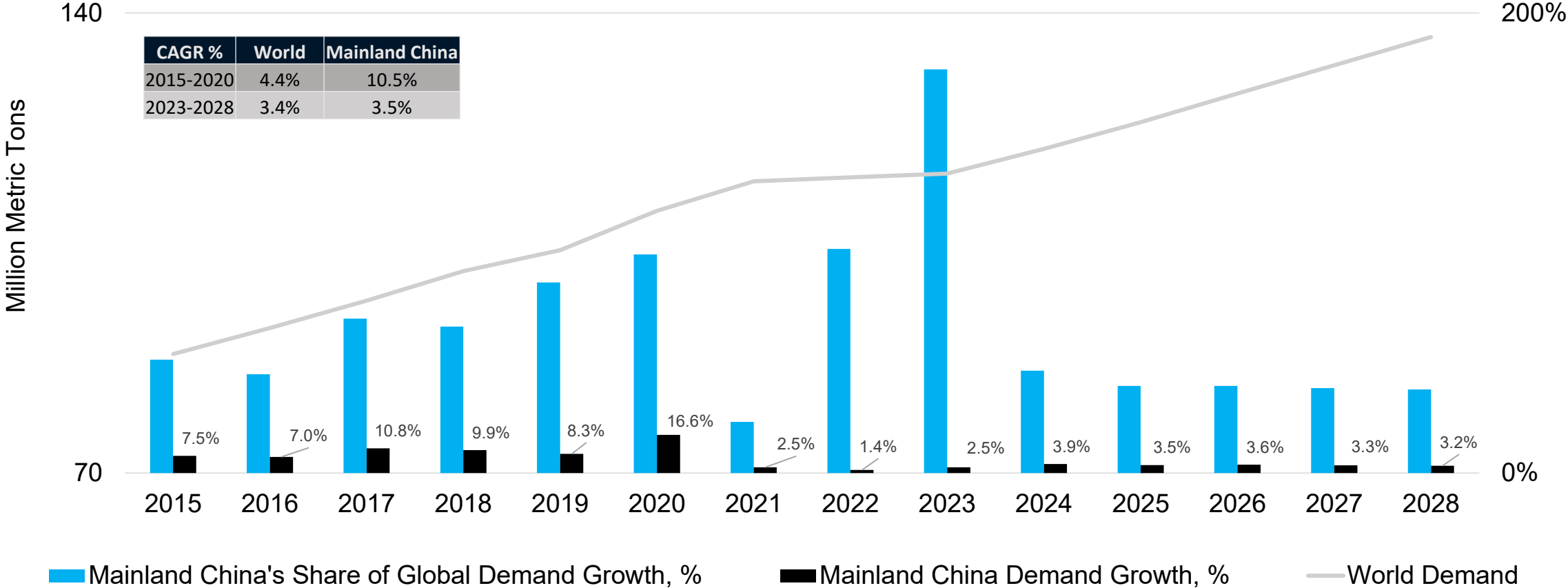
Note: CAGR % (2023-2028)

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# China polyethylene (PE) demand growth moderates: Engine that drives global demand stalls

## World vs Mainland China PE Demand



Source: Chemical Market Analytics by OPIS

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# China PE growth suppressed vs history: Why?

**China less competitive:**  
labor higher + inflation  
increases cost of doing  
business

**China GDP growth  
slowing:**  
2012 – 2022 avg = 6.4%  
2022 – 2032 avg = 3.9%

**China's economy  
changing structurally.**  
Future growth will be  
fueled by services and  
domestic demand growth

**Manufacturing slows** with  
onshoring trend

**China will remain the most important market,**

but the growth slows and driver will be more internal (not exports)

Trade plateauing

**Chinese Govt is no longer  
keen to prop up  
commodity  
manufacturing –  
Tesla's not toys**

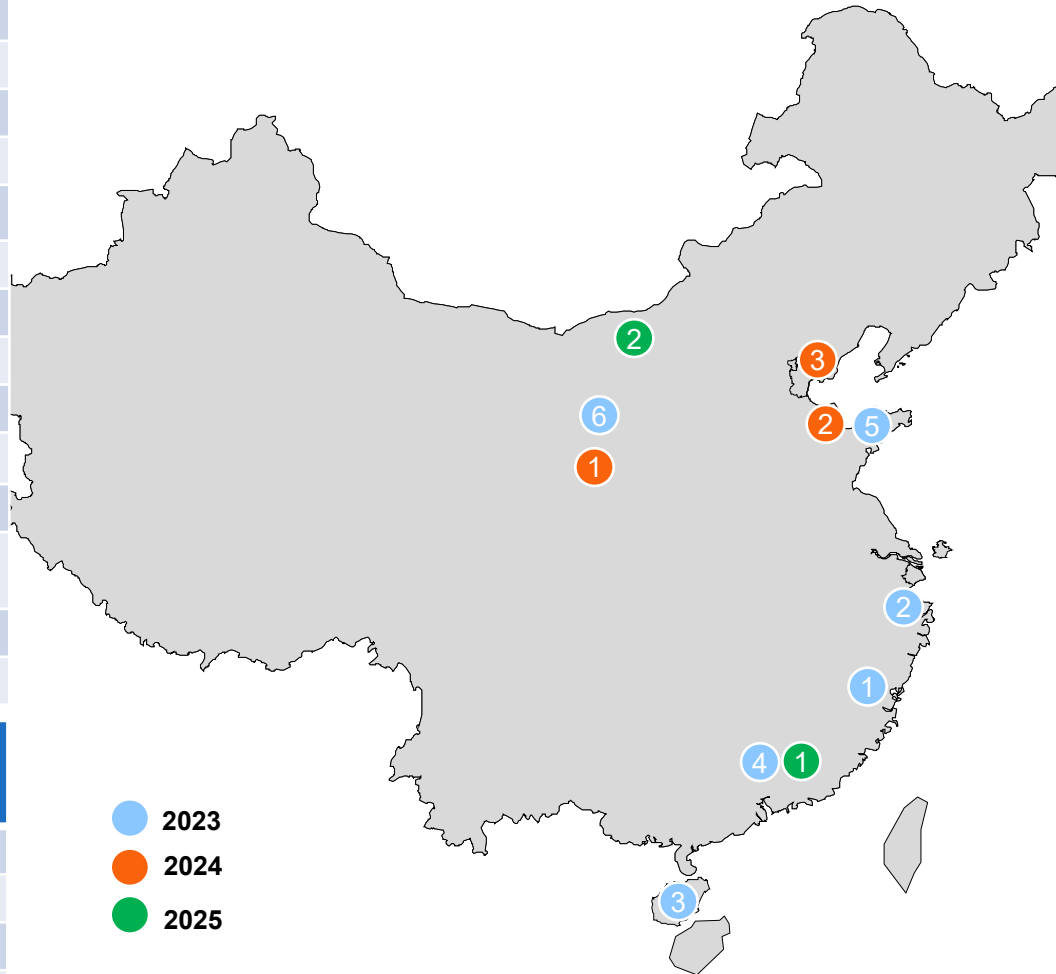
**PE demand: China  
domestic (processed) per  
capita demand is already  
higher** than global median  
growth linked to rising  
income

**Virgin PE growth  
impacted by displacement  
from recyclates and non-  
plastics**

# New Mainland China PE Capacity Additions

## 8.8 MMT new capacity 2023 - 2025

	Facility	Capacity	S/U time
1	LD Fujian Gulei	300	May
2	LD Formosa, Ningbo	28	Jul
3	LL Sinopec Hainan	300	Feb
	HD Sinopec Hainan	300	Feb
4	LL CNPC Jieyang	400	Feb
	HD CNPC Jieyang	400*2	Feb
5	HD Shandong Jinhai	400	Mar
6	HD Ningxia Baofeng	400	Sep
1	LD Ningxia Baofeng	250	Jan
2	LD Yulong	200+500	Jul
	LL Yulong	500	Jul
	HD Yulong	300+500+450	Jul
3	LL Tianjin PC	300	Jul
	HD Tianjin PC	500	Jul



	Facility	Capacity	S/U time
1	LD ExxonMobil	500	Jan
	LL ExxonMobil	500/730	Jan
2	LL Baofeng	275	Jul
	HD Baofeng	275	Jul

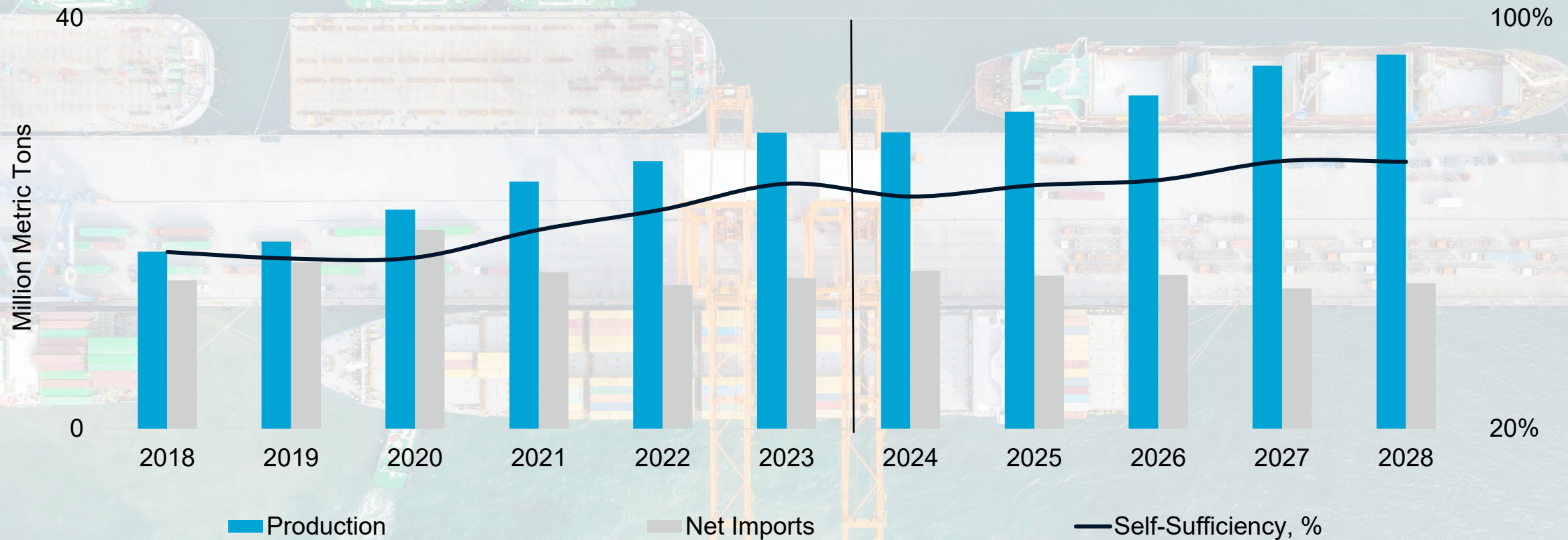
2026 = = 4.4 mmt

Year	Territory	LD	LLD	HD	Total
2023	Domestic	328	700	1900	2928
	Overseas	0	1650	1175	2825
2024	Domestic	950	800	1750	3500
	Overseas	0	0	0	0
2025	Domestic	500	1505	275	2280
	Overseas	0	150	460	610
	Total	1778	4805	5560	12143

**48%**  
increase  
over 2021

# As mainland China self-sufficiency rises, imports plateau

Mainland China PE Self-Sufficiency Rate and Imports



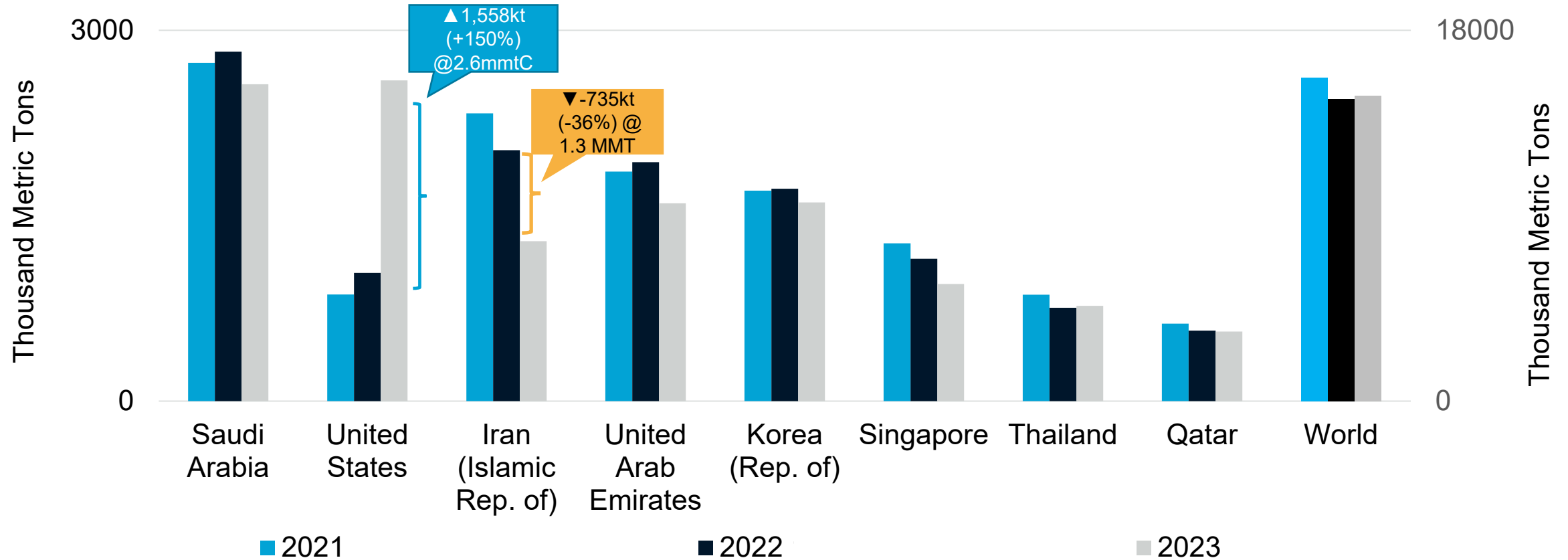
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# PE import slightly grew in 2023

## 14.8 MMT imported PE ....

PE import in China (2021-2023)



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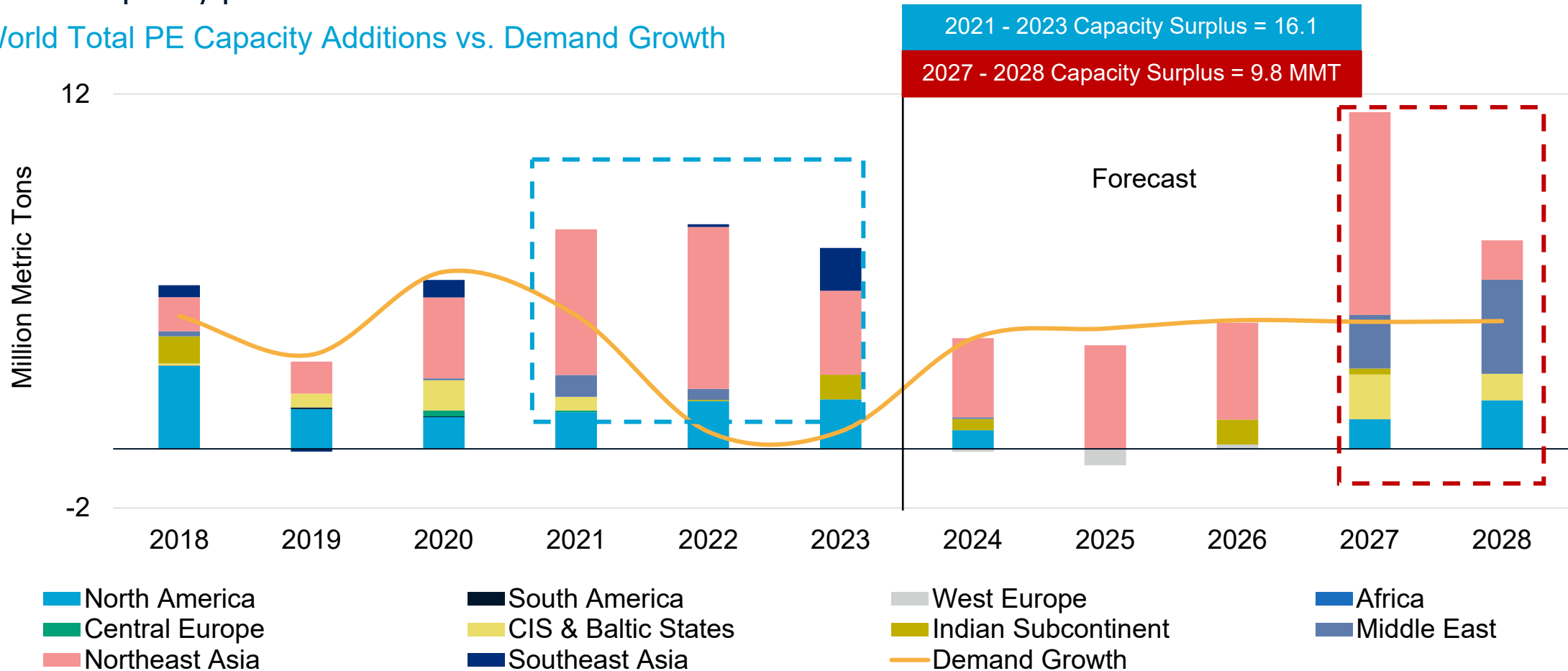
# NAM project list: New starts. . . Pause after Q1-24

Company	Location	Country	LDPE	LLDPE	HDPE	TBA	Startup	Comments
Sasol	Lake Charles, LA	U.S.		470			Q1 2019	
Exxon Mobil	Beaumont, TX	U.S.		650			Q3 2019	
Formosa Plastics Corp	Point Comfort, TX	U.S.			400		Q4 2019	
LyondellBasell Equistar	Laporte, TX	U.S.			500		Q2 2020	
Sasol	Lake Charles, LA	U.S.	420				Q4 2020	
Formosa Plastics Corp	Point Comfort, TX	U.S.	400				Q4 2020	
Gulf Coast Growth Ventures	Corpus Christi, Texas	U.S.		1300			Q4 2021	Advanced from Q3 2022
<b>Shell</b>	<b>Monaca, PA</b>	<b>U.S.</b>		<b>500</b>	<b>1000</b>		<b>Q3 2022</b>	<b>Delayed from Q3 2021</b>
Bayport Polymers	Bayport, TX	U.S.			625		Q4 2023	Delayed from Q1 2022
Nova Chemical	Sarnia, ON	Canada		450			Q4 2023	Delayed from Q4 2021
FG LA LLC	St. James, LA	U.S.		400	400		2027+	Delayed FID
FG LA LLC	St. James, LA	U.S.		400	400		2027+	Delayed FID
PTTGC	Dilles Bottom, OH	U.S.		900	700		2027+	Delayed FID
<b>CPC – Qatar (Golden Triangle)</b>	<b>Orange, Tx</b>	<b>U.S.</b>			<b>2000</b>		<b>2027+</b>	<b>FID Approved</b>
Dow	US Gulf Coast	U.S.		600			TBD	Delayed FID
Dow Canada	Ft. Saskatchewan	Canada				1800	2029 / 2030	<b>FID Approved - Net Zero Carbon Emission</b>
<b>Totals, 000s MT</b>			<b>820</b>	<b>5670</b>	<b>6025</b>	<b>1800</b>		

# Record overbuild looming. . .

Excess capacity pressures market

World Total PE Capacity Additions vs. Demand Growth

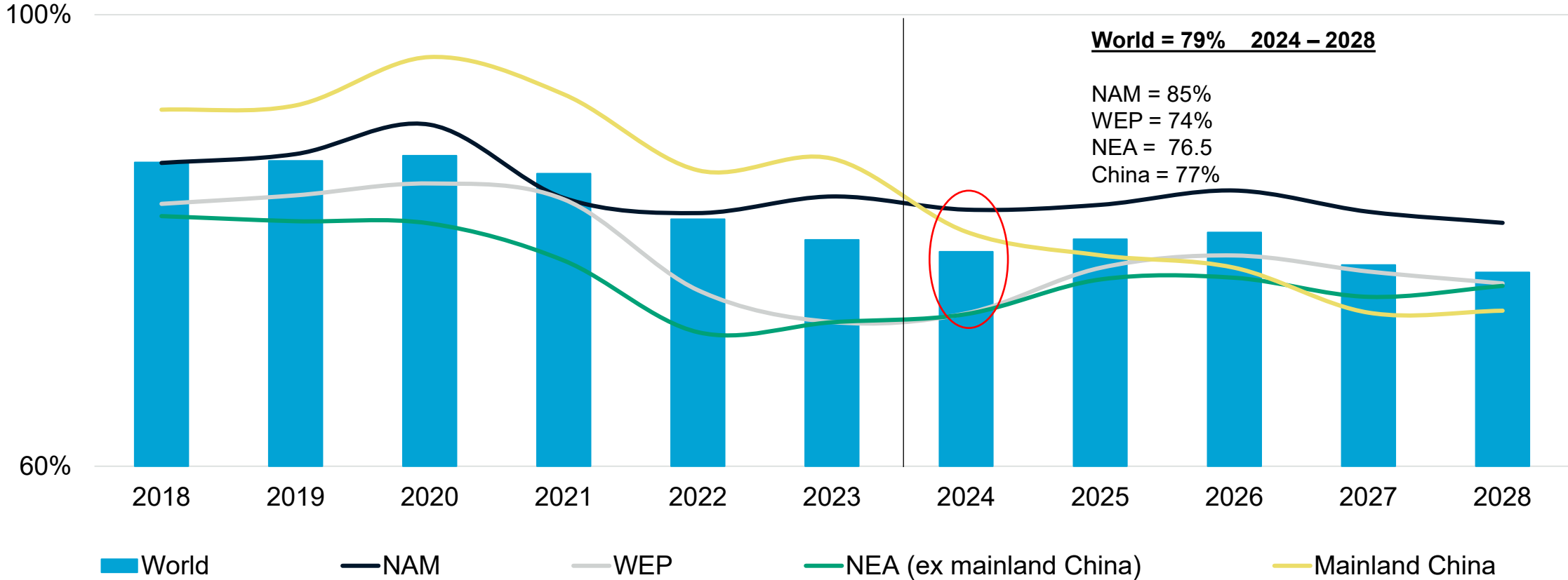


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# Regional operating rates: Total PE

## Regional PE Operating Rates



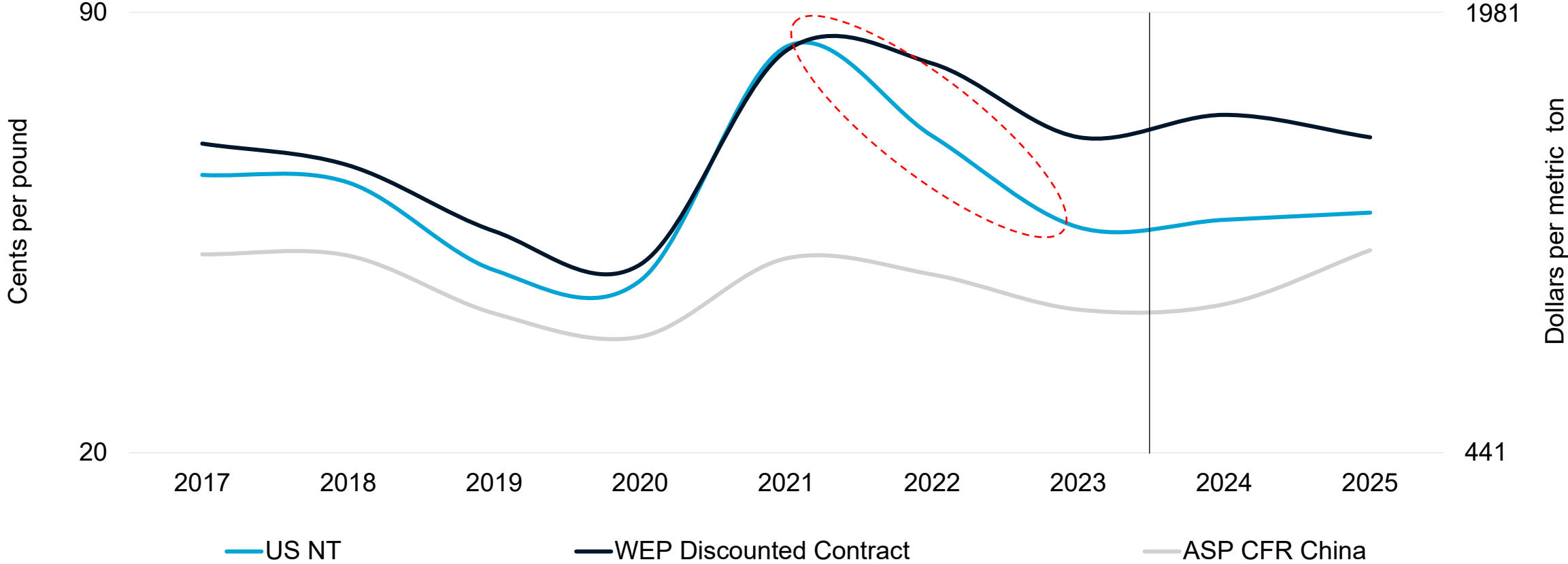
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# Regional PE prices: Pressure through forecast

N. America sees sharpest price decline

LLDPE Prices by Region



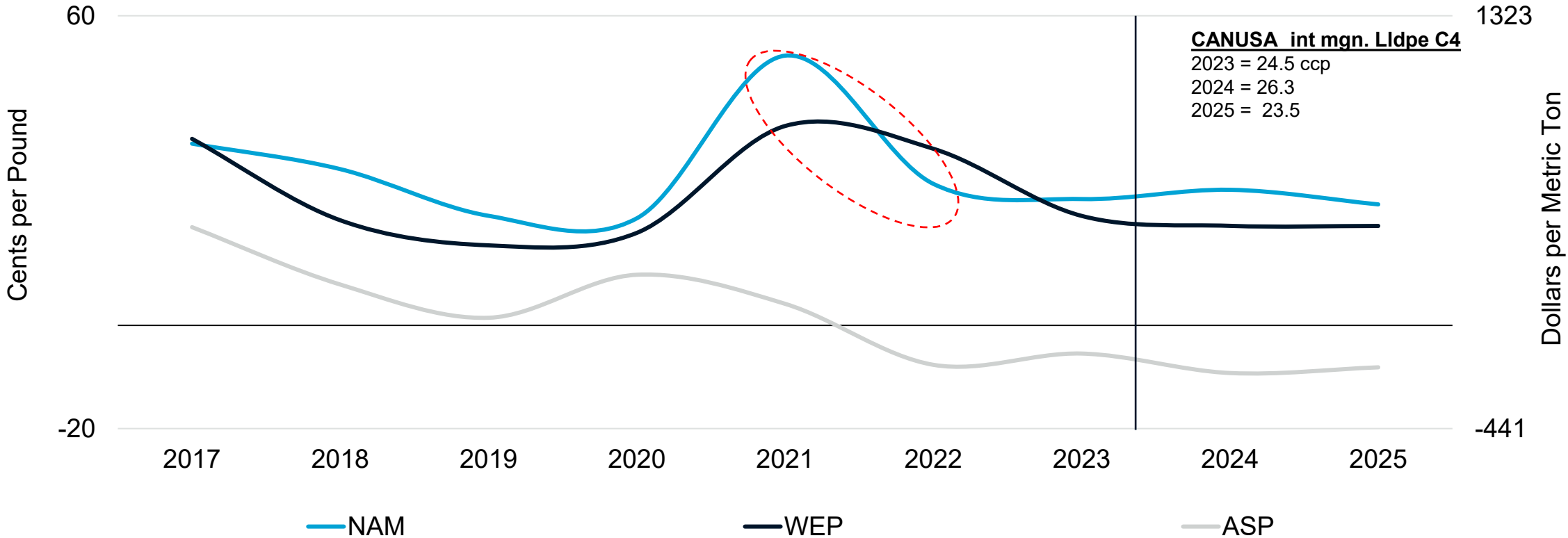
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# Margin pressure develops with excess capacity

Oversupply and stable energy limit upside – Negative Asia margins limit downside

## LLDPE Butene Integrated Margins



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# Europe's Losing Share in PE Business to Emerging Markets

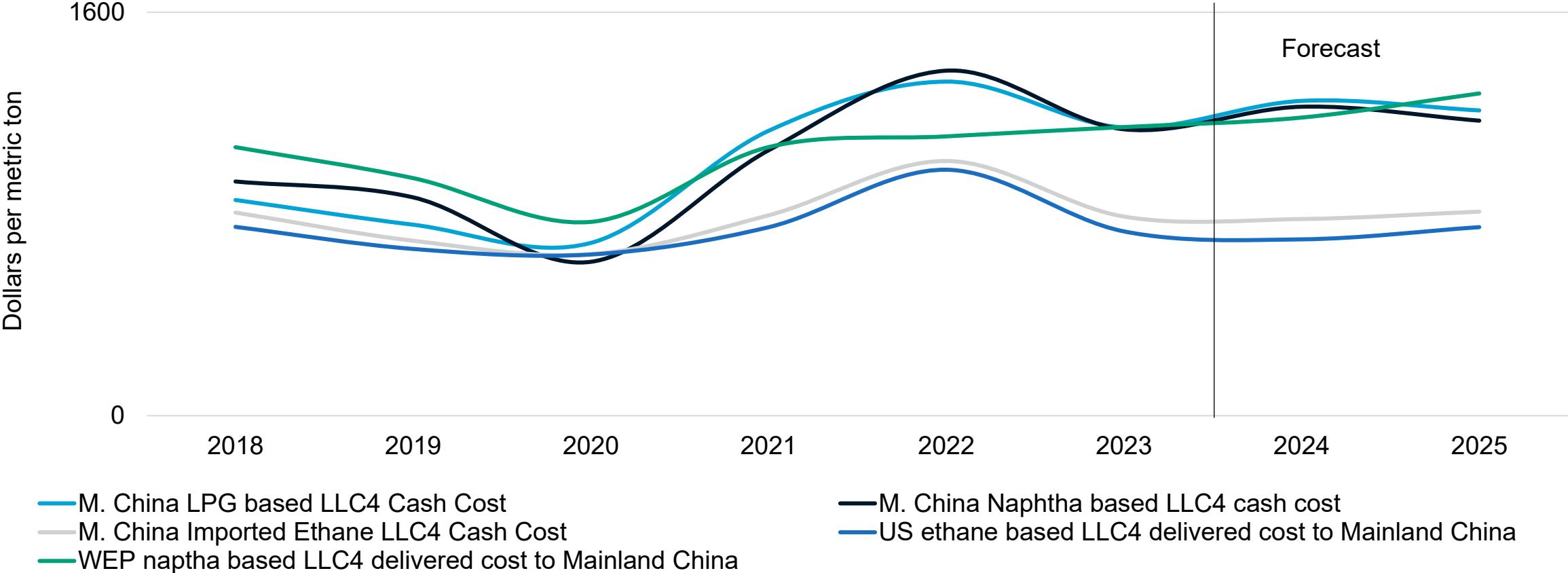
## Europe's Waning Position In The World

	2000	2023	2030
GDP Share	30%	22%	20%
Population Share	8%	7%	6%
PE Capacity Share	25%	11%	9%
PE Demand Share	24%	12%	10%
PE Net Import/ Demand	2%	13%	19%

- Macroeconomic slowdown, inflation, high interest rate dampen demand in Europe
- Negative demand growth in 2022 and 23 (-3.1 % -6.2%) modest rebound in 2024 and 2025 @ 2.4% and 1.2%
- Destocking due to market uncertainty amplifies demand pressure and heightens risk from supply chain volatility (Red Sea crisis)
- Structural factors (decoupling from Russia) weakens cost position exposing industry to imports
- Low demand and import competition cause European producers to slash operating rates, aiming to balance market share and margin
- European producers shift portfolio to more value added products which allowed exports to increase (pipe grade, metallocene, higher alpha olefin products)
- Rising PE imports weigh on spot market and pressure contract business.....(spot/ contract) price widens
- Short term rise in operating rate in response to Red Sea crisis will be short-lived, more utilization cuts anticipated
- Costs remain elevated (naphtha, LPG, utility), setting a firm floor for PE prices but PE prices will stay rangebound

# Production Cost Favors Ethane

Mainland China LLDPE Cash Cost by Feedstock



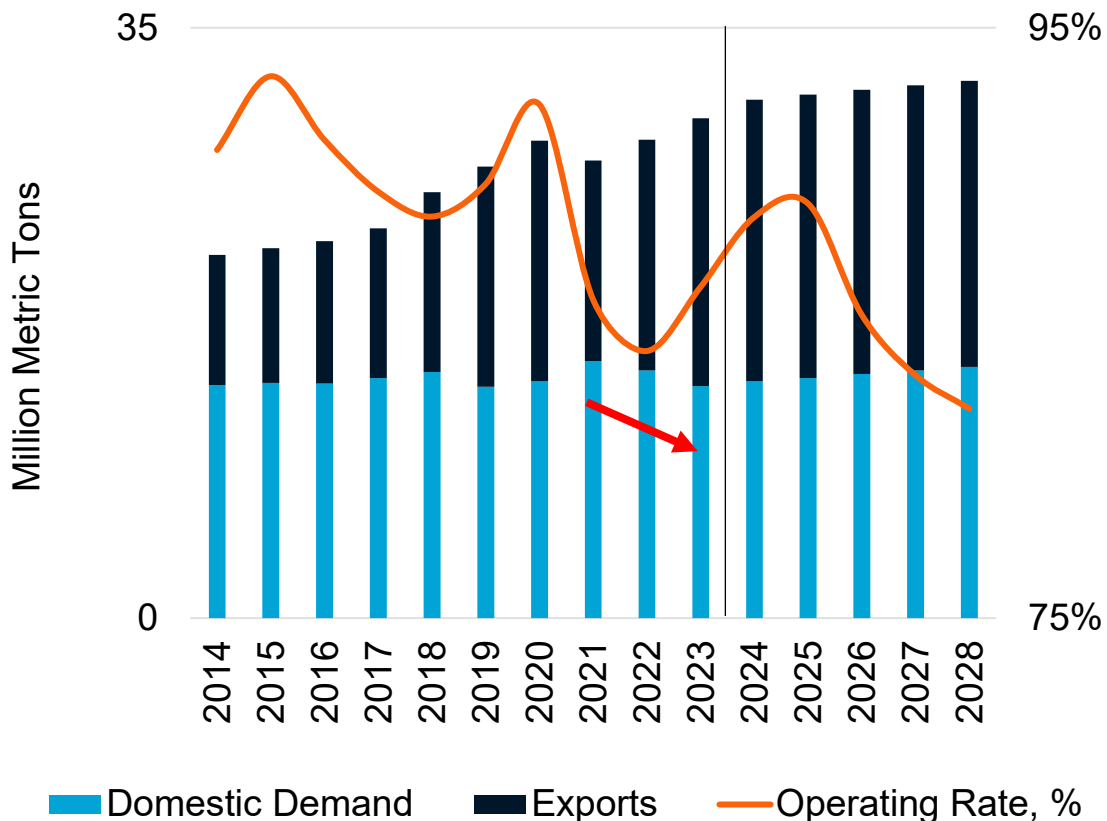
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# CANUSA demand remains modest

## Exports support growth

CANUSA Total PE Demand



- 2 yrs. negative domestic demand growth: CY23 demand -7.0% & CY 22 = -3.8%..... Fcst. + 3.2% CY24
- 2023 domestic demand below 2014 level
- Demand trimmed by recycle, downgauging, anti-plastic movement, weak economy
- Exports drive total demand growth based on cost advantage and new production capacity.
- Op rates fcst at 89% in CY 24 and 25
- Exports approximately 50% of production
- Exports to China exceed 30% of total exports

CAGR	Domestic Demand	Exports	Total Demand
2018-2023	-1.2%	8.3%	3.3%
2023-2028	1.6%	1.3%	1.1%

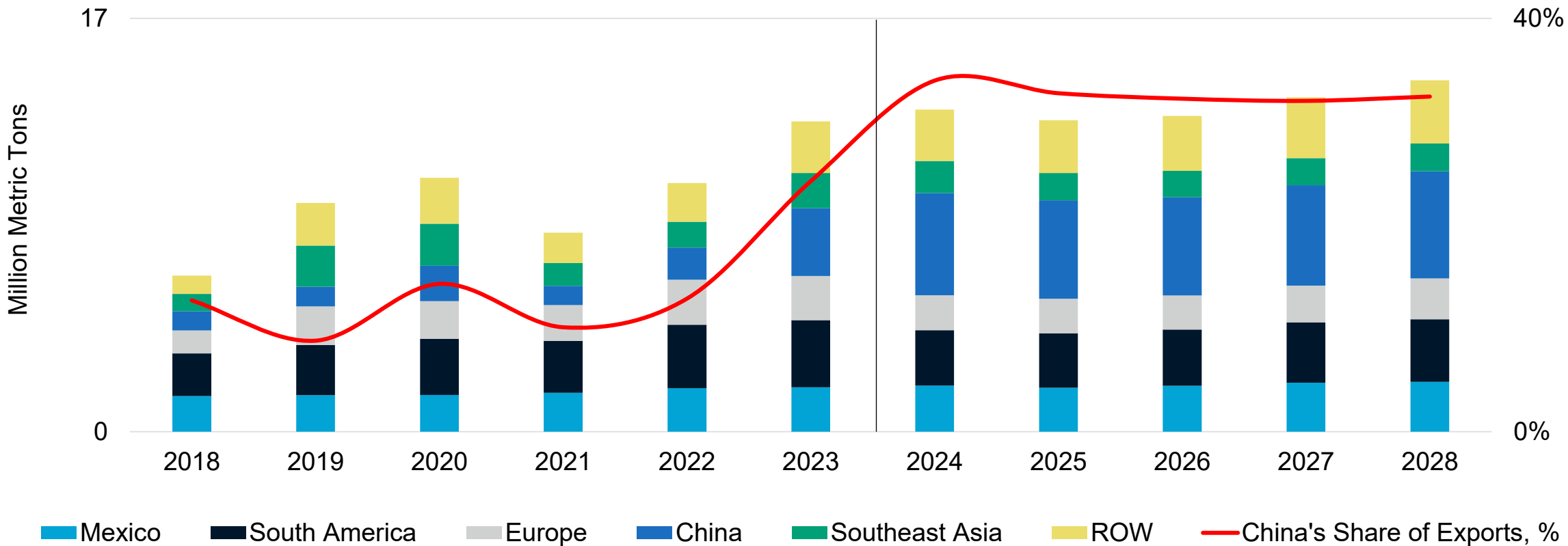
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# CANUSA PE exports: Volume builds as exports to China and ROW recover

## CANUSA PE Exports



Note: Excludes trade between USA and Canada  
Source: Chemical Market Analytics by OPIS

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# Evolving sales mix skews to lower total margin

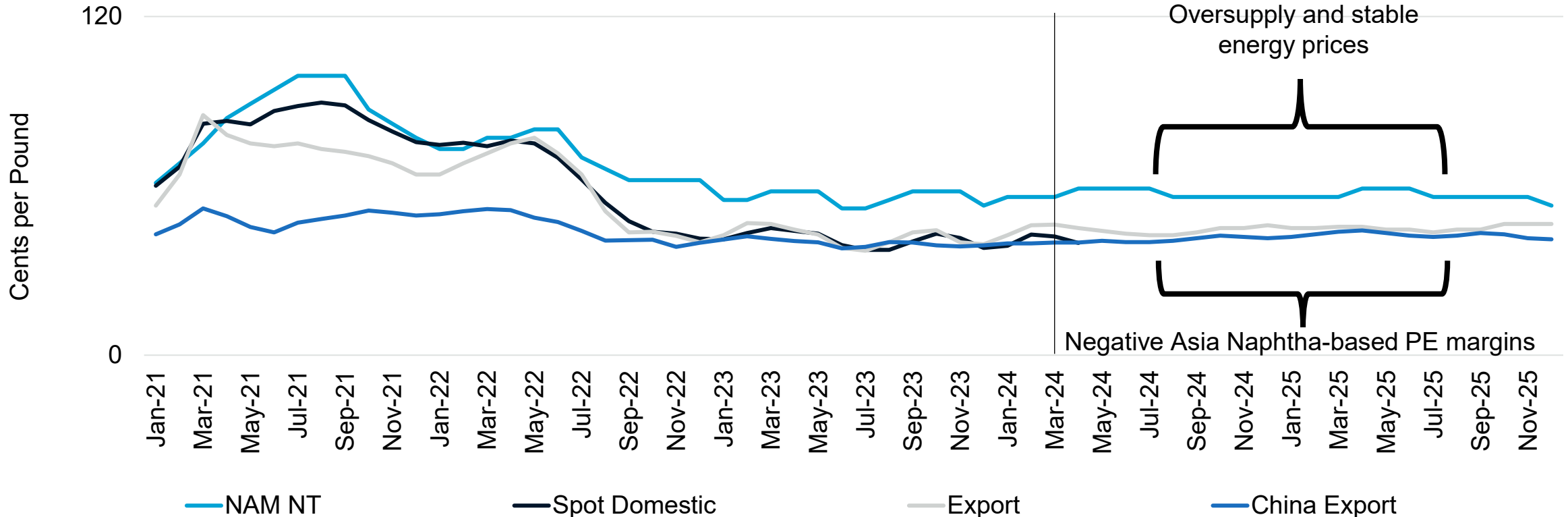
- Contract Sales volume
  - Domestic spot (resellers)
  - Producer direct spot
  - Export (non-China)
  - Export China
- 
- Overcapacity, domestic premium competition, increased direct spot, increased exports and increased exports to China = margin pressure.... and test producer discipline.



# Rangebound price outlook

Price differential compressed....

## LLDPE Butene Prices



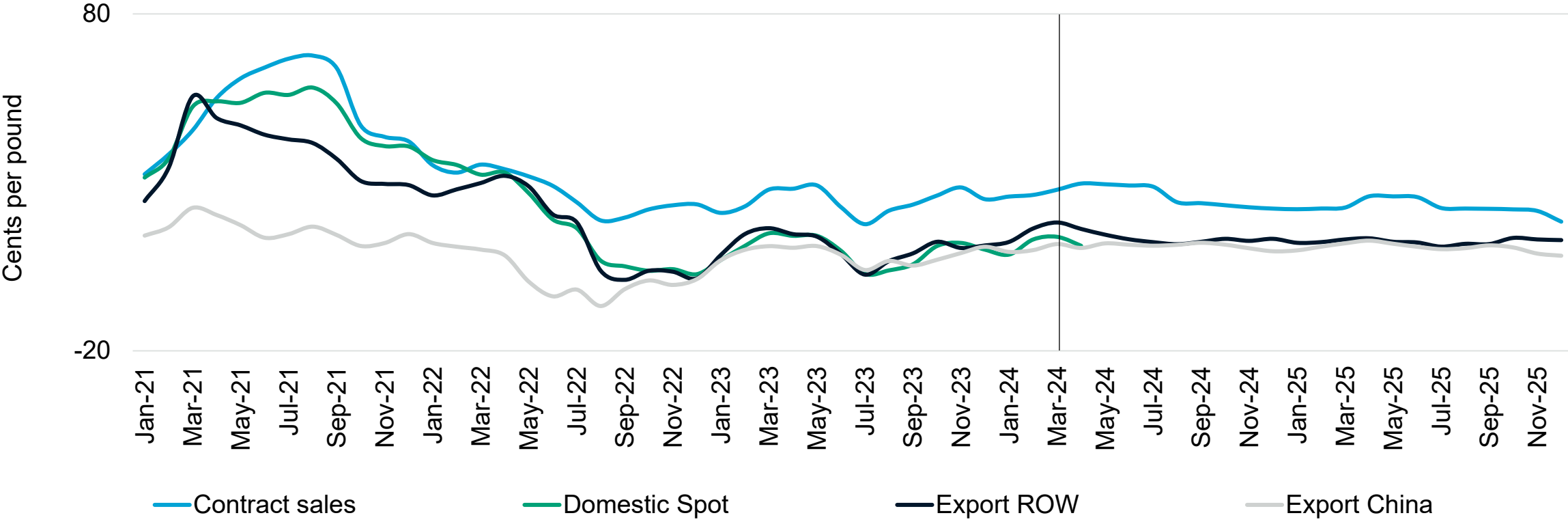
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2024 – 25 ....Domestic premium avg 14.5 cpp

# NAM LLDPE integrated margins by sale type

NAM LLDPE integrated margins by sale types



Source: Chemical Market Analytics by OPIS

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# Something's got to give. . . Who cuts, closes or delays?

## Cut, close, or delay

- Non-integrated to monomer producer
- Not integrated to refinery
- CTO-based supplier(s) not integrated to coal mine vulnerable to highly volatile spot coal prices
- Small or old capacity requiring significant Capex for maintenance
- High Carbon producer selling into Europe – CBAM
- May elect to run at technical minimum rates....., Ex: some in Europe

## Run or run hard

- Ethane-based producers
- Naphtha-based production integrated to refinery
- Government supported (encouraged) facility
- High-cost lengthy process to close



# Two scenarios for expedited recovery

## Medium Case

- Global plant startup delays (~3500 kta)
- WEP expected shutdown (~800 kta)
- Inefficient/Old units (~2050 kta)

Total Amount = ~6.35 MMT

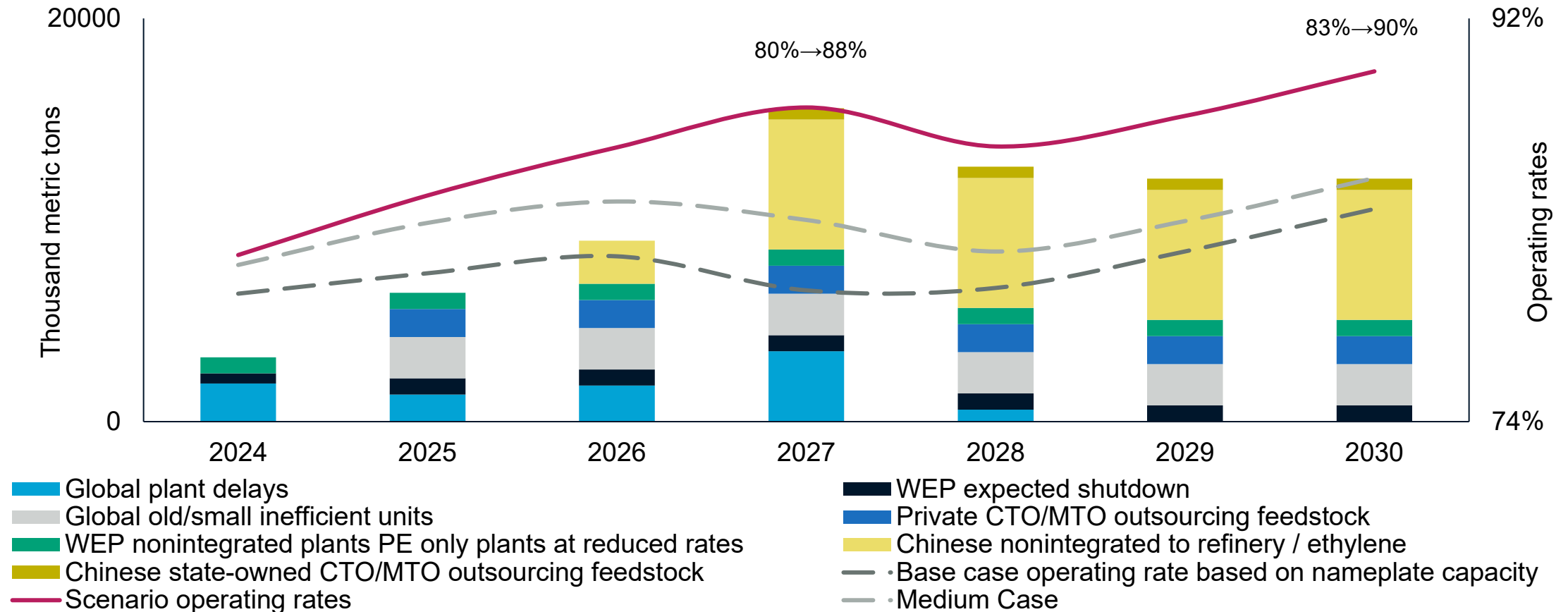
## High Case

- Global plant startup delays (~3500 kta)
- WEP expected shutdown of (~800 kta)
- Inefficient/Old units (~2050 kta)
- Private CTO/MTO outsourcing coal/methanol (~1400 kta)
- Private Chinese plants nonintegrated to refinery/cracker (~6450 kta)
- Chinese state-owned nonintegrated CTO/MTO (~560 kta)
- WEP nonintegrated units without other derivatives operating at technical minimum (800 kta)

Total Amount = 6.35 MMT + 9.2 MMT = ~15.5 MMT

# What's required to achieve healthy operating rates?

## High Case: For 90% Rates in 2030 cut 15.5 MMT by 2027

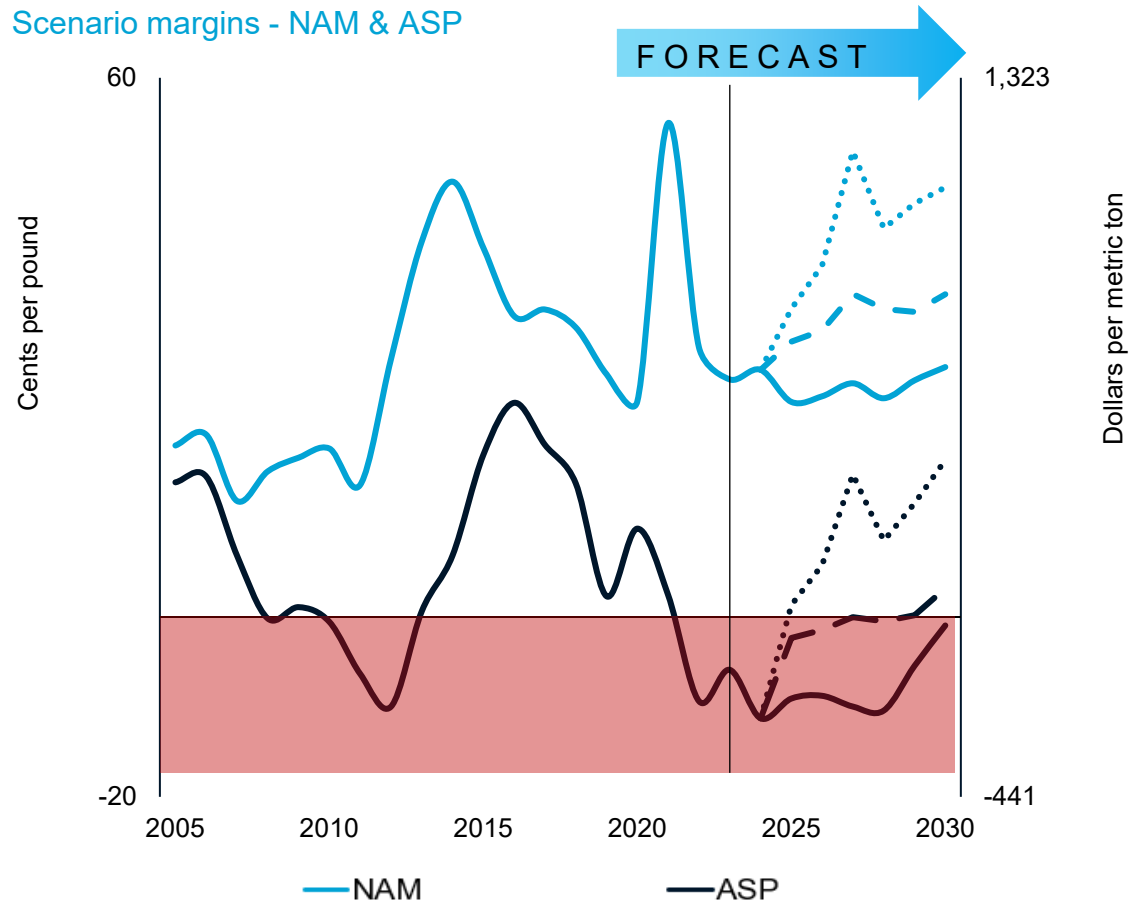


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# Base Case vs Scenario Margin Forecast

Scenario margins - NAM & ASP



Source: Chemical Market Analytics by OPIS

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## Scenario Methodology

- 2015 – 2020 global op rates were 87 – 88%
- Asia Margin averaged \$330/t 2015 – 2020
- Targeted ramping to \$350/t by 2027 based on 2015 – 2020 result
- Assumed 40% of incremental high case margin gain for medium case.... resulting in breakeven margin by 2027
- +\$570/t over base case for high scenario case
- + 220/ ton over base case for medium scenario case



# Polyethylene Key Takeaways



Reach out to us for  
questions or slides



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