Global LPG Trends & Outlook

CMT 13th LPG Trade Summit - 22-24 Oct, 2018 – Istanbul, Turkey

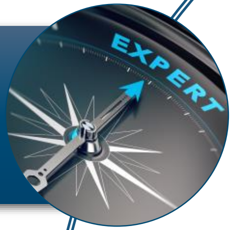
Agenda

- Global Market Overview & Short-term Outlook
- Propane & Butane Markets
- The Rising Importance of Petrochemicals
- Increasing Complexity & the Effect on Global LPG Pricing & Economics
- Shipping Outlook

NGLS profile

"Connecting high quality analytics with commercial decision making"

Commercial Advice



Market Insights

Retainer Agreements

Consulting

Multiclient Products

Training/Workshops

NGLS Expertise
LPG (Propane & Butane)
Ethane
Olefins and their feedstocks
Global petchem gases trade

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Global Market Overview & Short-term Outlook

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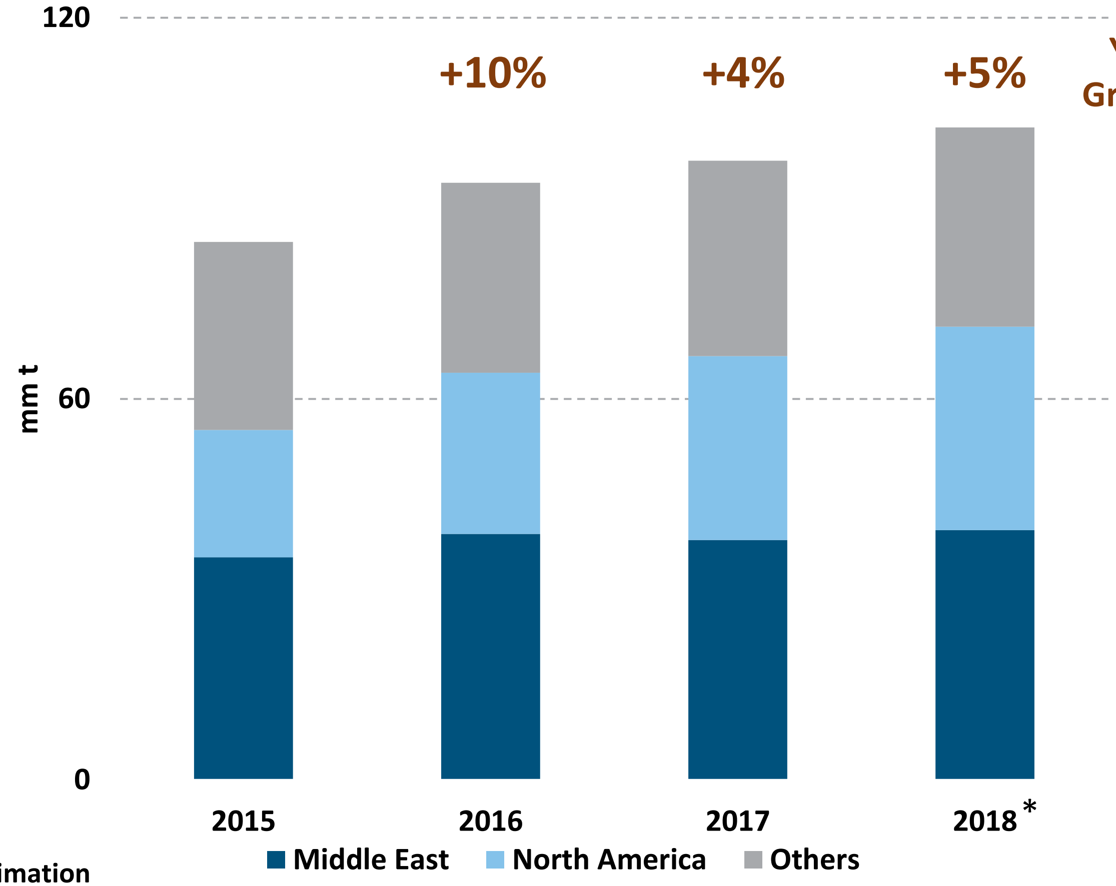
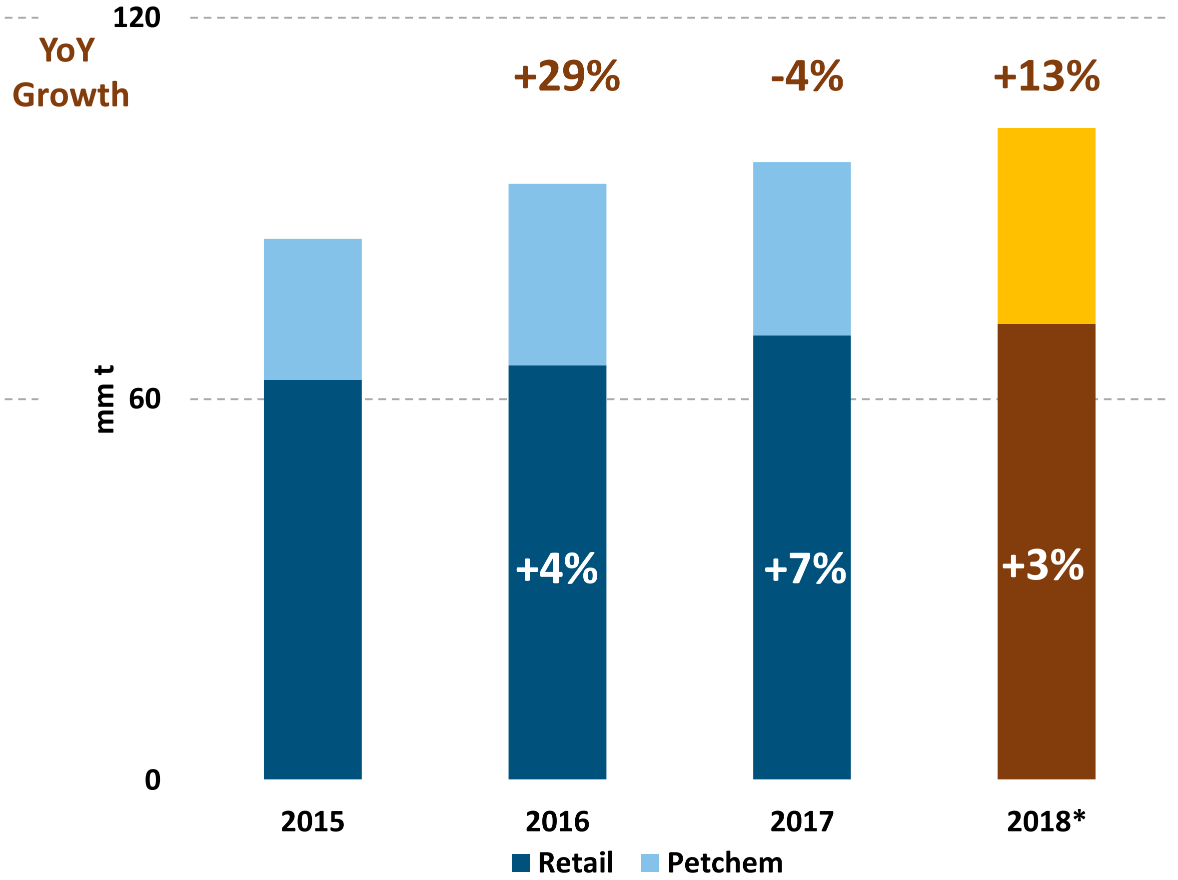
Slow export growth complicates demand balance

Global LPG export growth



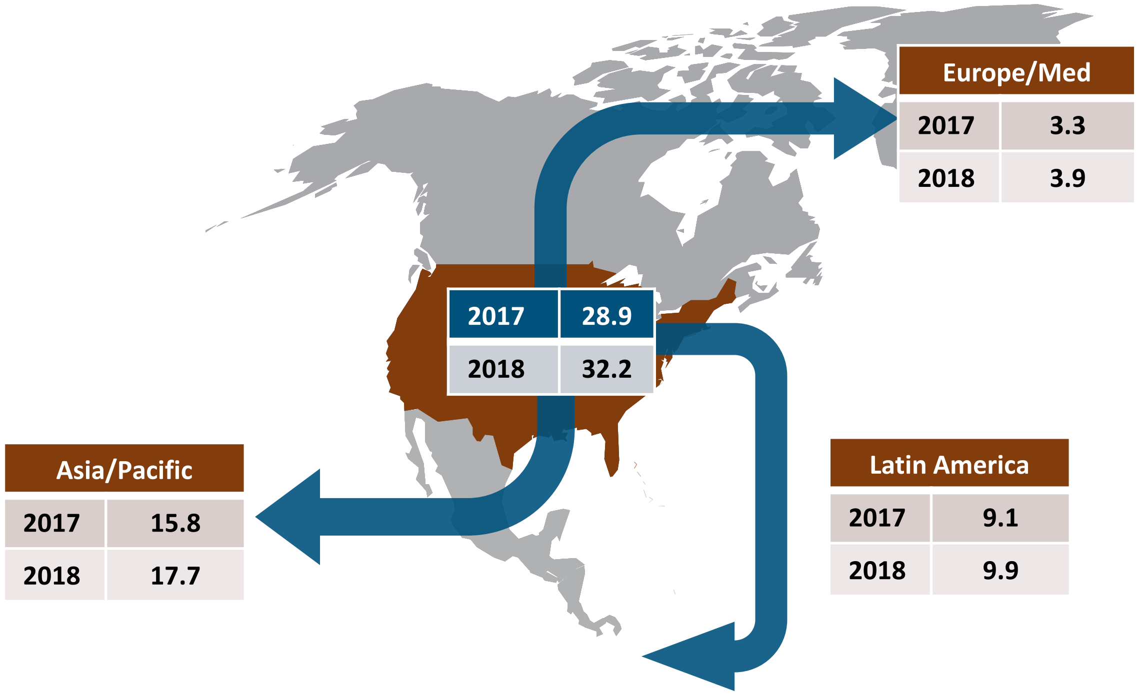
*Estimation

Global LPG import breakdown

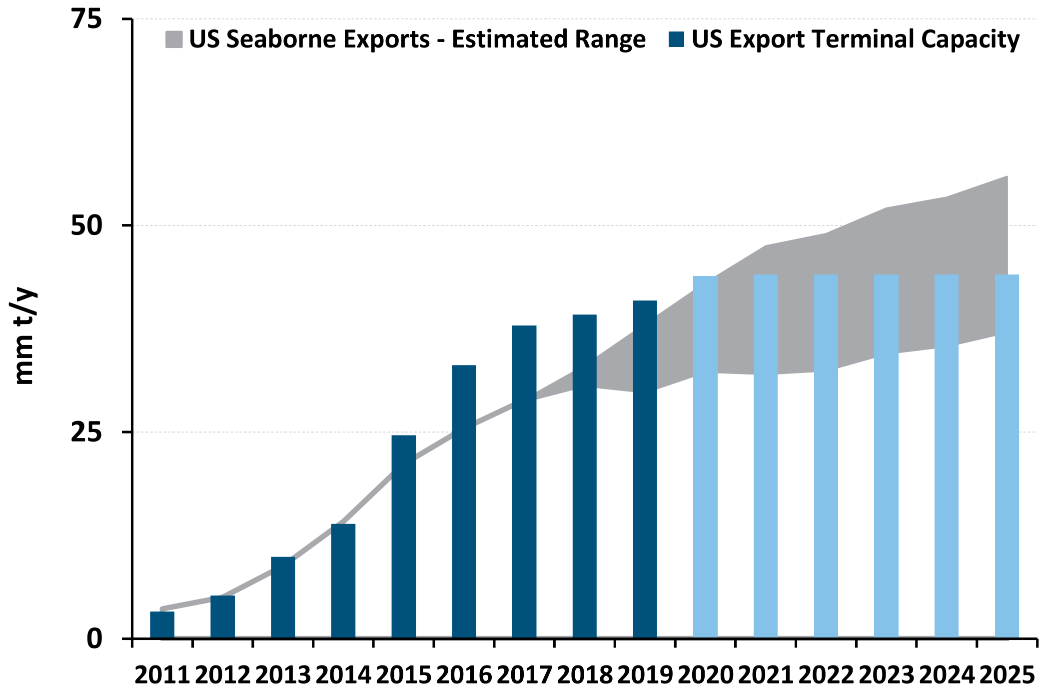


US supply defines global market dynamics

Single largest exporter – but are there limitations?



US LPG export range vs terminal capacity



ME2 delays → Fractionation capacity → Terminal capacity → Ethane dynamics → Oil/gas prices → TIGHTER MARKET NEAR TERM

What will be the driving forces in the near term?

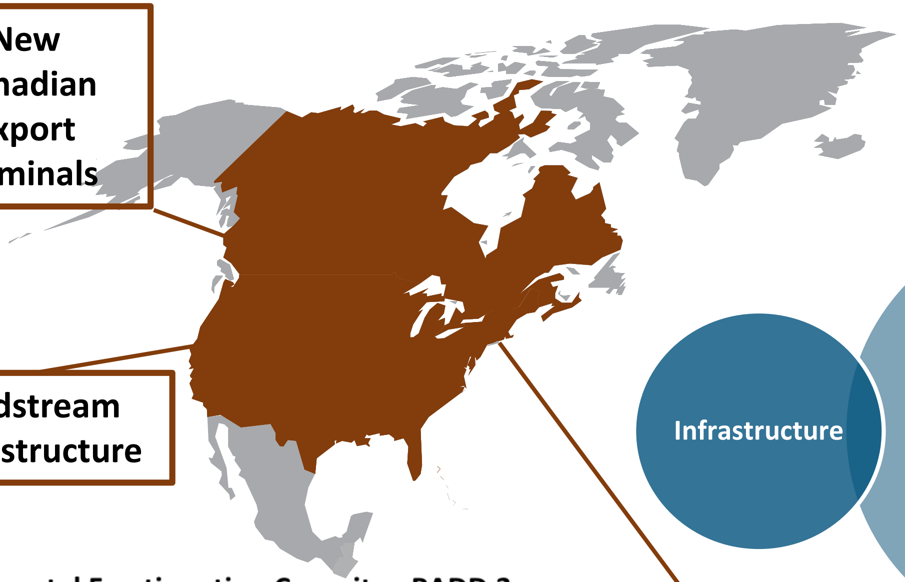
US still at the forefront…

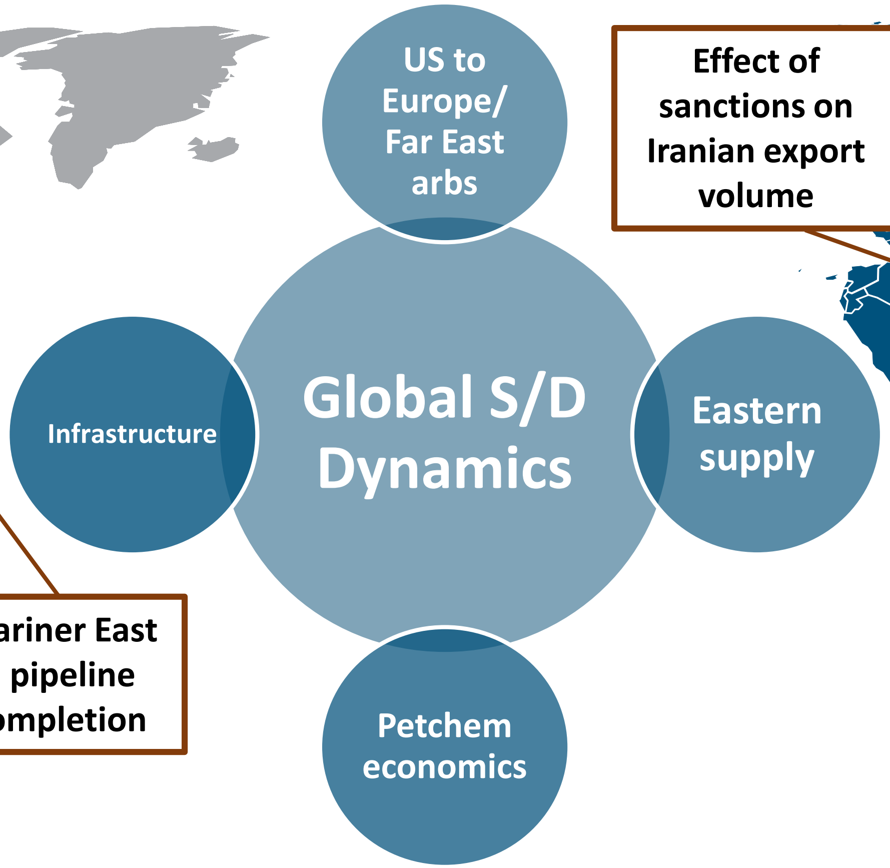
…with the East remaining the key outlet

New Canadian export terminals

Midstream infrastructure

Mariner East 2 pipeline completion





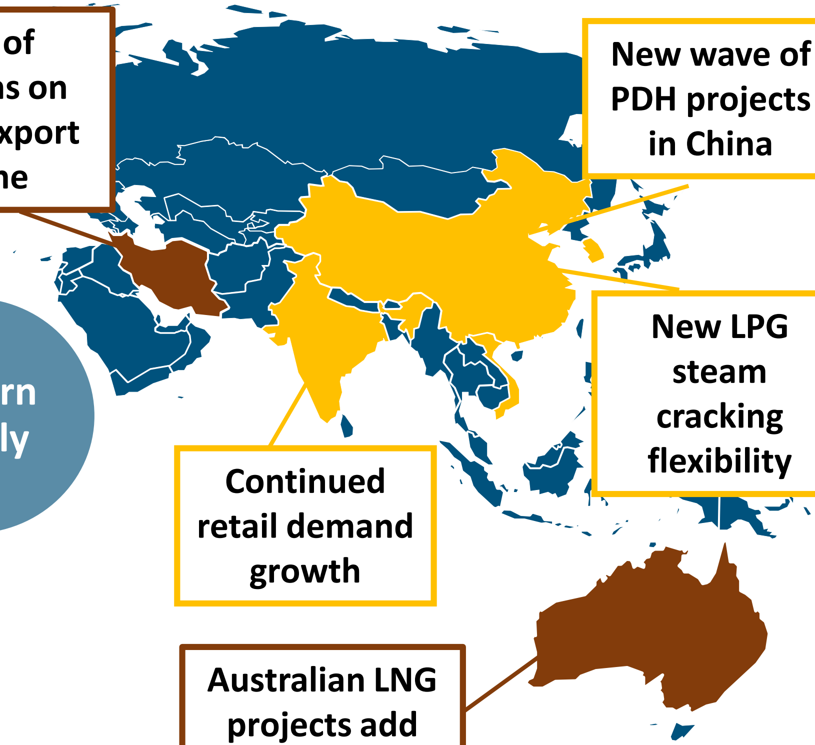
Effect of sanctions on Iranian export volume

New wave of PDH projects in China

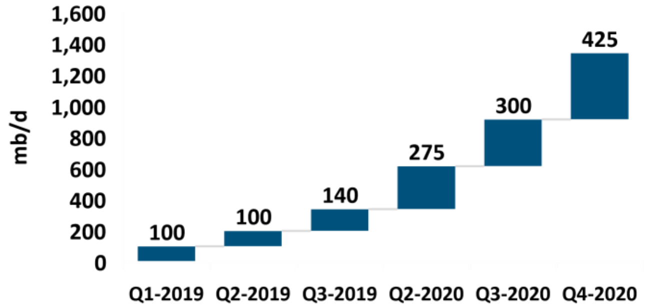
New LPG steam cracking flexibility

Continued retail demand growth

Australian LNG projects add LPG export volumes



Incremental Fractionation Capacity - PADD 3

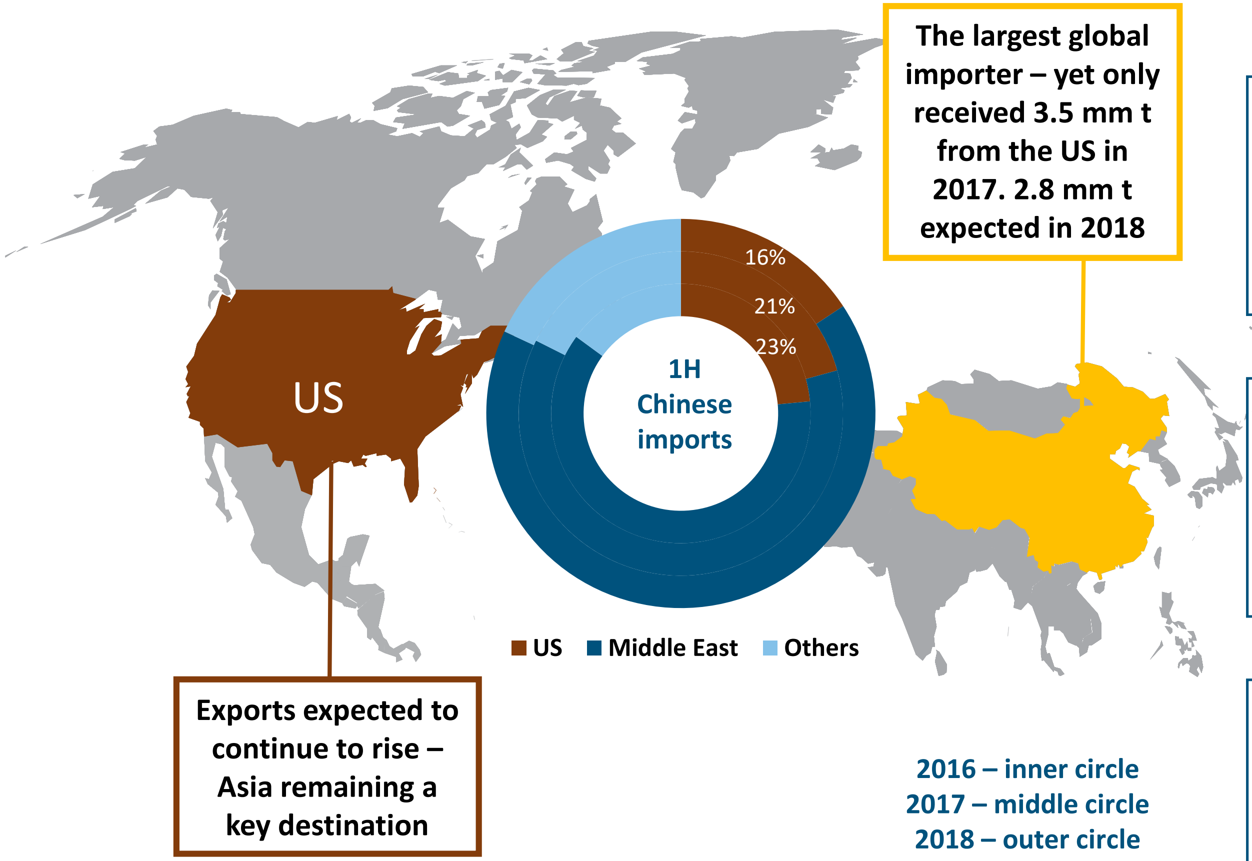


Supply factors

Demand factors

Political relationships play a role too

US to China tariffs effect



What are the implications?

Chinese Petchem demand on the rise

- New petrochemical plants
- Propane PDH demand to rise by around 2 mm t by 2020 from 2018

Iranian exports slowdown

- Iranian export volumes estimated to subside in 2019
- How this will affect Chinese imports?

2 tiers pricing mechanism East

- Diversification of supply – Canada/ Australia
- 2 tiers of Eastern prices: US vs ME/other origin

Propane & Butane Markets

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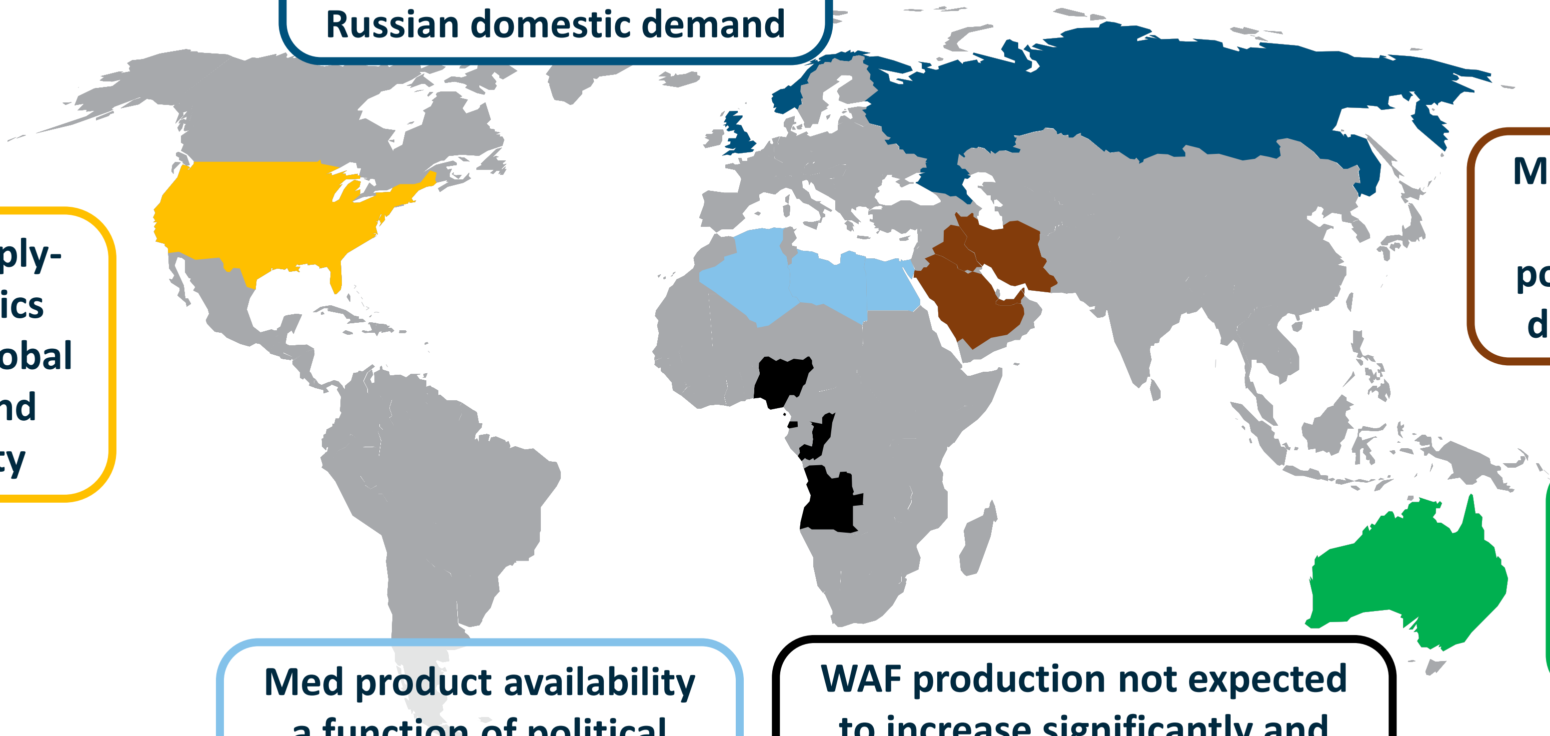
Key supply/export considerations

N. Europe exports connected with N. Sea field depletion/additions and Russian domestic demand

US domestic supply-demand dynamics will dictate the global trade growth and pricing volatility



Middle East export level will depend on politics/investment and domestic petchem use

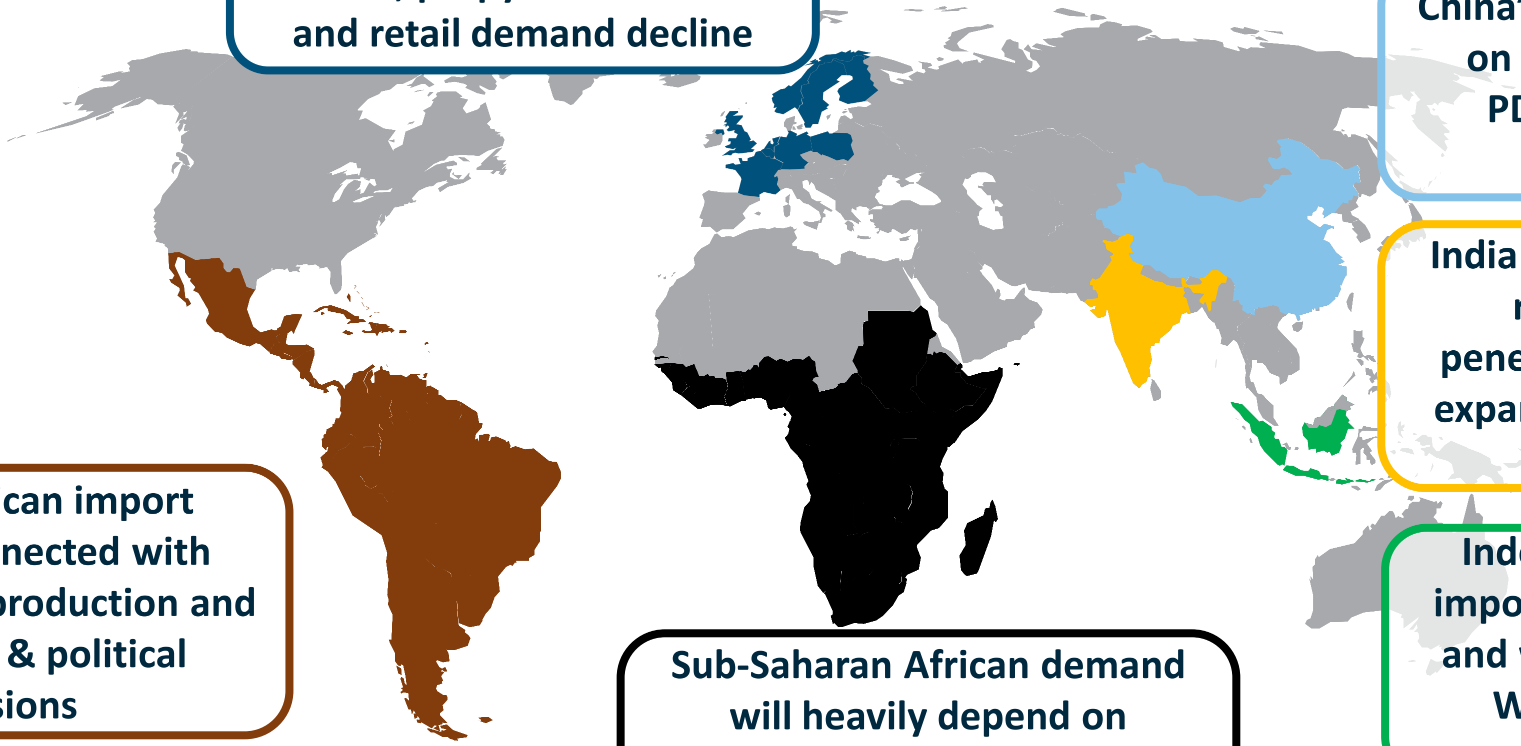
Increase of exports out of Australia will add another factor in the Asian outlet competition

Med product availability a function of political factors and field depletion

WAF production not expected to increase significantly and the question is domestic demand growth

Key demand/import considerations

N. Europe demand a function of LPG vs ethane/naphtha econs, propylene demand and retail demand decline



Major Asian Countries for Import Growth

China’s level of demand will depend on economics/investments for PDH/steam-cracking and for retail/gasoline blending

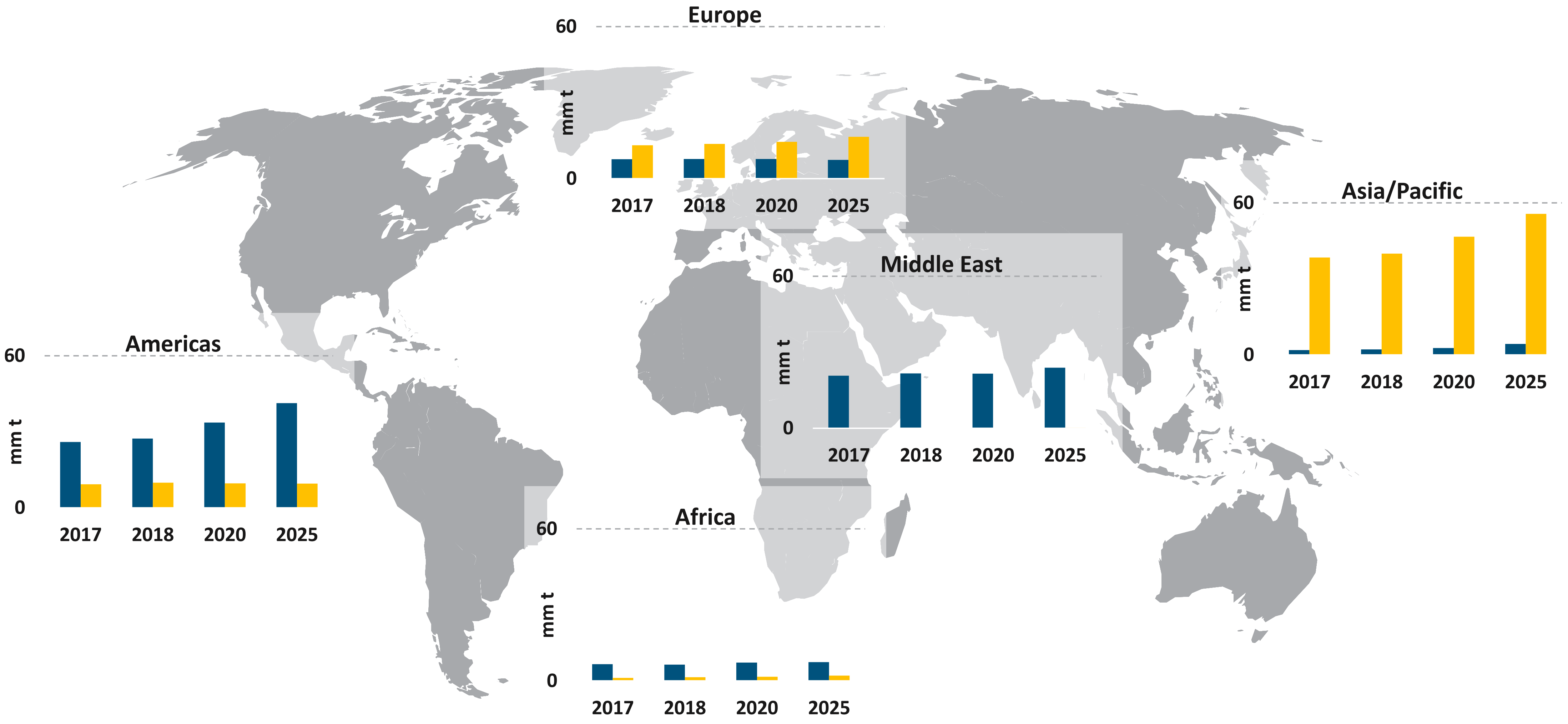
India is already undergoing a large retail growth and market penetration followed by terminal expansions. How far can this level of growth be sustained?

Indonesia has been growing its import demand rapidly since 2008 and will continue towards 2020+. What are the limits and the alternatives?

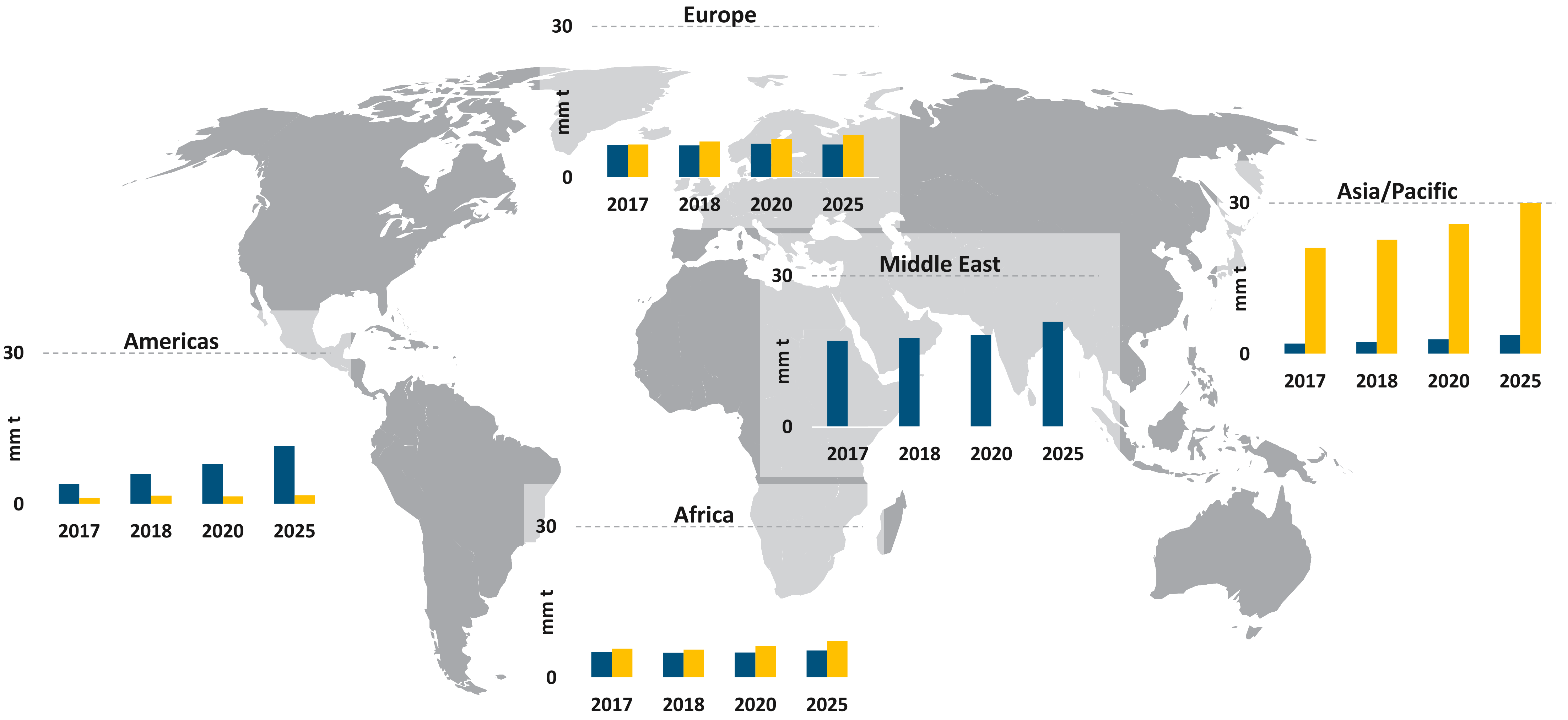
Latin American import demand connected with domestic LPG production and availability & political decisions

Sub-Saharan African demand will heavily depend on infrastructure developments, investment in LPG operations and governmental support

Global propane s/d balance - more of the same?



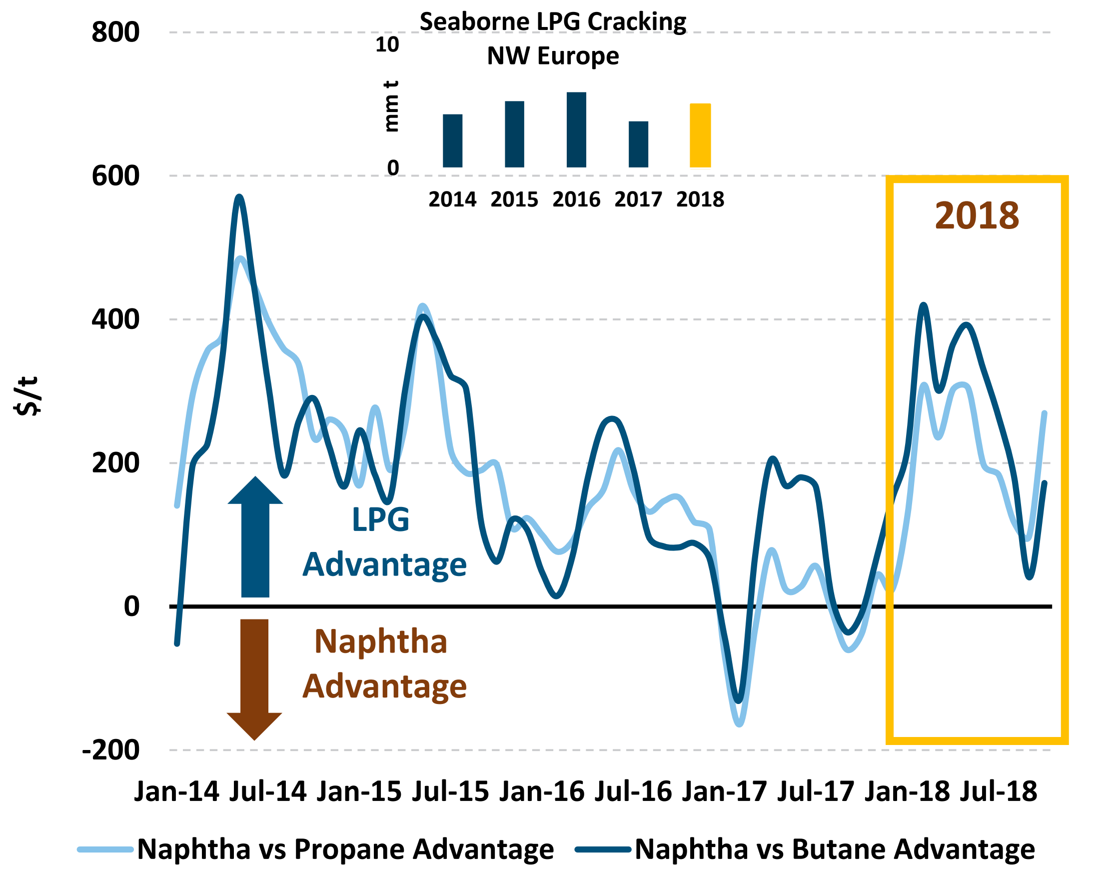
Global butane s/d balance – market changes ahead



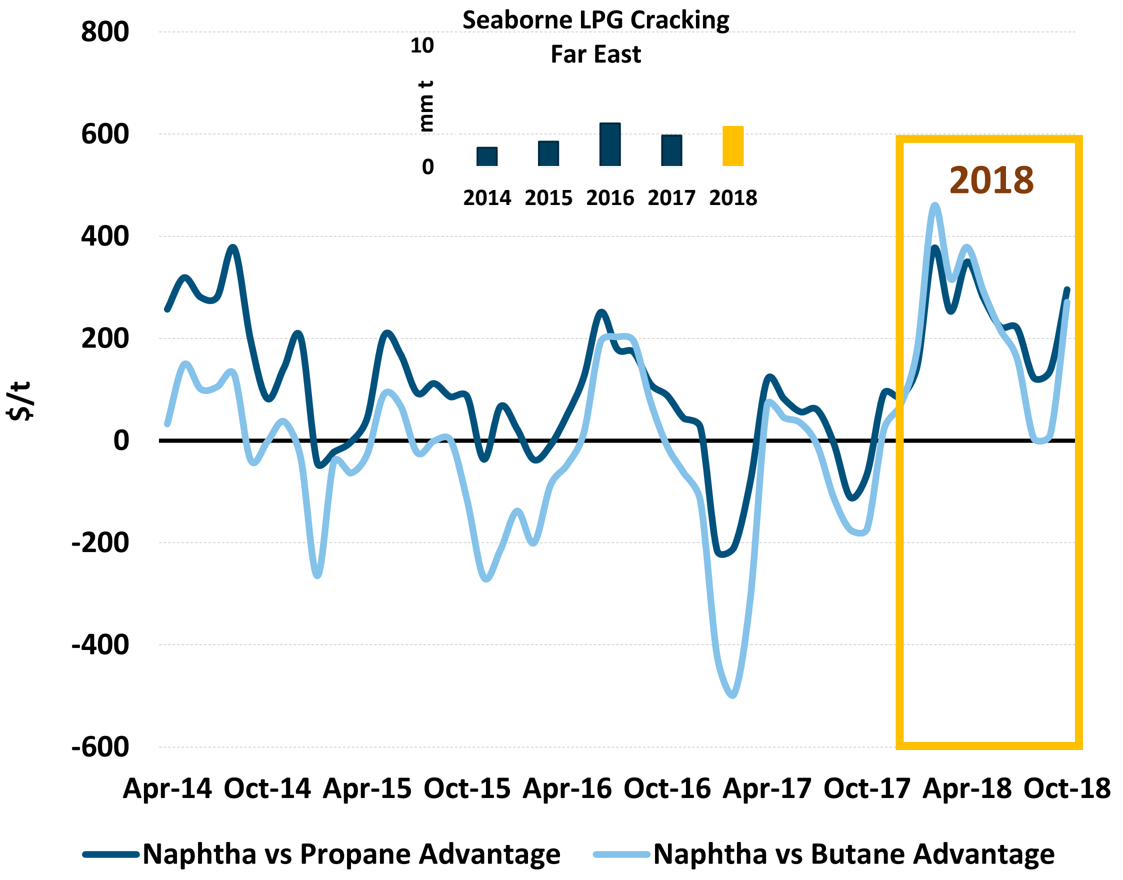
The Rising Importance of Petrochemicals

Sensitive petchem demand acts as a balancing mechanism

Cracker incremental cash margins advantage N. Europe

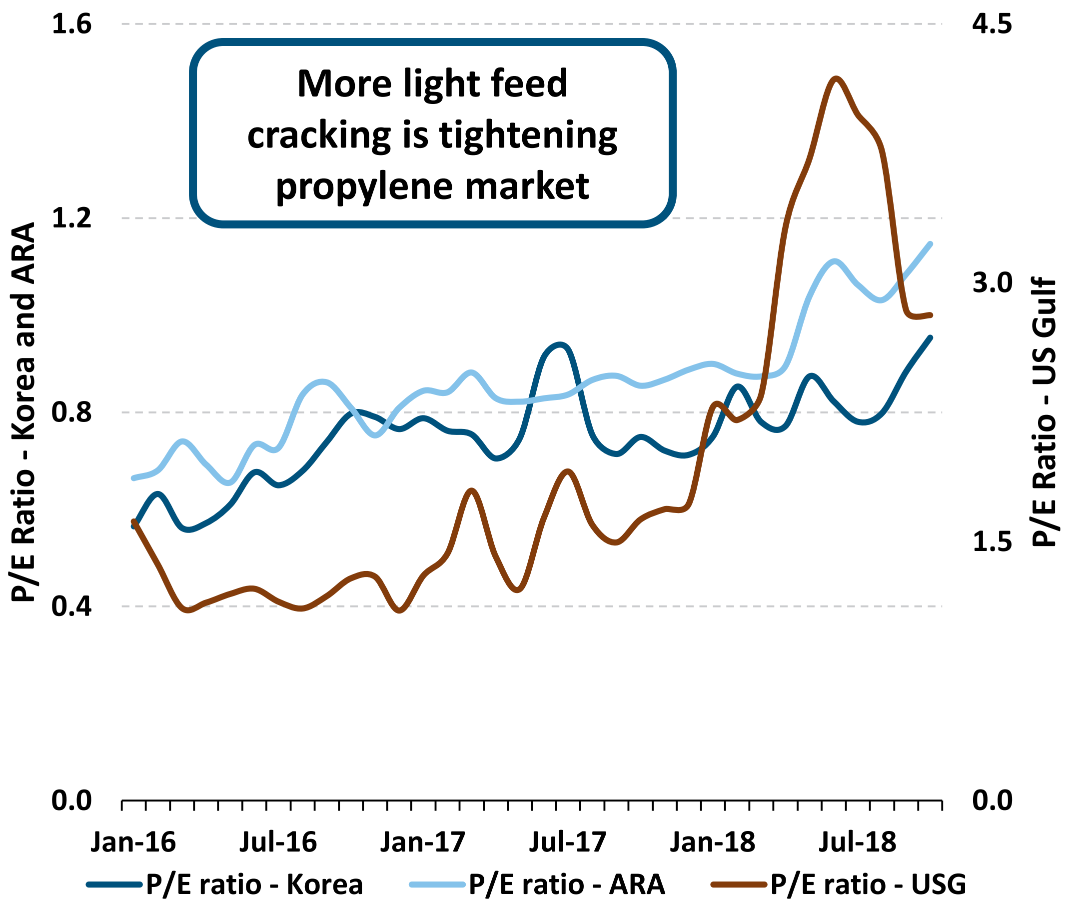


Cracker incremental cash margins advantage Far East

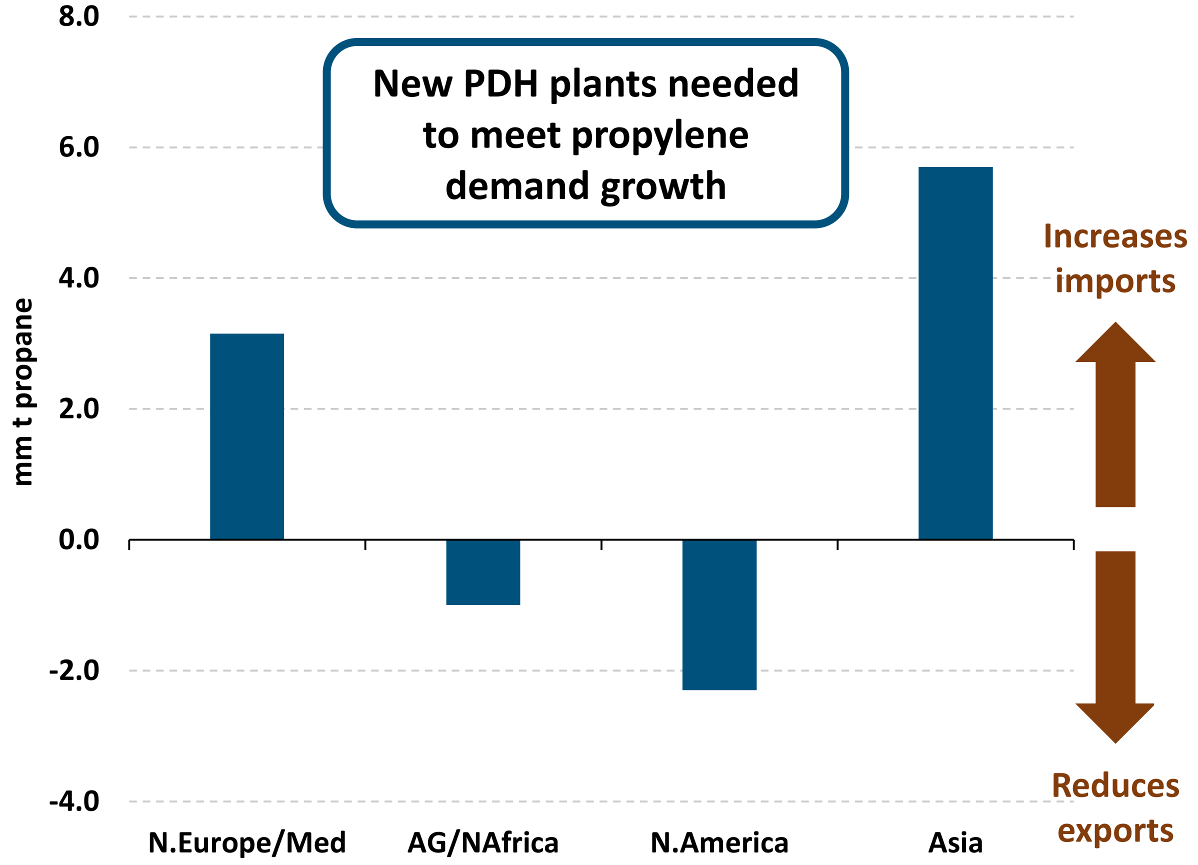


Propylene is tight and needs more PDH units

Global Propylene prices on a rising trend

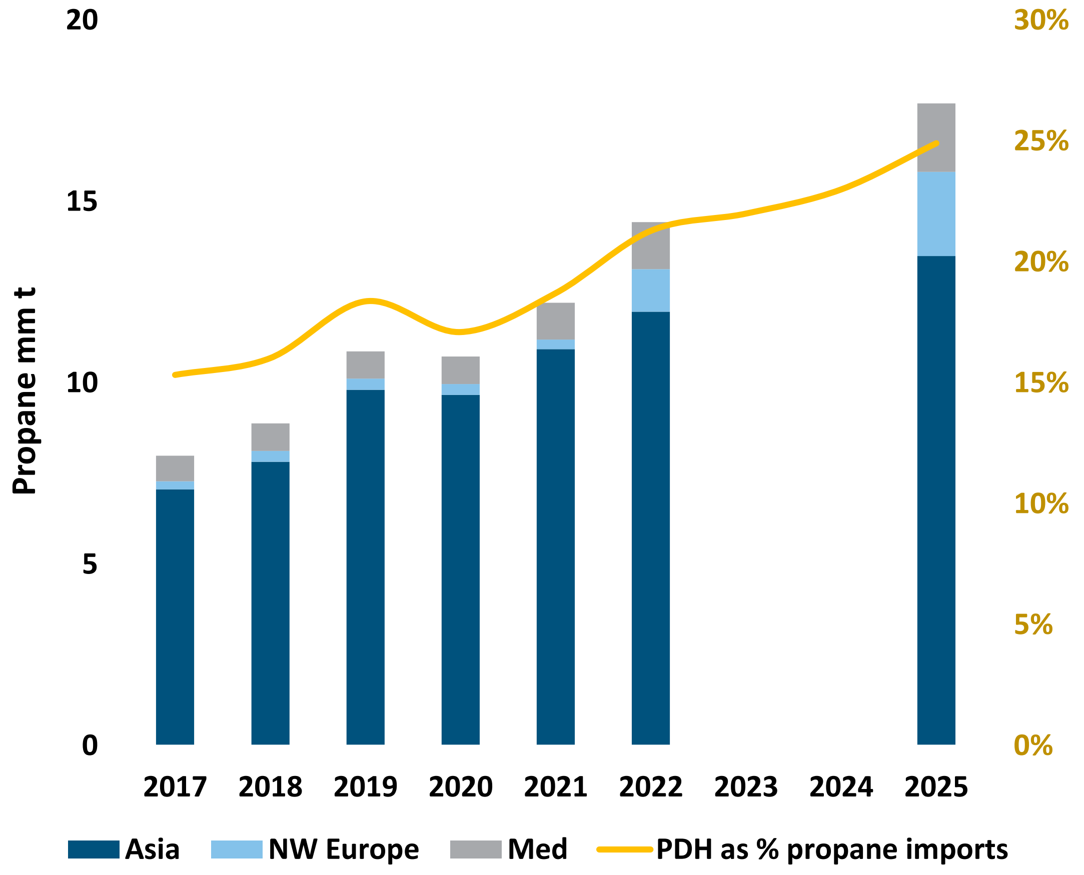


Change in propane trade 2018-25 due to PDH

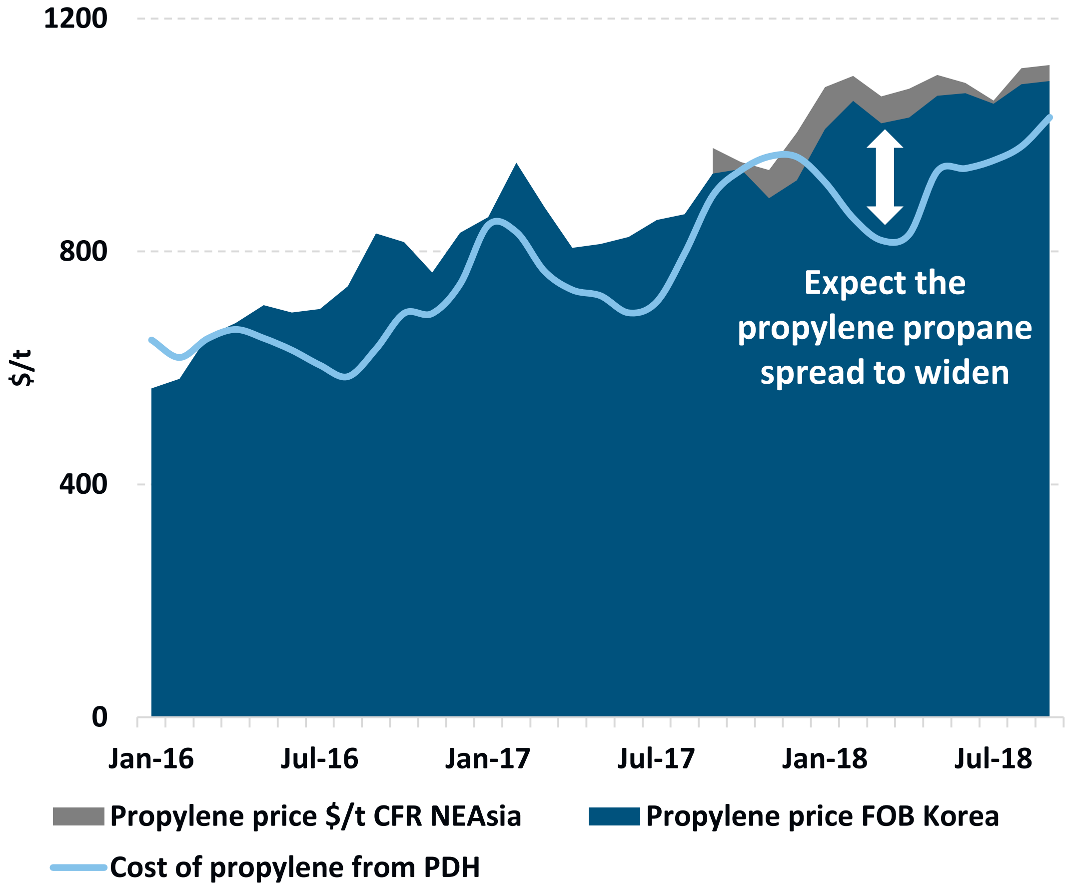


Propane for PDH becomes major trade

PDH will account for 25% of propane imports



PDH economics support new plants



Increasing Complexity & the Effect on Global LPG Pricing & Economics

Pricing is the key to clear the LPG markets

Lower LPG Trade Margins

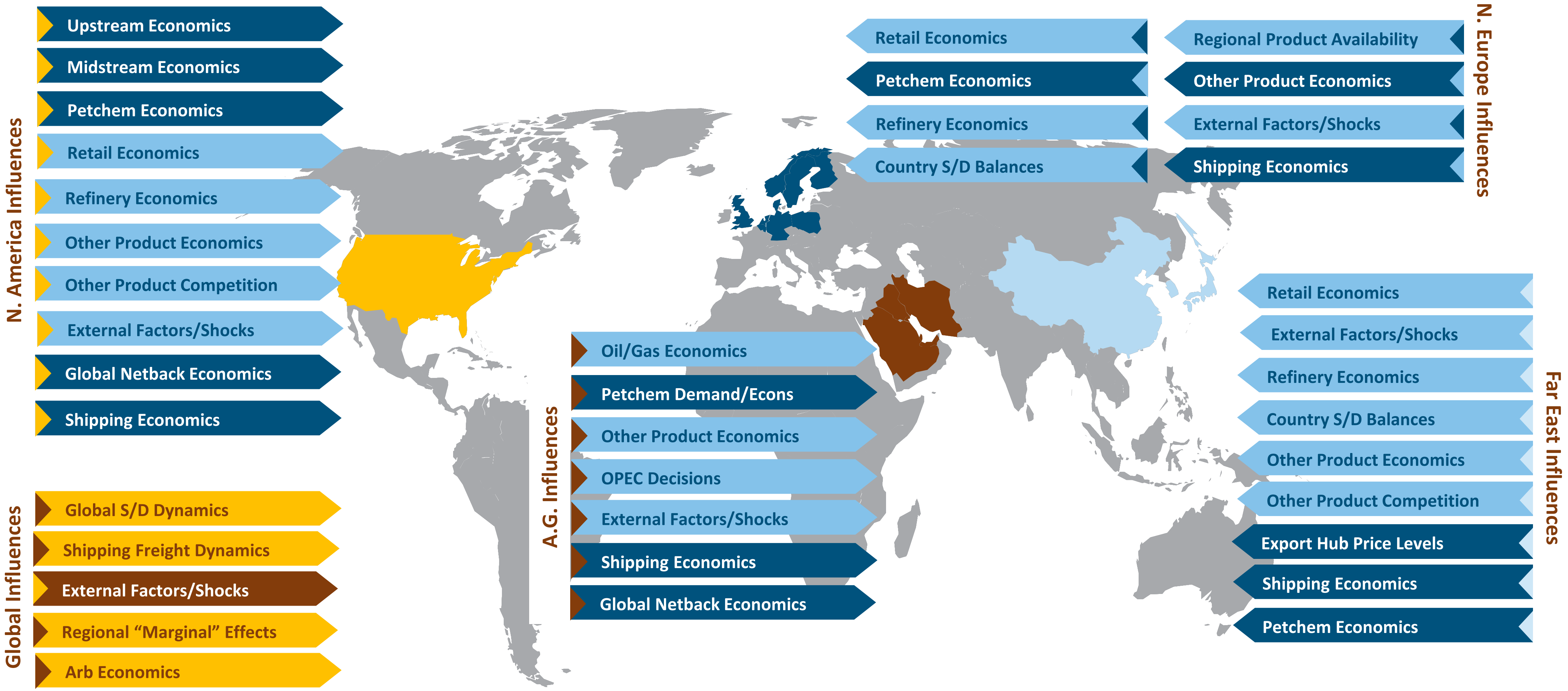
Retail Market
- Residential Uses
- Commercial Uses
- Autogas

Small Bulk Market
- Agricultural Uses
- Small Industrial Uses

Large Bulk Market
- Refinery Uses
- Petchem Feedstock
- Small Scale Power Generation

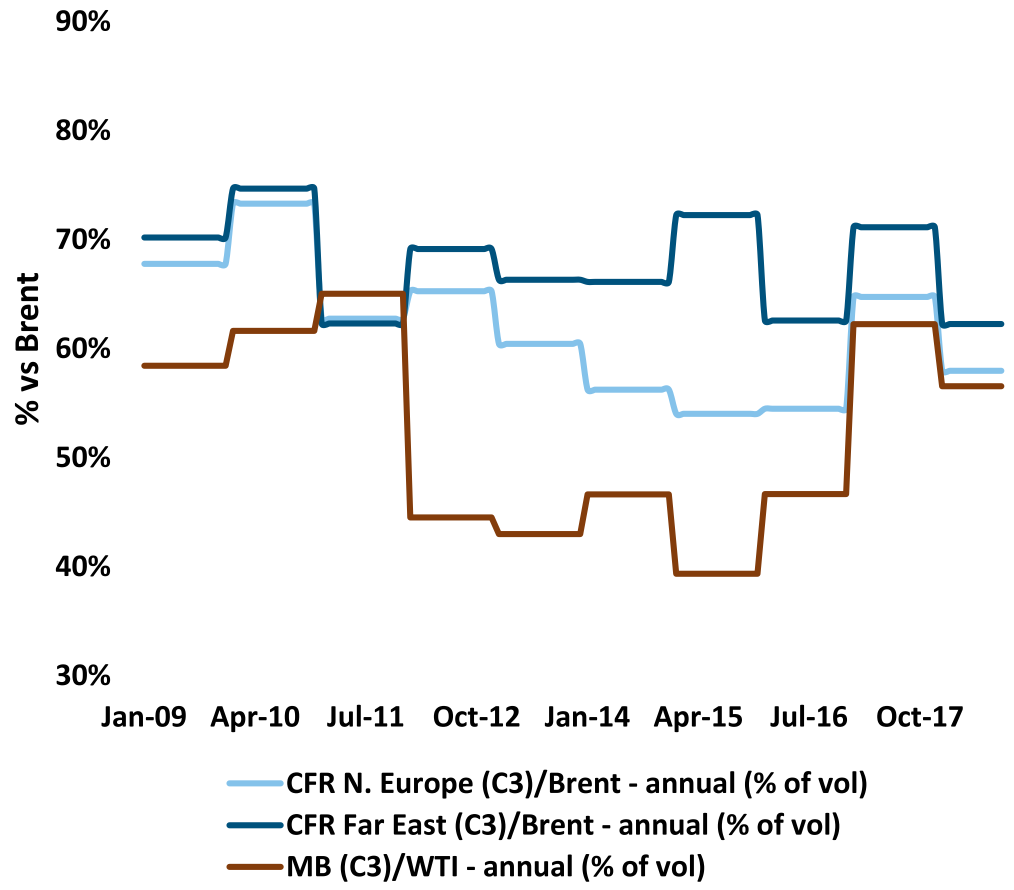
Fuel Substitution
- Larger Scale Power Generation
- Use as Fuel (bunker fuel, other)
- Other industrial Uses

LPG pricing/economics more complex

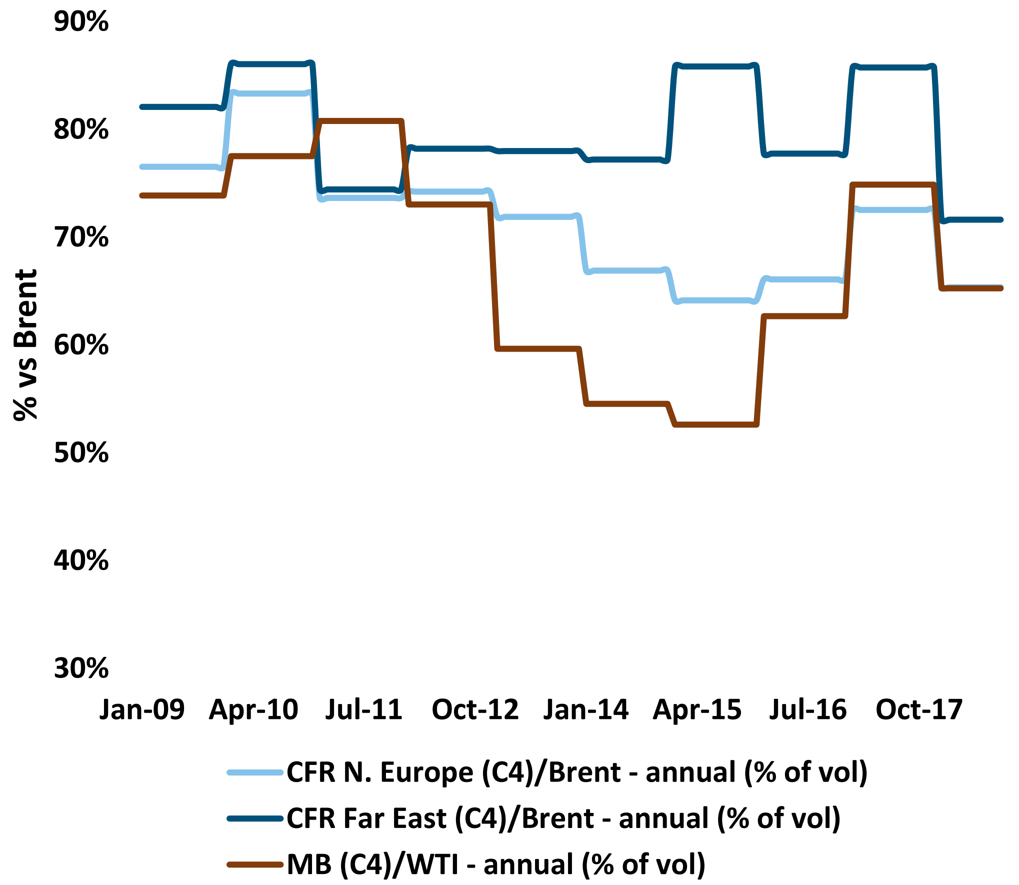


US price fluctuation affects global markets

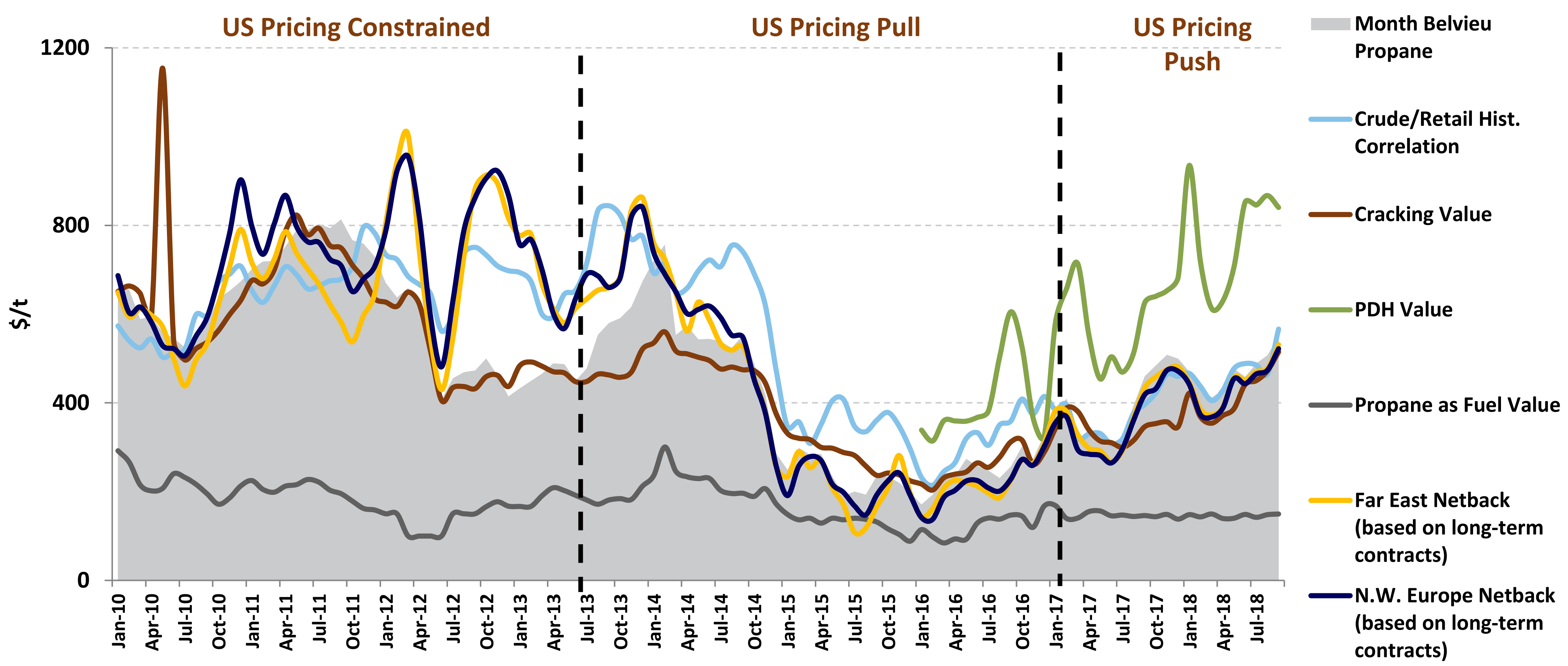
Propane vs Crude (%) 2009-2018



Butane vs Crude (%) 2009-2018

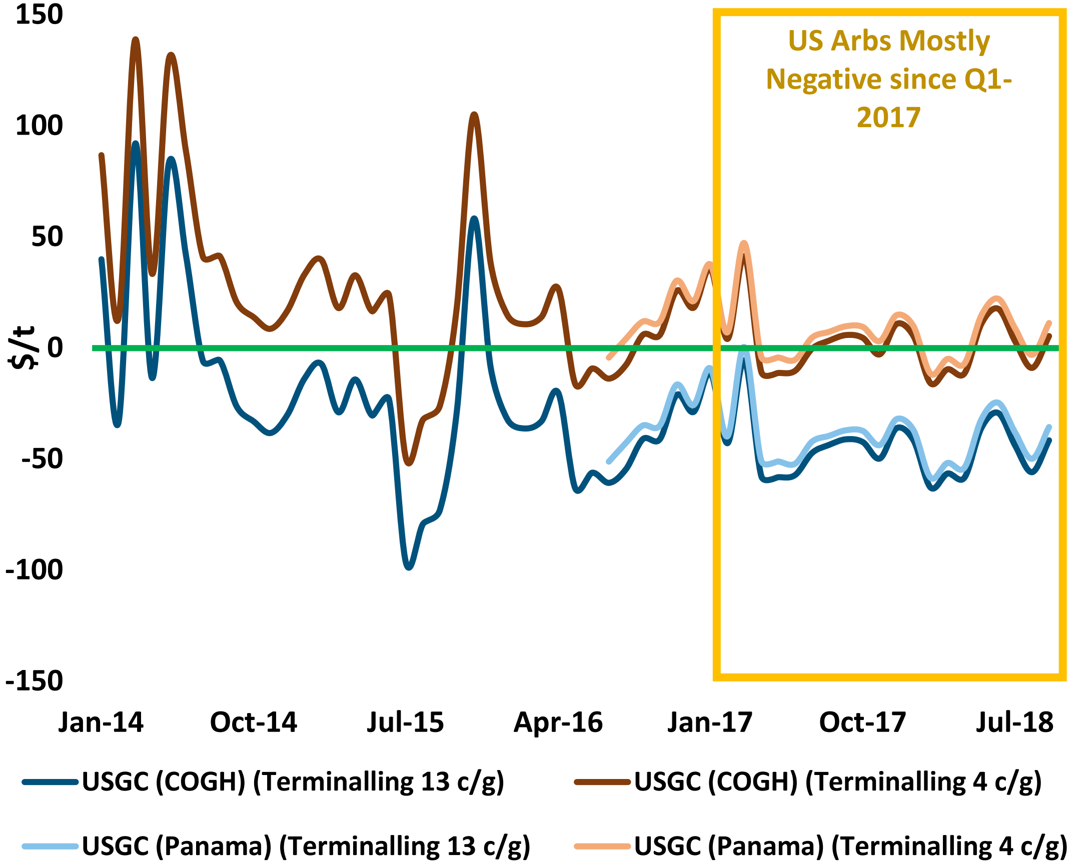


Have US prices become the global setter?

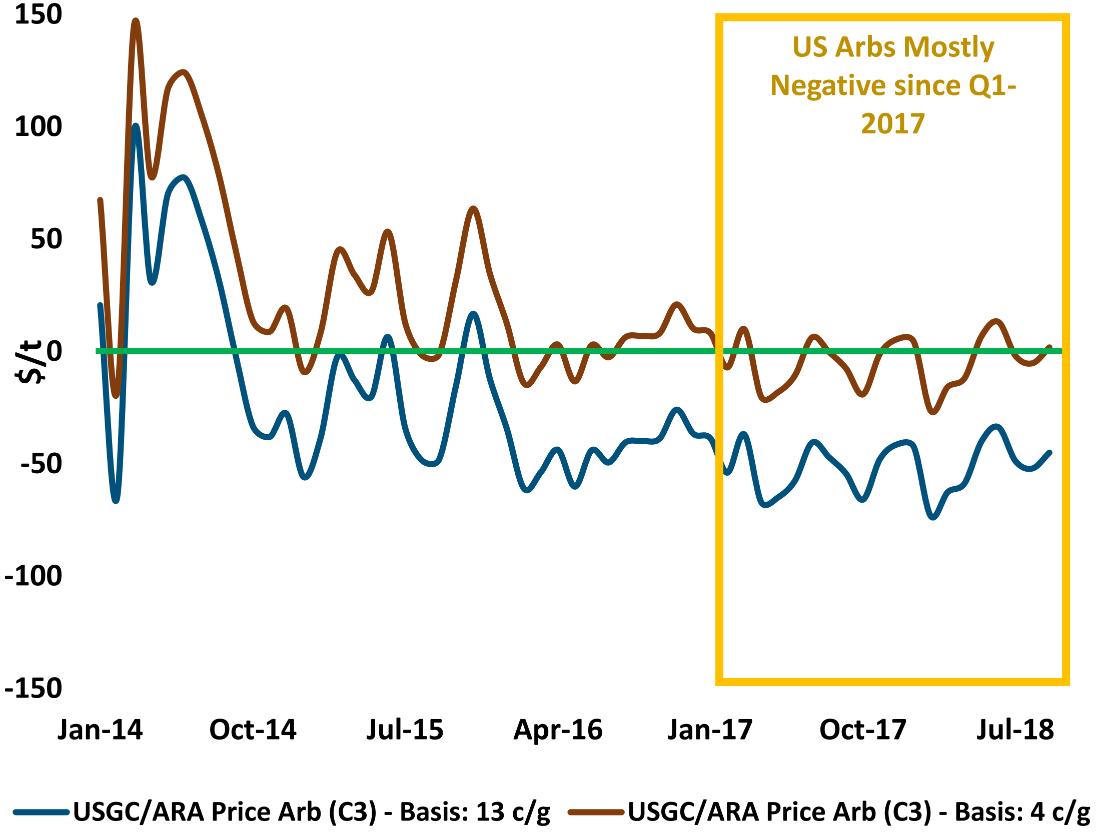


US to markets arbs will need to improve; at whose expense?

USGC to Far East propane arbs



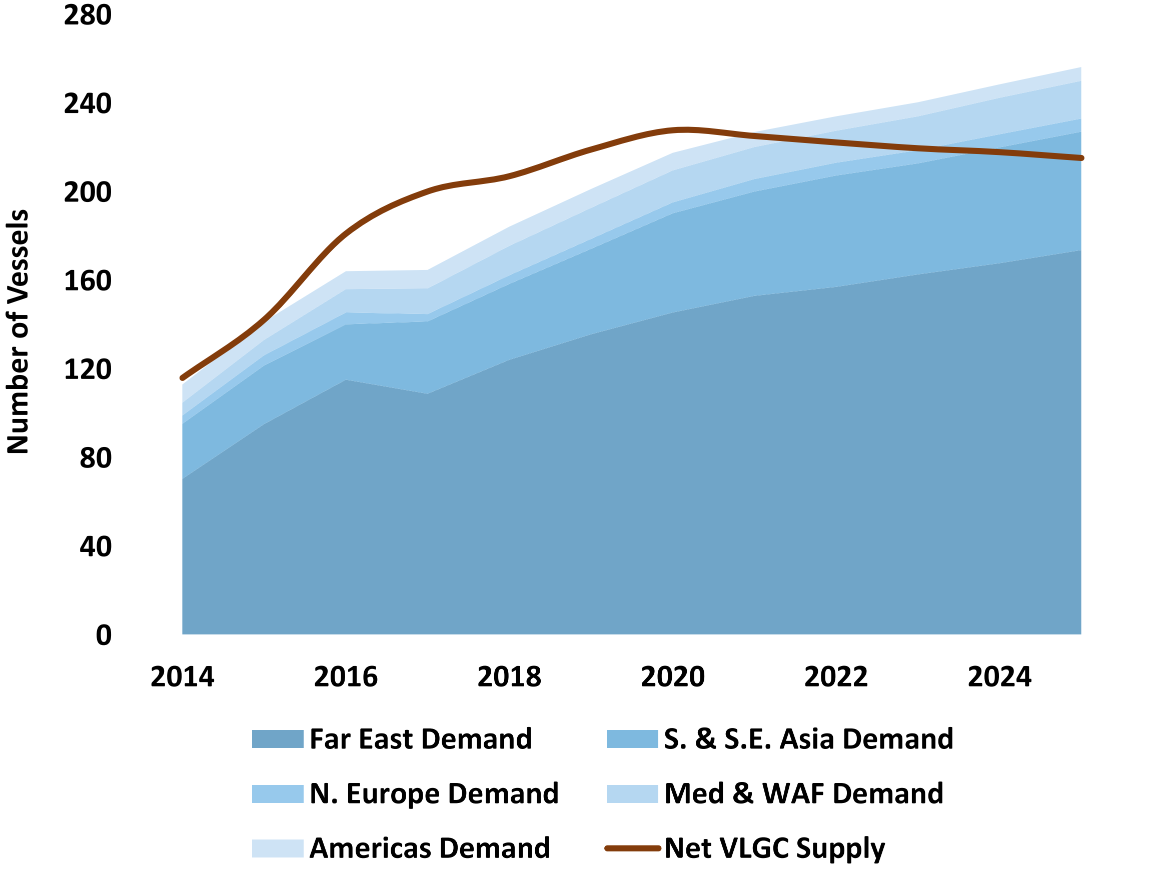
USGC to N. Europe propane arbs



Shipping Outlook

VLGC market looking upwards in the mid-term

VLGC Supply/Demand balance
Base case scenario



Factors affecting S/D balance

Supply

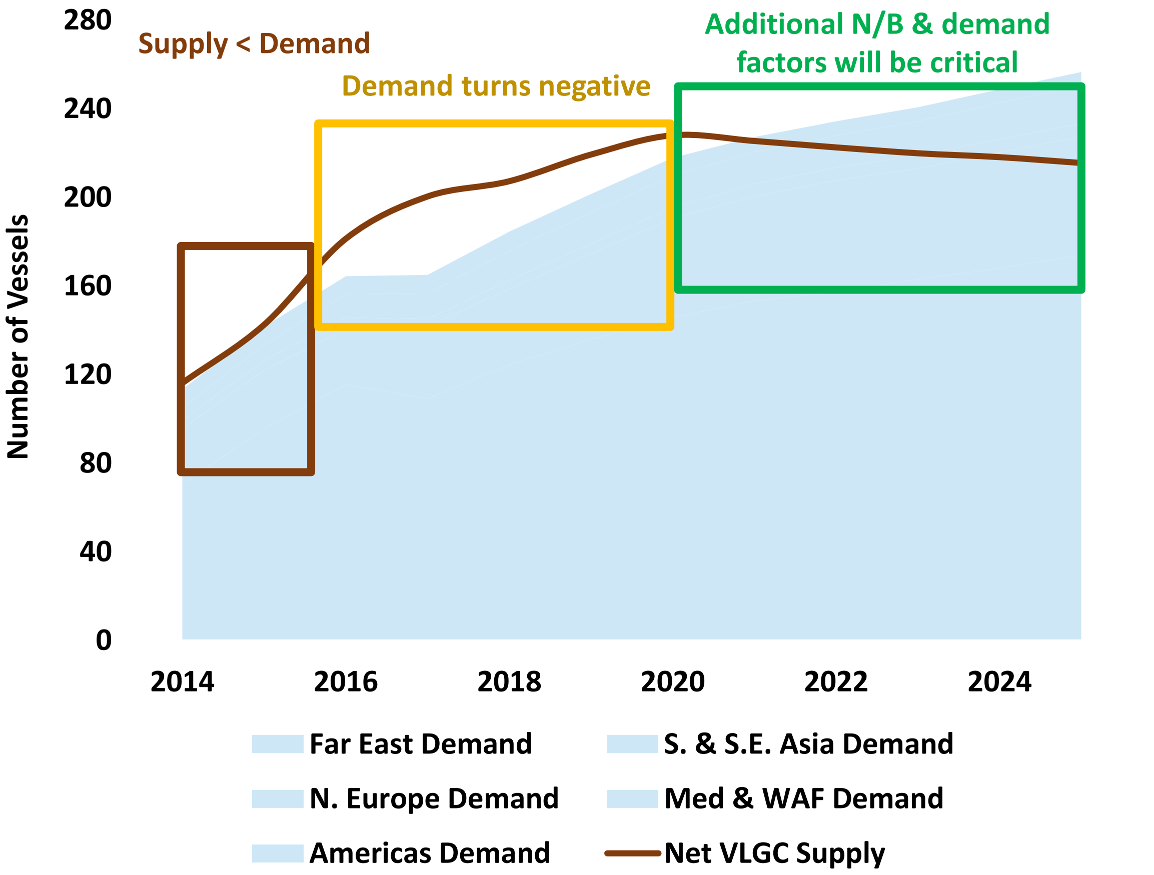
- Utilization (Market, Panama Canal, etc)
- Lay ups/maintenance
- Slow steaming/other trip assumptions
- Port/route congestions
- N/B assumptions
- Competition with smaller segments
- Other

Demand

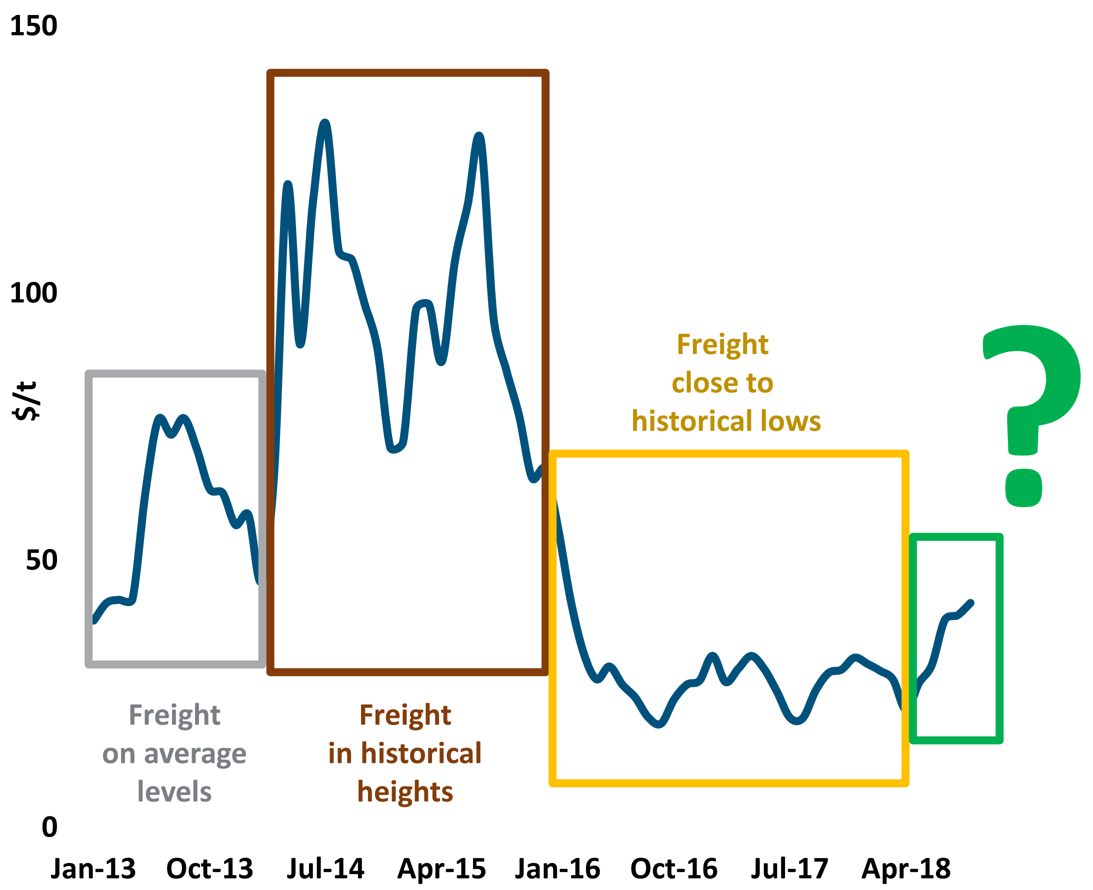
- Product s/d trade model
- Direction of trade changes
- Trade sensitivities
- Geopolitical assumptions
- Average product carried per trip

LPG freight rates highly sensitive

VLGC Supply/Demand balance



VLGC (AG – Japan) spot freight development 2013-2018



Final thoughts

The beginning of another cycle beyond 2019/20

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Available Multi-client Studies:
August 18: ***Petchem Gas Seaborne Trade 2016-2025***:
“Impact of feed costs, developments and opportunities”
August 18: ***Propane & Butane Seaborne Trade 2016-2025***
“Where the next wave of LPG exports is heading to?”

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