

Geopolitical Shocks:

Decoding the impact
of war on the
petrochemical supply
chain

August 2026





Survive, Adapt, Win: Emergency race to reinvention

1. “Shock” Middle east conflict and impact
2. “Realignment” market landscape for petrochemicals
3. “Choice” strategic implications and resilience strategies



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Shock:

Middle East conflict and impact





External landscape characterized by geopolitics, resulting in continuing supply chain uncertainties and pricing volatilities



Macro economics

Economic headwinds persist due to geopolitics



Petrochemical industry

Vulnerability of the supply chain

Geopolitics

- Geopolitics dominated by the ongoing **US/Israel-Iran**, conflict and the weaponization of the strait of Hormuz.
- Houthi forces have blockaded Saudi oil vessels in the Red Sea since late July.
- **80-90%** of what transits Hormuz is headed to Asia

Energy landscape outcomes

- **~ 20 million barrels/day of oil products** transit Hormuz – approximately 25% of all global seaborne oil trade and 20% of world oil consumption
- **Bypass capacity** covers barely a quarter of the flow. ~3.5-5.5 million barrels/day of pipeline capacity availability for rerouting
- **LNG has zero workaround** –most exposed

Supply chain impacts

- Impact on Asia's refineries partially cushioned by "strategic oil inventories" in key markets covering 3-6 months.
- 60-70% of Asian naphtha transits the Strait of Hormuz.
- Feedstock shortages halt chemical production at multiple sites across the region

Petrochemical landscape

- Capacity rebalancing resulting in over 10 million tons of ethylene capacity closures across Europe and Asia.
- China's chemicals investment landscape remains strong, despite ongoing oversupply, with a renewed focus on coal conversion.



Conflict-related infrastructure damage is creating opportunities for asset restoration and resilience investments – over 80 assets damaged

Iraq

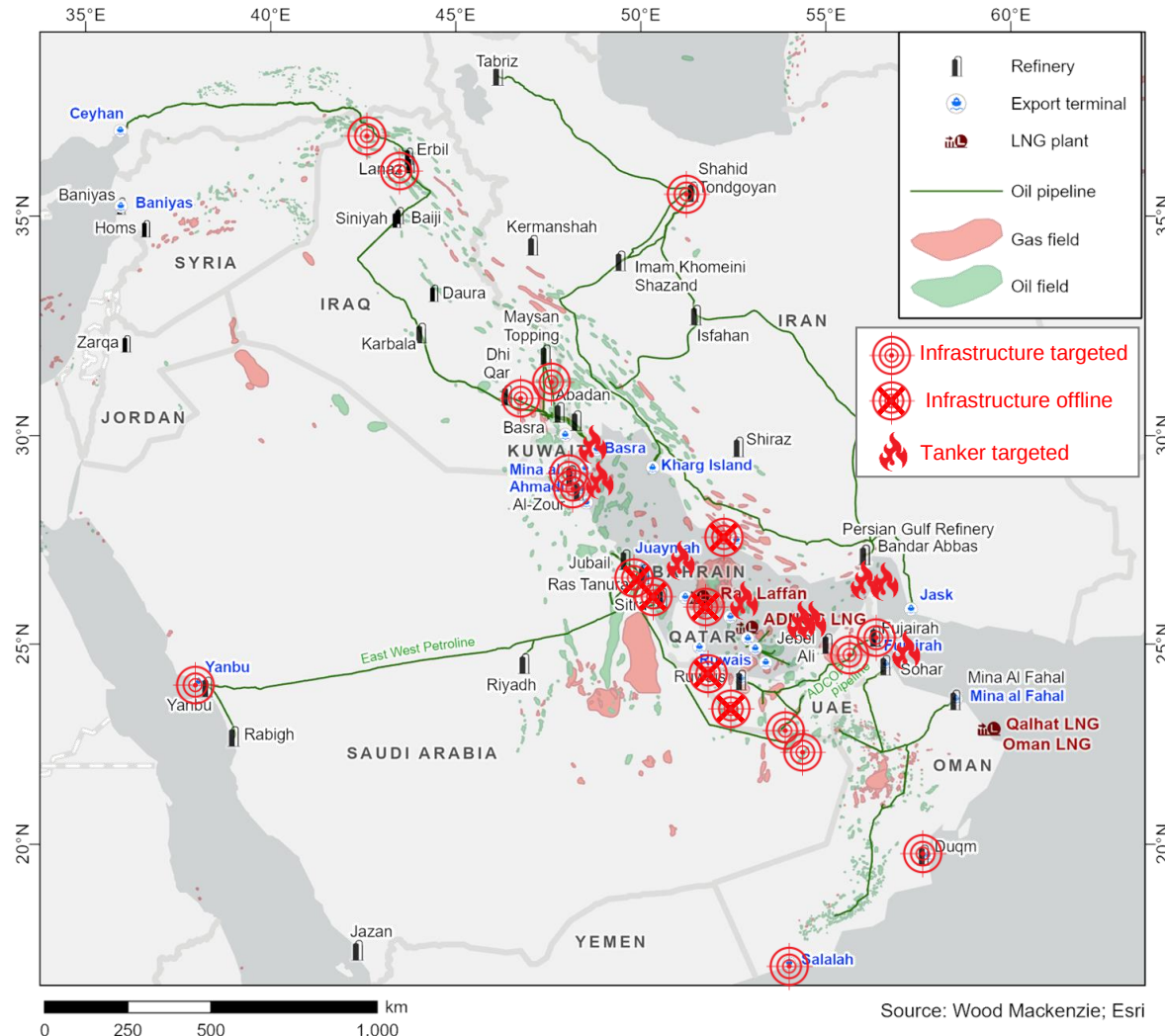
- 3.5 million b/d of southern exports fully dependent on Hormuz
- Limited storage capacity
- ~3 million b/d already offline

Bahrain

- Bapco Energies declared force majeure following attacks on the Sitra refinery

Saudi Arabia

- The East-West pipeline (~7 million b/d) provides a key bypass route to the Red Sea
- Oil loadings at Yanbu for last week of March reached to ~4.9 million b/d – a record level.
- >2 million b/d has been cut, mostly from offshore fields



Iran

- Production and export levels remain steady until US blockade
- Attack on South Pars onshore facilities forced partial shut ins

Kuwait

- Exports fully rely on Hormuz.
- KPC called force majeure and KOC accelerates output curtailments with >1 million b/d offline.

Qatar

- QE declared force majeure on LNG, downstream operations

United Arab Emirates

- Fujairah exports (up to 1.8 million b/d) disrupted after repeated attacks, but is now back online
- >1 million b/d of offshore production is offline
- Shah, Bab, Habshan operations disrupted



Asia is most exposed to crude oil and feedstock shock from the Middle East

Asia is highly dependent on Middle Eastern supplies - particularly crude oil, LPG, naphtha and methanol - while natural gas sourcing is relatively more diversified across regions

Middle East Share of Imports by Country (%) 2025	Crude	LPG	Naphtha	Natural Gas	Methanol
China	55%	42%	44%	30%	72%
South Korea	69%	8%	62%	16%	61%
Japan	91%	5%	76%	7%	58%
India	46%	97%	40%	61%	48%
Philippines	94%	75%	79%	18%	63%
Vietnam	82%	72%	81%	12%	66%
Thailand	60%	84%	98%	23%	69%
Indonesia	20%	35%	73%	16%	54%
Taiwan	56%	10%	44%	34%	37%

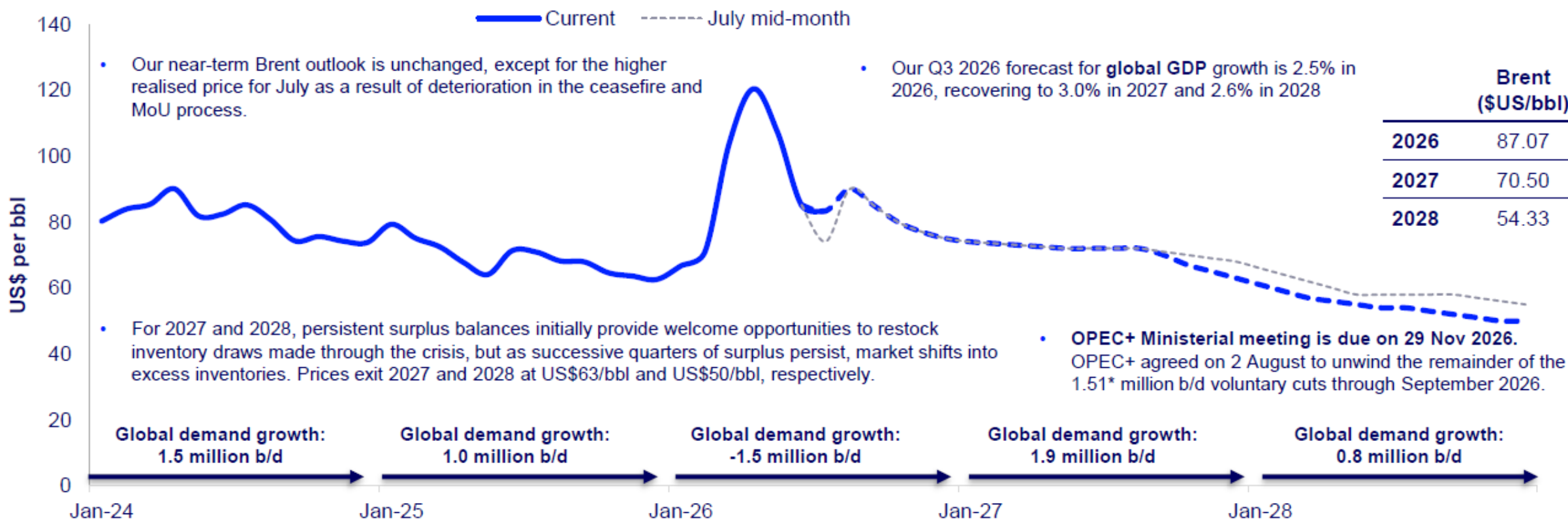
- **China - diversified feedstock strategy:** balanced import approach across key feedstocks, with Middle East share limited to 55% crude, 42% LPG and 44% naphtha through deliberate sourcing from Russia, Africa and the Americas. This positions China's petrochemical sector with greater resilience to ME supply disruptions.
- **NEA ex-China - infrastructure lock-in:** Japan (91% crude), South Korea, and Taiwan face technical dependency on ME crude and naphtha with integrated complexes calibrated for Middle Eastern grades, thus limiting their ability to rapidly switch sourcing during supply disruptions.
- **Southeast Asia - multi-commodity concentration:** exhibits the highest systemic risk, averaging >70% ME dependency across crude, LPG and naphtha. Limited supply diversification leaves minimal flexibility during ME supply disruptions.
- **India - residential fuel vulnerability:** near-total LPG dependency (97%) on GCC creates acute household energy risk. While crude sourcing is diversified (46% ME share), LPG and natural gas remain highly concentrated, tying domestic stability to ME supply.



Brent outlook: Transient strength from el-Mandeb re-routings

Longer voyages via Suez result in a gap in arrivals for Asian refineries. 2028 price outlook continues to weaken as balances appear increasingly long beyond what is required to restock from the SoH disruption.

Brent price outlook (nominal)



Realignment: Market landscape for petrochemicals

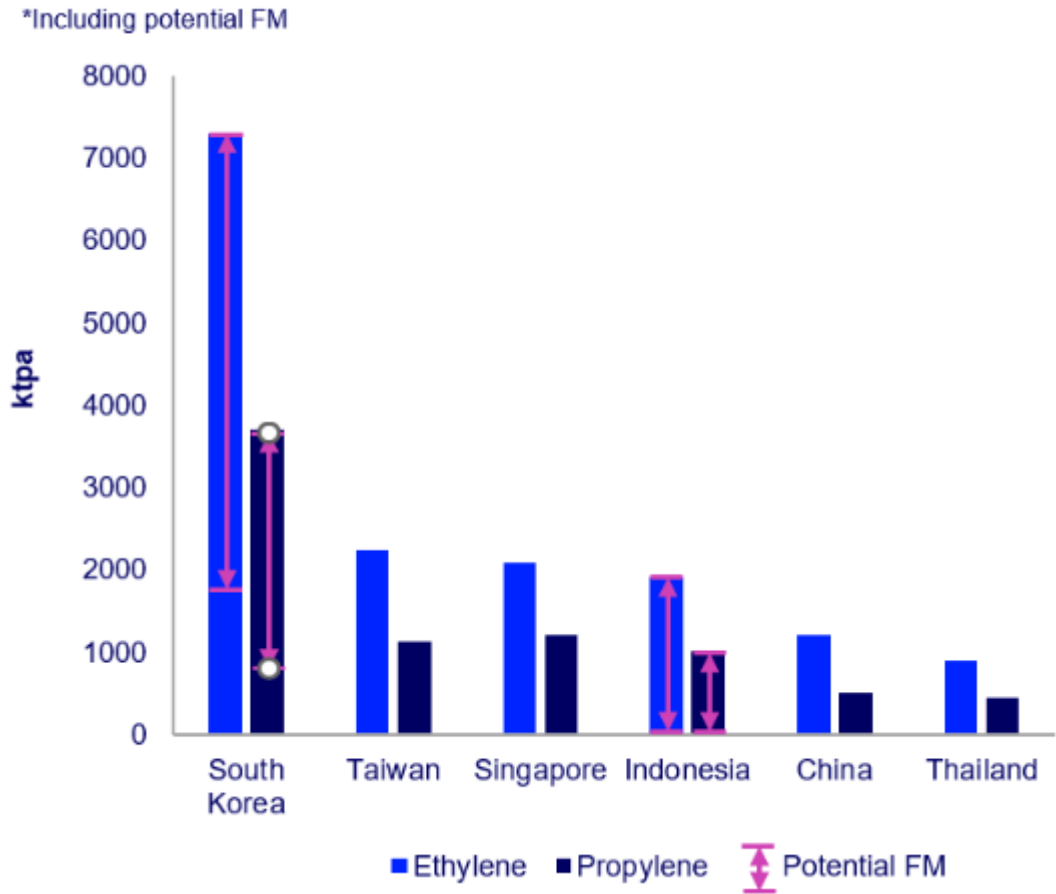




Feedstock limitations results in extensive Asian olefins capacity making force majeure

declarations with more planned

Asia olefin capacity under force majeure by country



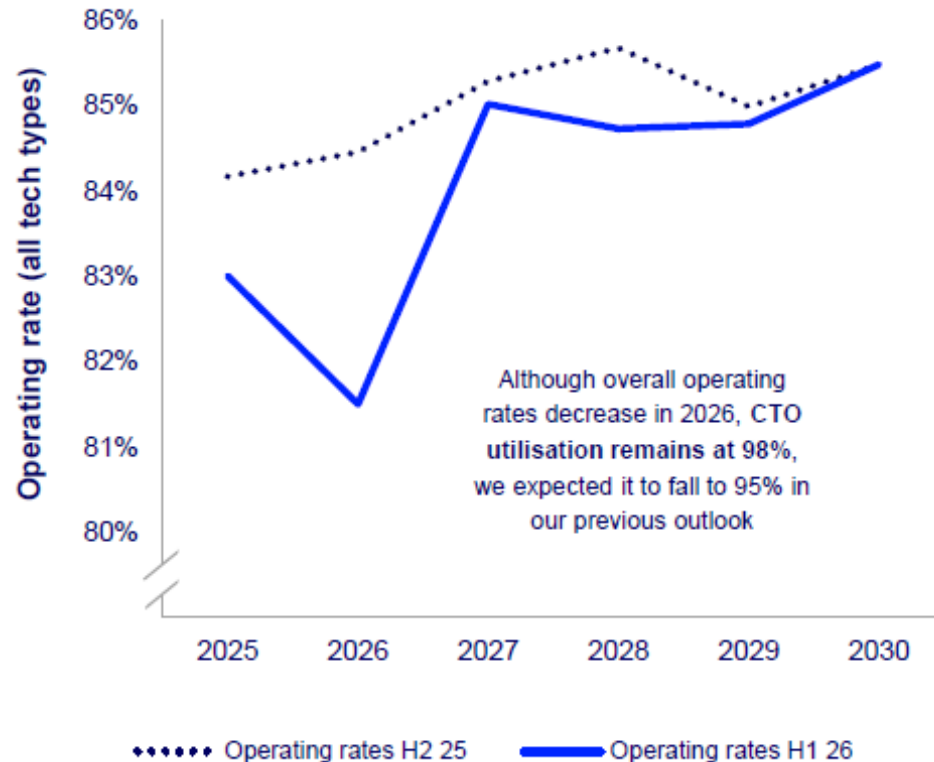
Operator	Country	Ethylene capacity (ktpa)	Propylene capacity (ktpa)	FM declaration date
Aster Chemicals and Energy	Singapore	1,000	560	06-Mar
Formosa Petrochemical	Taiwan	2,235	1,118	09-Mar
Petrochemical Corporation of Singapore	Singapore	1,090	636	05-Mar
PT Chandra Asri Petrochemical Tbk	Indonesia	900	490	02-Mar
Rayong Olefins	Thailand	900	450	06-Mar
Yeochn NCC Co.,Ltd (YNCC)	South Korea	1,775	900	04-Mar
CNOOC and Shell Petrochemicals Line 2	China	1,200	500	09-Mar
Lotte Chemical Corporation	South Korea	2,300	1,155	Potential FM
LG Chem	South Korea	3,220	1,635	Potential FM
Lotte Chemical Indonesia	Indonesia	1,000	520	Potential FM



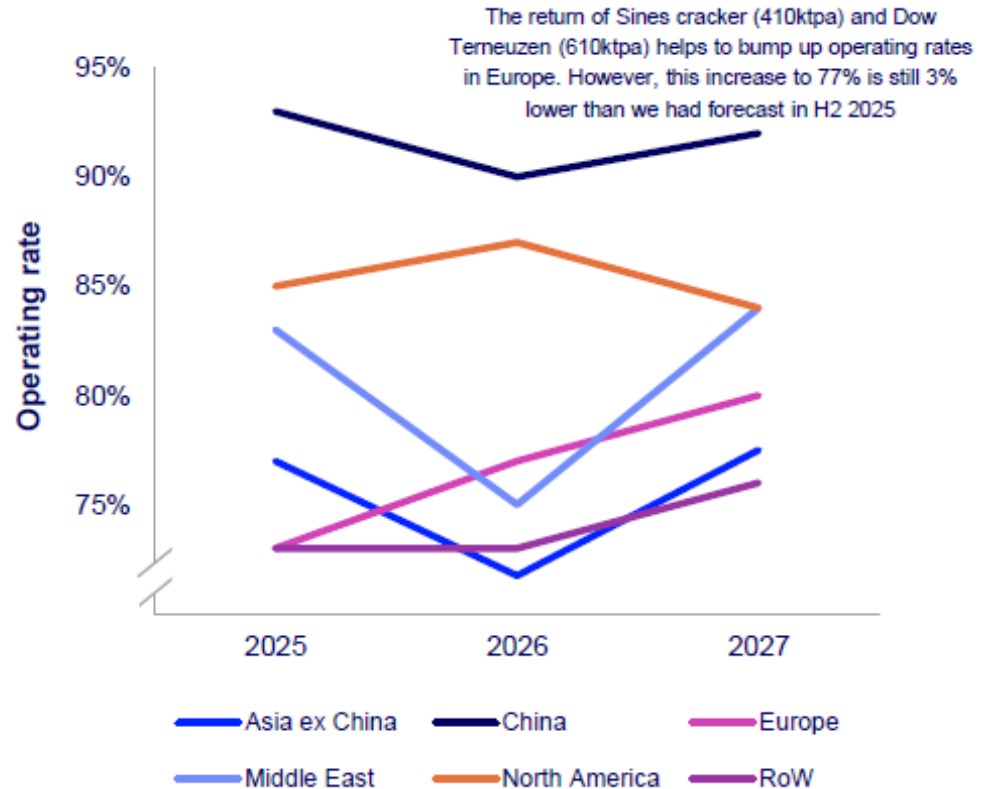
Weathering the impact: reduction in ethylene operating rates is region specific

Current downturn in chemicals, means there is spare capacity that is now being utilized.

Global ethylene operating rates



Ethylene operating rates by region

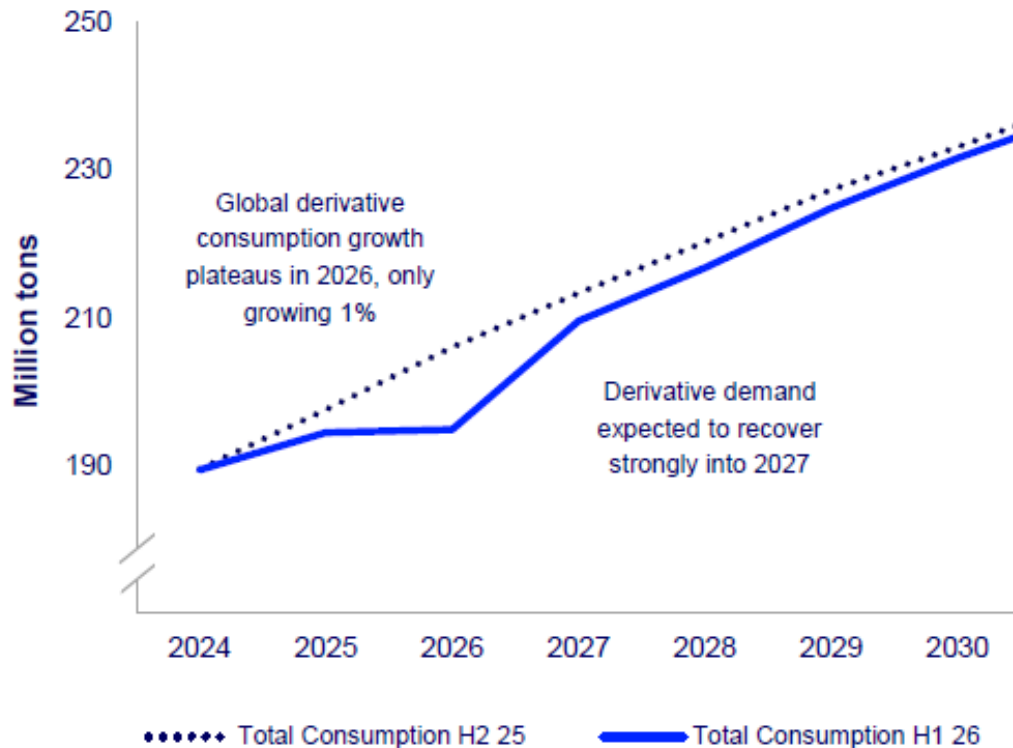




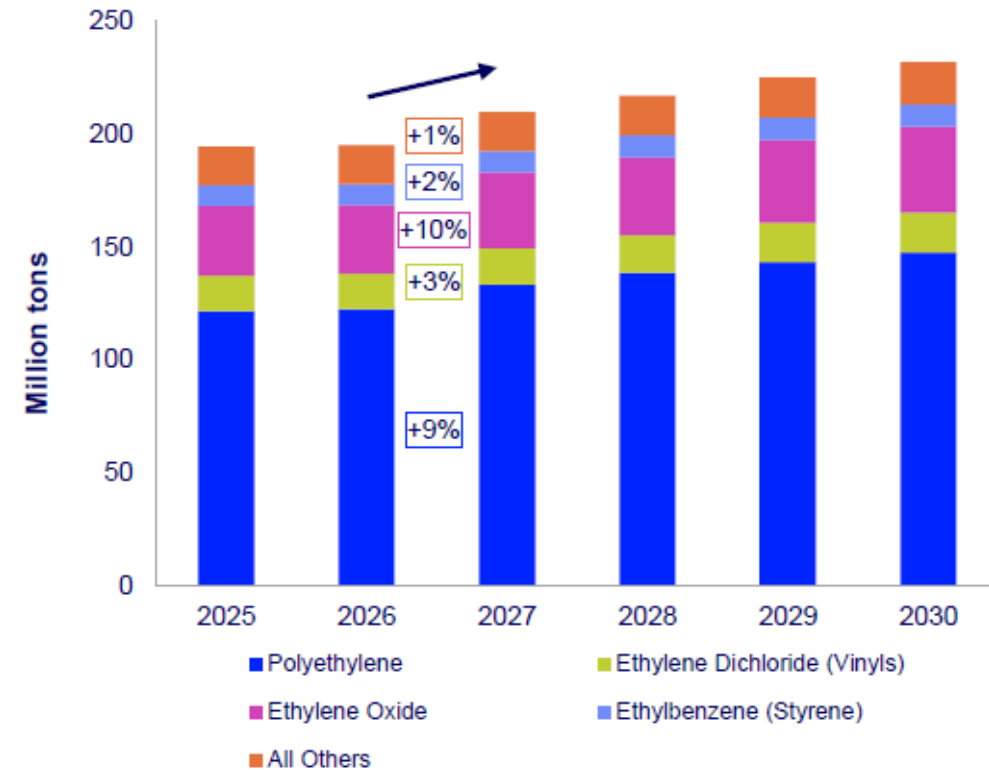
Ethylene consumption for 2026 down 5.4% from our previous forecast

This translates to 11 million tonnes of ethylene consumption, with polyethylene the most affected - down over 7 million tonnes

Global ethylene consumption H1 26 vs H2 25



Global ethylene consumption recovery

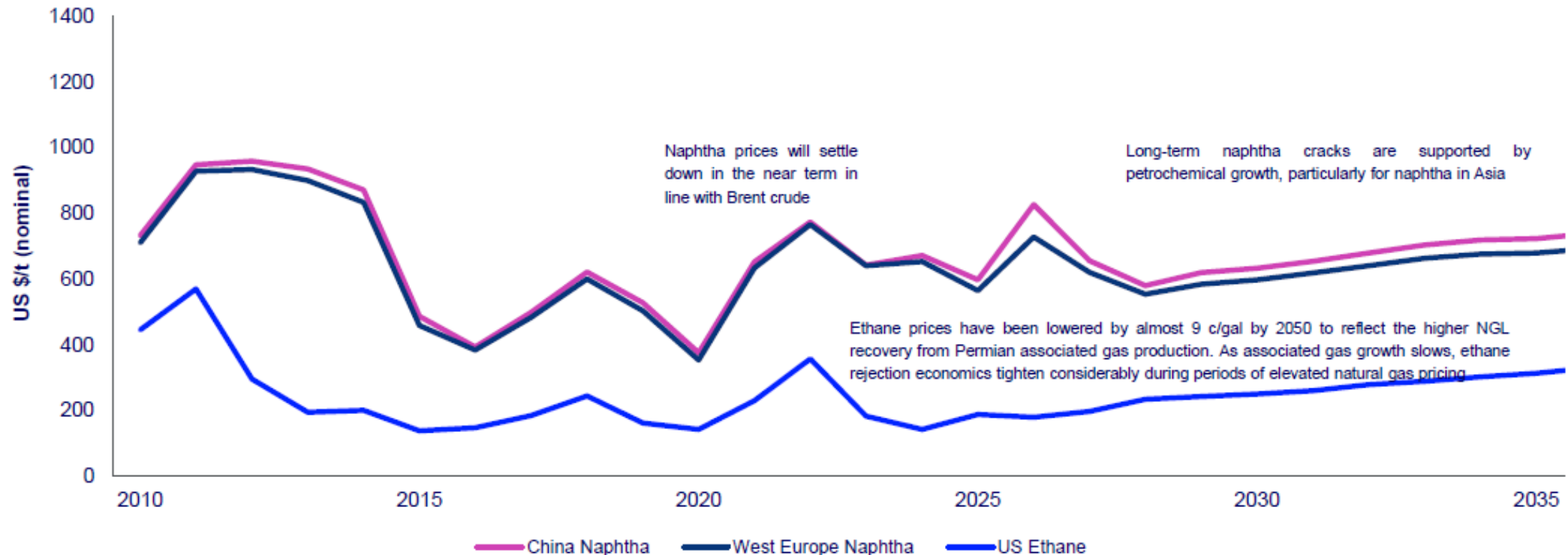




Ethylene feedstocks price trends show a long-term widening of the ethane advantage (post Middle East conflict)

China naphtha prices surge 164% year-on-year, reaching nearly US\$1,000 per tonne in 2026, whilst West European naphtha climbs 150% to US\$850 per tonne. We forecast feedstock prices to ease through 2027, returning to 2025 levels by 2028

Regional ethylene feedstock prices

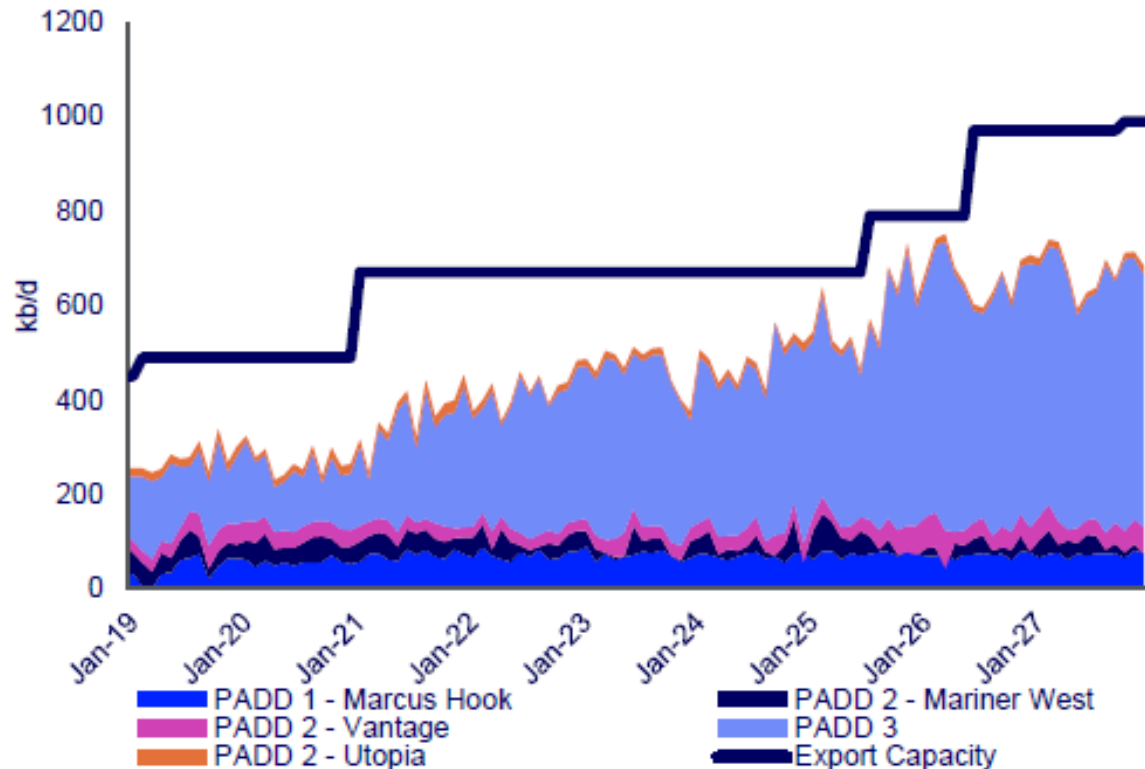




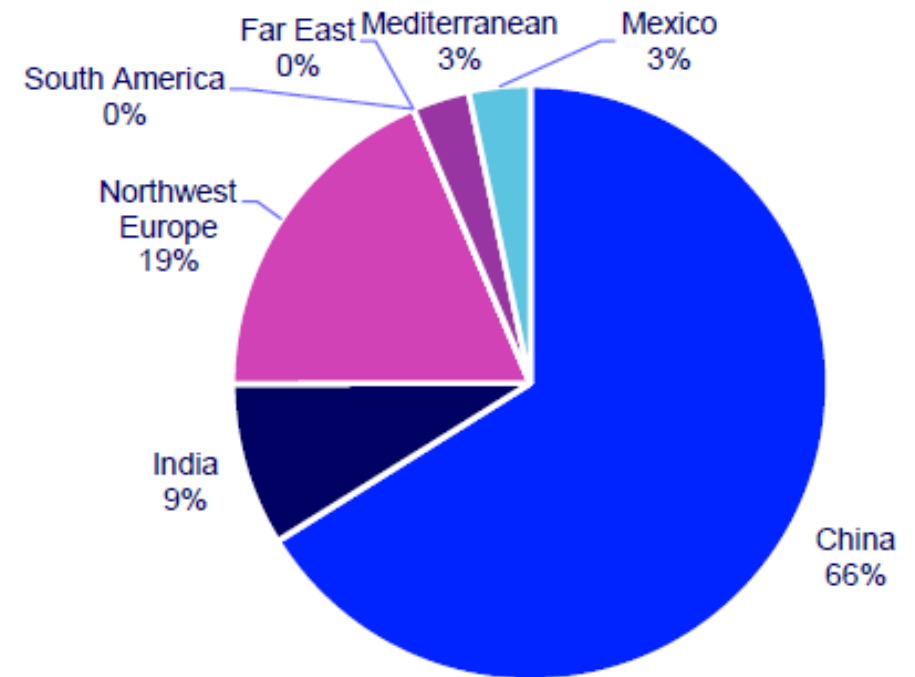
U.S. ethane exports expected to rise to 667 kbd in 2026 and to 680 kbd in 2027

With Asia especially China keeps increasing ethane usage in the cracker to improve competitiveness, US's ethane export to Asia is expected to rise further. However long-term competitiveness is a concern due to changing market dynamics

U.S. ethane export forecast



Ethane exports by destination 1H 2026

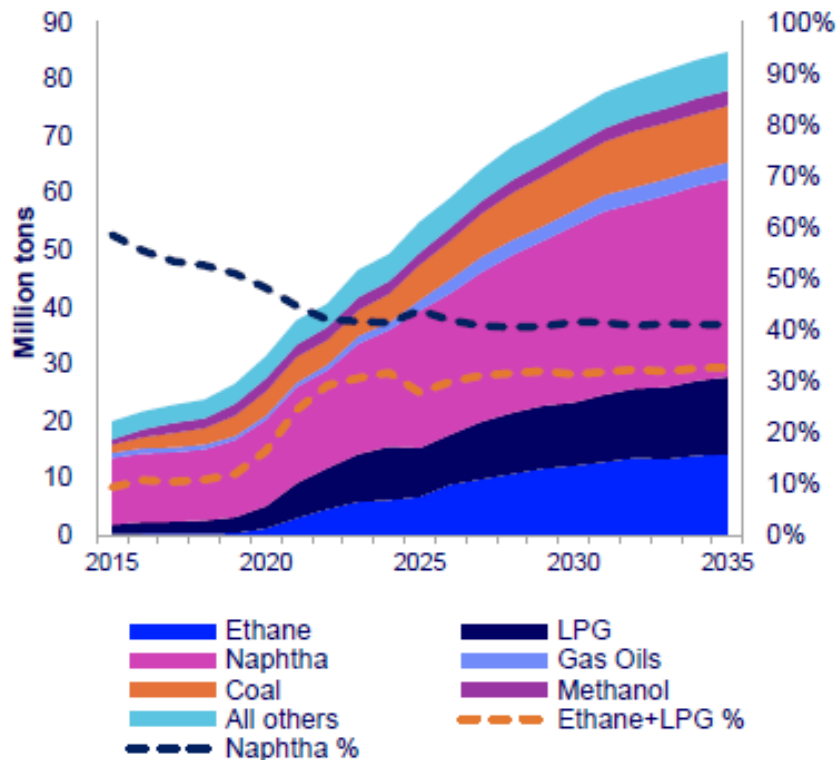




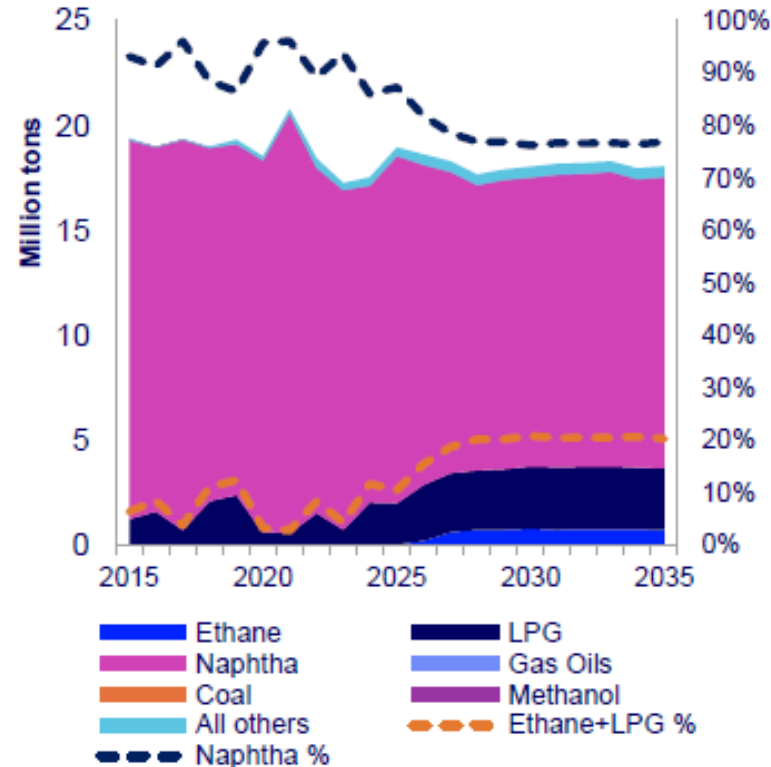
Ethylene feedstock mix in Asian countries varies with China most diversified

Asia's crackers are naphtha-dominated, but driven by economics and naphtha's reliance on the Middle East, more producers—especially in China—are considering adding more ethane to their feedstock mix

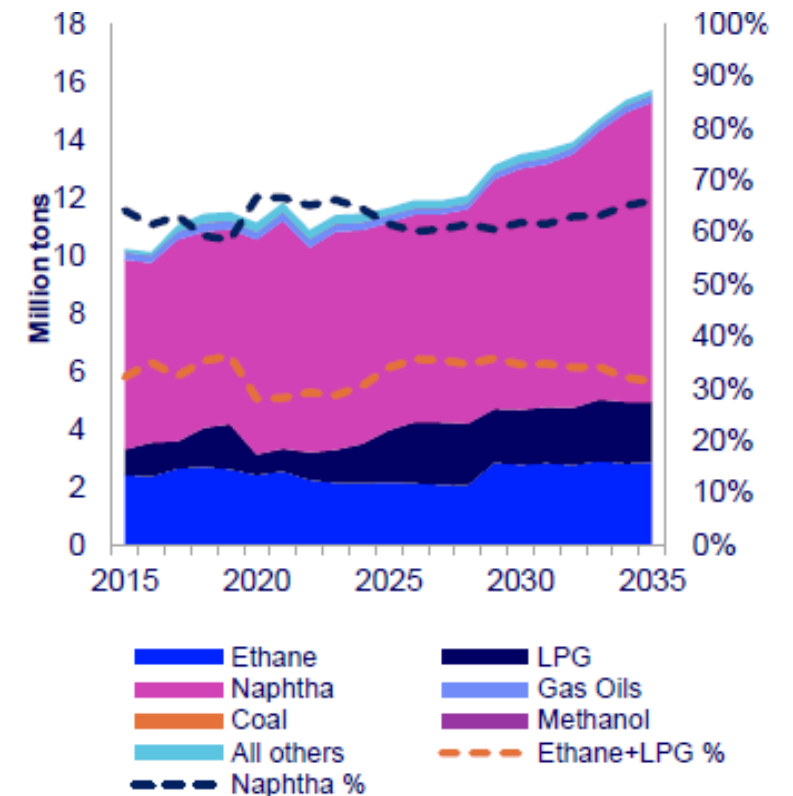
Feedstocks: China



Feedstocks: Northeast Asia (excl. China)



Feedstocks: Asia



Choice:

Strategic implications and resilience strategies





Strategic actions are readily identifiable, but challenging to implement.

Current restructuring activities are being accelerated to 1) mitigate against future supply chain shocks & 2) meet new investor requirements covering “resilience metrics”

Strategies to hedge supply chain risks in petrochemicals

	Feedstock “origin diversification”	• Multiple origins required – not multiple suppliers from the same origin. • Refining sector has more options longer-term (heavy oil etc.) but sourcing naphtha is more challenging
	Feedstock “Alternative carbon”	• Going lighter – cracking ethane: Feedstock flexibility is key across multiple sites. Surging ethane export demand will impact production competitiveness • Alternatives – coal/methanol is feasible in China and other selected markets; India, Indonesia etc.
	Portfolio rationalization	• Close / exit underperforming assets: Focus is on higher cost assets that are import dependent for feedstocks from the Middle East • Facilitated by joint ventures / production alliances. Examples in Korea and now Thailand.
	ESG Metrics	• Refocus on sustainability and low carbon options to reduce exposure to conventional oil-based markets. • Levers include: bio feedstocks, circular feedstocks, plastic recycling, green hydrogen etc.

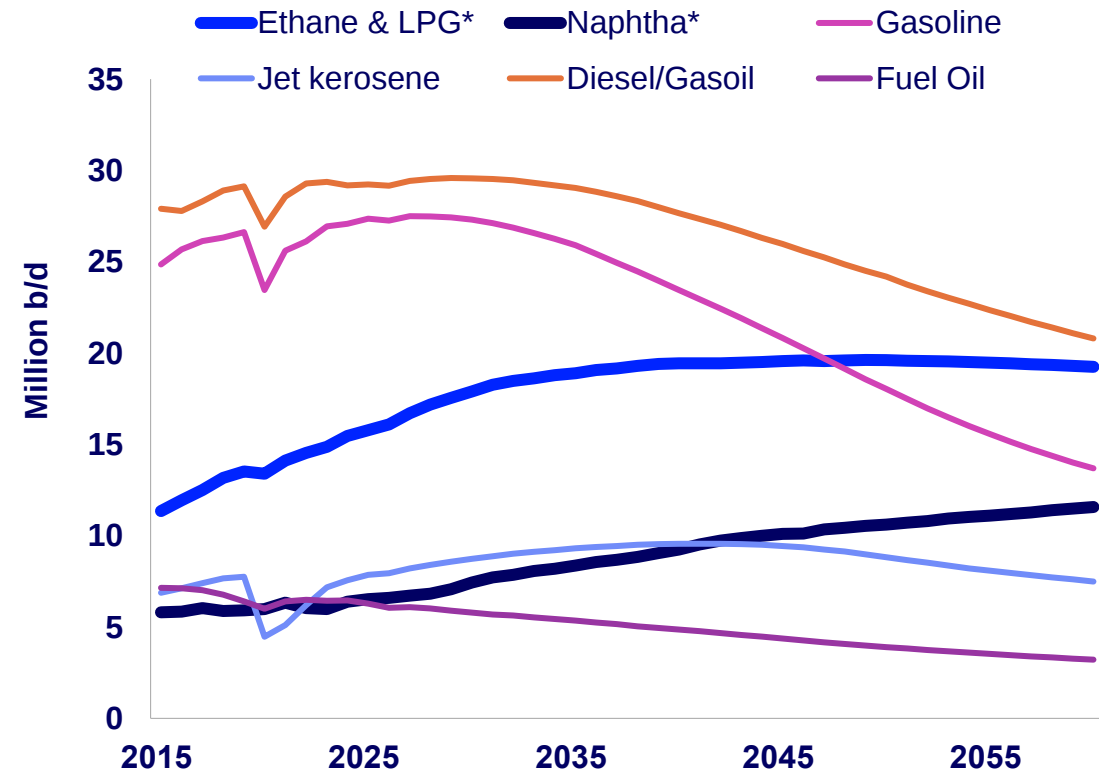


Strategies for success tied to feedstock diversification across different assets.

The pace of energy transition will play a major role in future petrochemical investments and industry competitiveness

	Ethane	Naphtha
Business model	- Imported ethane from the U.S. - Portfolio focus PE/MEG	- Refinery integration. - Portfolio focus diversified with C3, C4 & C5+ processing
Supply origin	Single origin of supply - 100% U.S.	Currently high exposure to the ME for oil/naphtha – set to subside overtime
Logistics	High cost – dedicated ethane carriers and storage required	Low cost – bulk liquids
Oil price & competitiveness	High oil preferred	Low oil preferred
Gas/LNG	High demand required to drive supply availability	N.A.

Global products demand, 2015-2060





EU PPWR & EPR : Will impact Asian producers and global polymer markets

Policy is live as of August 2026 and recycled content mandatory by January 2030

The Policy

PPWR (Packaging & Packaging Waste Regulation)

- All plastic packaging >70% recyclable by 2030
- 10-35% post-consumer waste recycled content by 2030
- Design-for-recycling compliance mandatory
- Applies to all imports into EU (no exceptions)

EPR (Extended Producer Responsibility)

- Producers pay fees based on recyclability grade
- Eco-modulation: Grade A gets 15-30% fee discount

Timeline

August 2026 (now)

- EPR registration mandatory
- Eco-modulation fee invoicing starts

January 2030y (cliff)

- Recycled contents mandates apply
- >70% recyclable only – market ban

2030-2035

- Recycled PE/PP supply deficit
- 40-60% margin premium opportunity

Impact on Asian Producers

Virgin PE/PP

- 15-25% demand decline by 2035

Recycled PE/PP

- Supply gap until 2032 – higher margin

Compliance costs (registration & auditing etc.)

- \$100k-500k per year per producer

Strategic options polymer producers

Option 1: Invest in recycling

- Build or acquire recycling capacity
- Attractive investment economics
- Margin premium 40-60%
- Time sensitive now-2032.

Option 2: Reduce EU / packaging exposure

- Remain Asia focused & reduce compliance costs
- Pivot to non packaging applications
- Risks associated with Asia compliance and global branding meeting sustainability targets

Option 3: Design –for-recycling

- Focused plastic production for Grade A recyclability.
- Competitive moat vs low-cost suppliers
- EPR fee savings 15-30%

Option 4: Hybrid

- Secure PCR partnerships + redesign for recyclability
- Risks hedged
- Scale recycling

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