

What impact will ethane and LPG exports have on shipping?

Prepared for:
Gas Trading & Shipping Americas

Houston 2016

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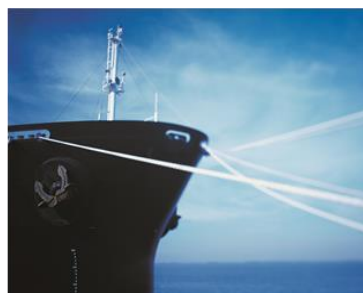
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Upstream



Midstream



Marine



Infrastructure



Downstream



Agenda

1. LPG Market

- ✓ Market Overview
- ✓ Global Supply/Demand Outlook
- ✓ The Shipping Impact

2. Ethane Market

- ✓ Market Overview
- ✓ Global Supply/Demand Outlook
- ✓ The Shipping Impact

3. Closing Thoughts



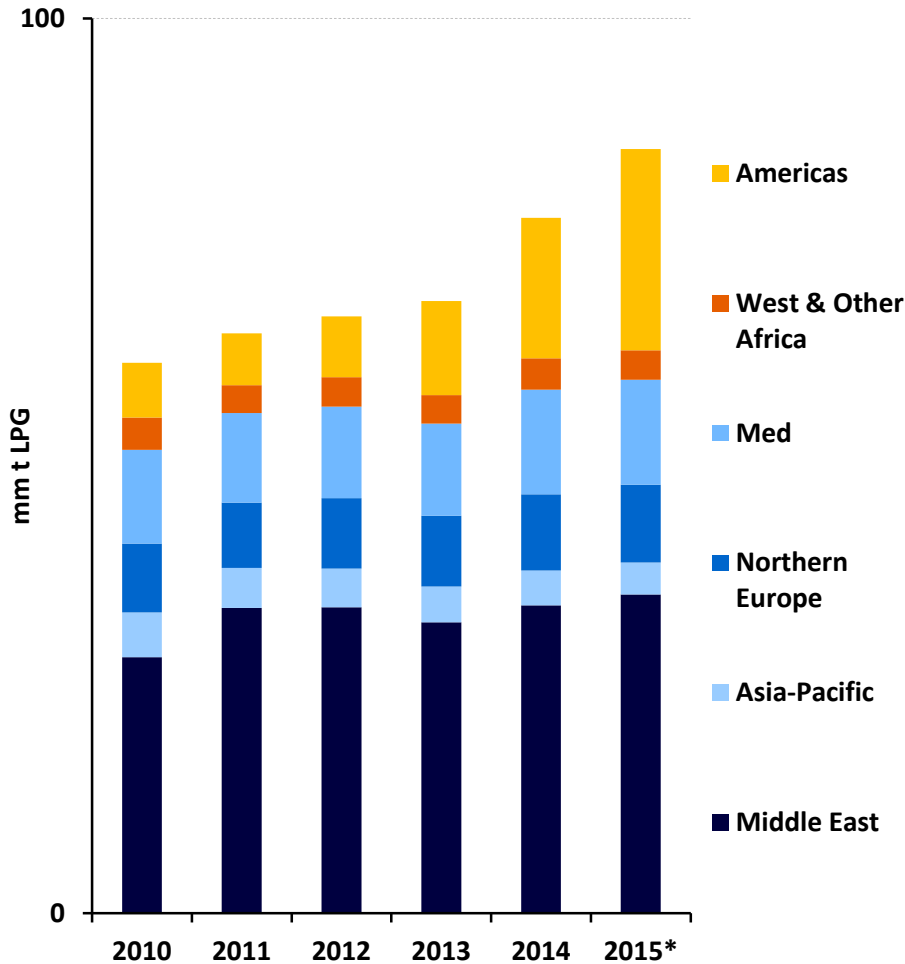
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1 - LPG Market



US exports dominate LPG supply growth in 2015...

Global LPG Seaborne Supply



US LPG exports estimated to have increased about 50% yoy in 2015

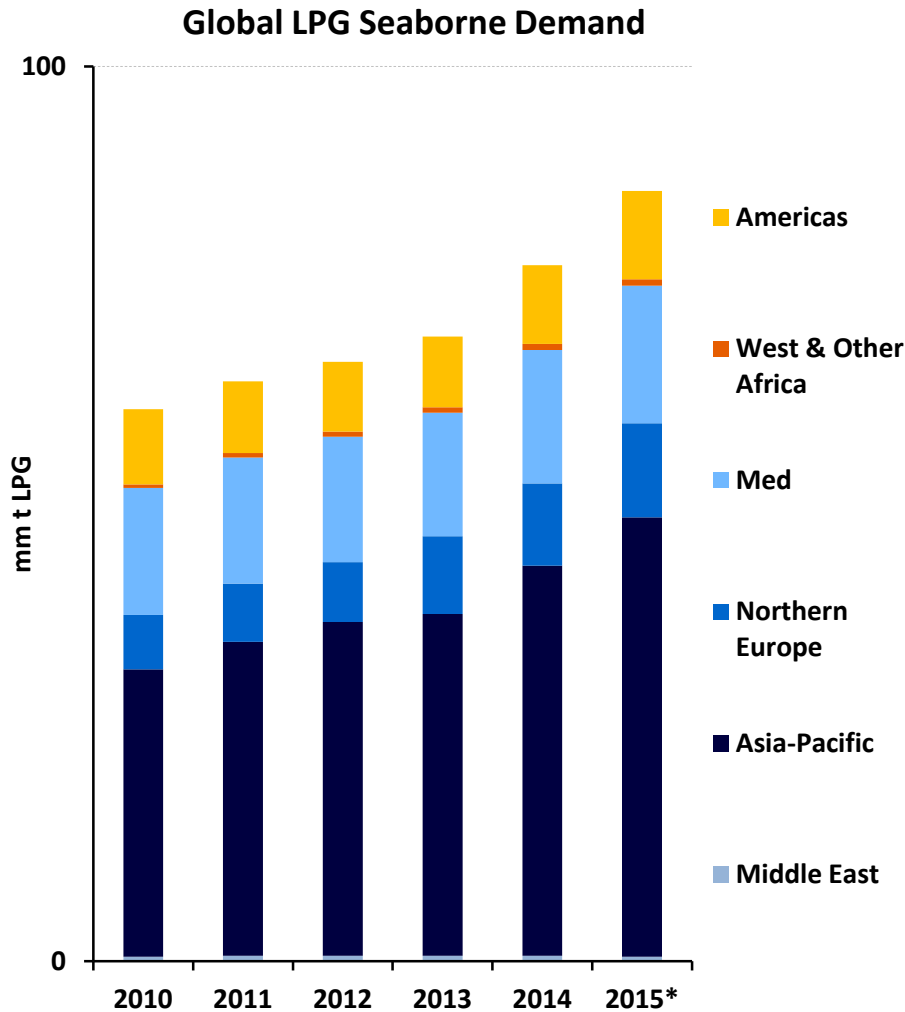
Middle East exports grew moderately

Exports from other regions have remained relatively flat during the course of 2015

— Source, Poten & Partners

*Preliminary Data

...with Asia pivotal in absorbing the new supplies



Europe and L. America imports have increased in 2015...

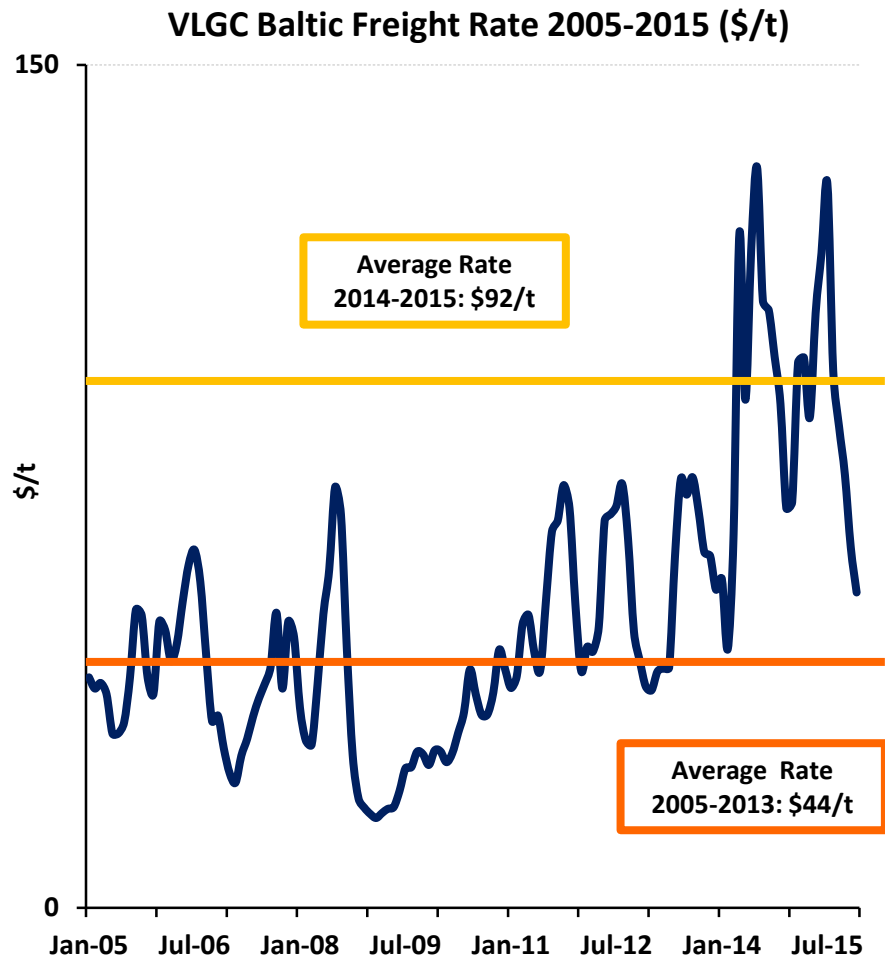
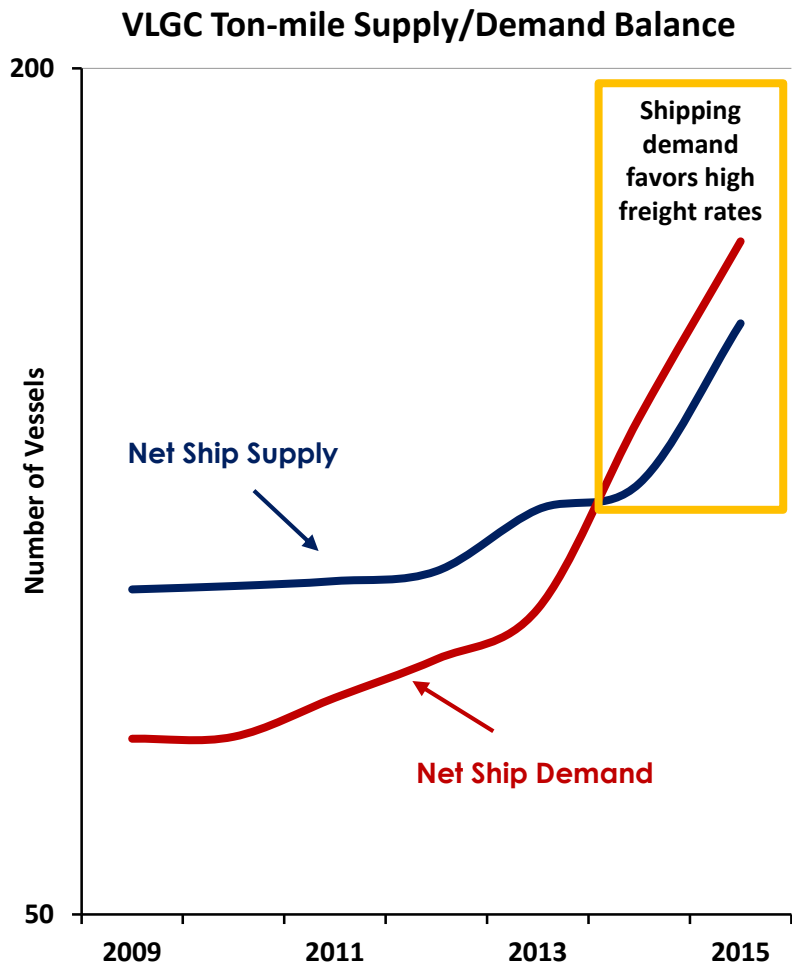
...but Asia has been the main factor balancing the global trade

China and India combined imported about 6 mm t more LPG than in 2014

— Source, Poten & Partners

*Preliminary Data

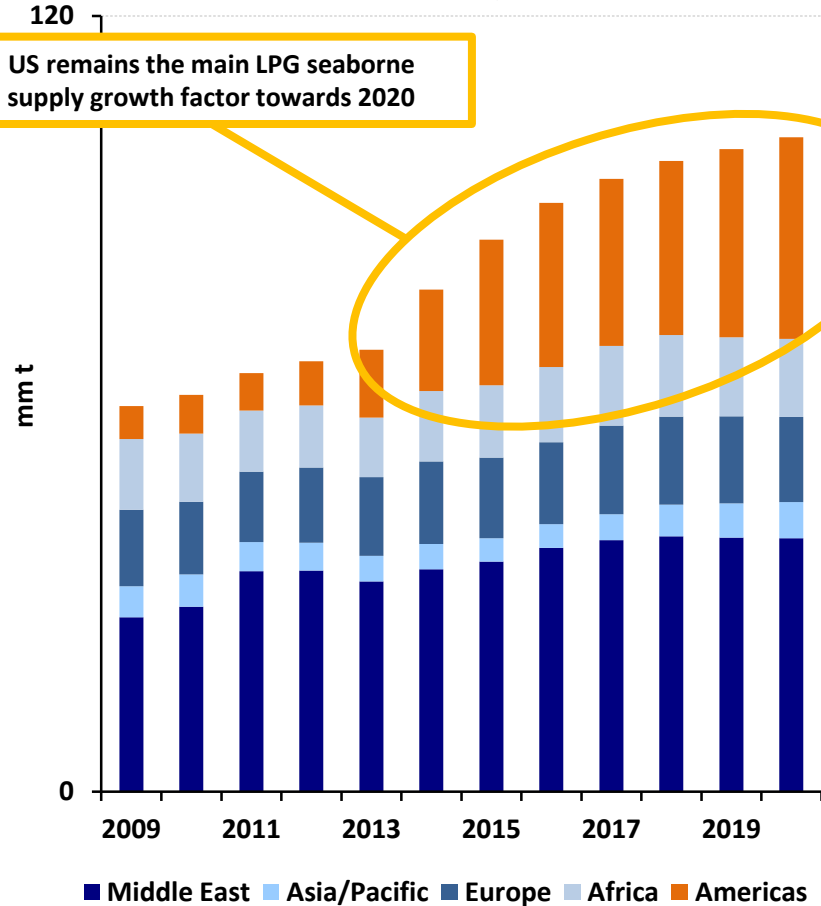
Shipping s/d dynamics kept freight at high levels



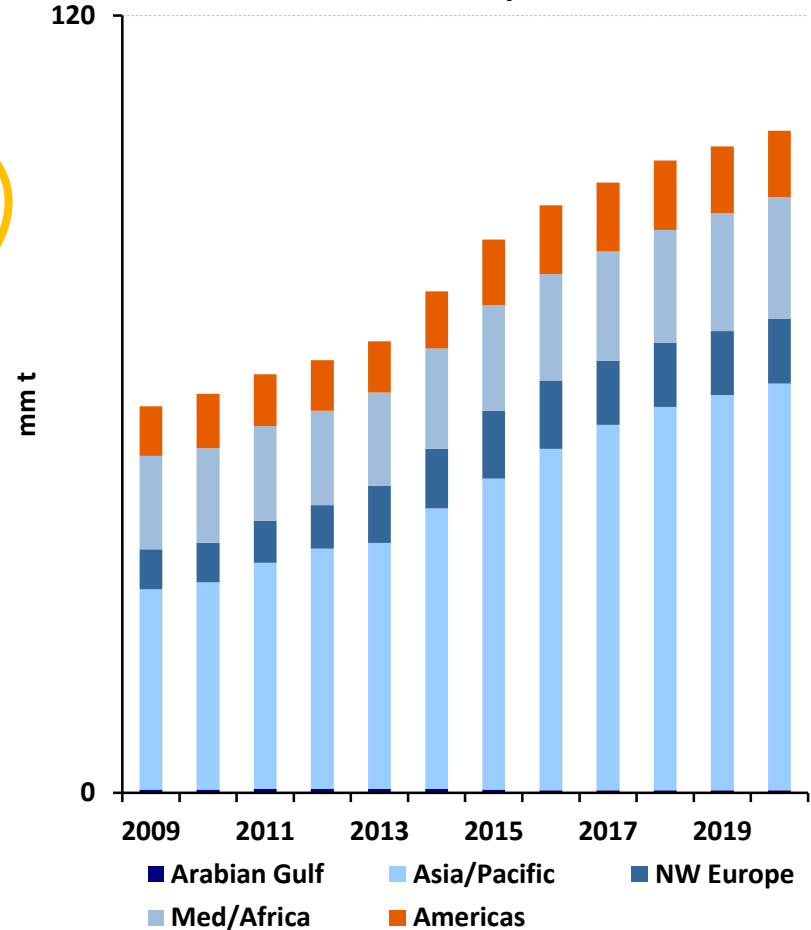
— Source, Poten & Partners

Global LPG trade volumes continue to grow

Global Seaborne Export Forecast



Global Seaborne Import Forecast

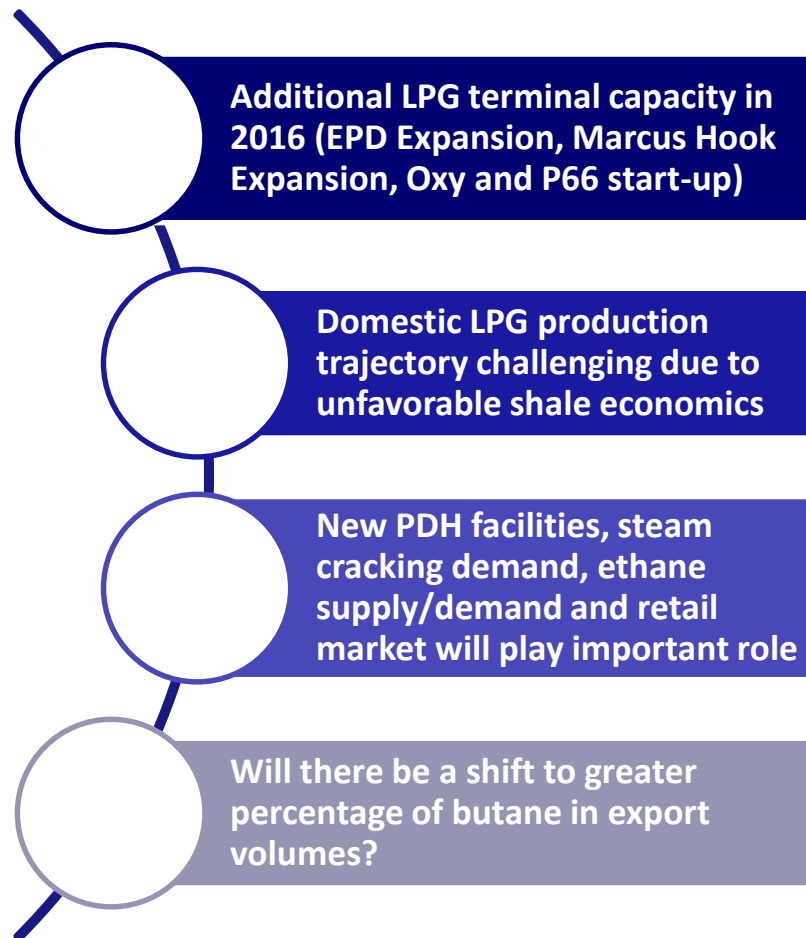
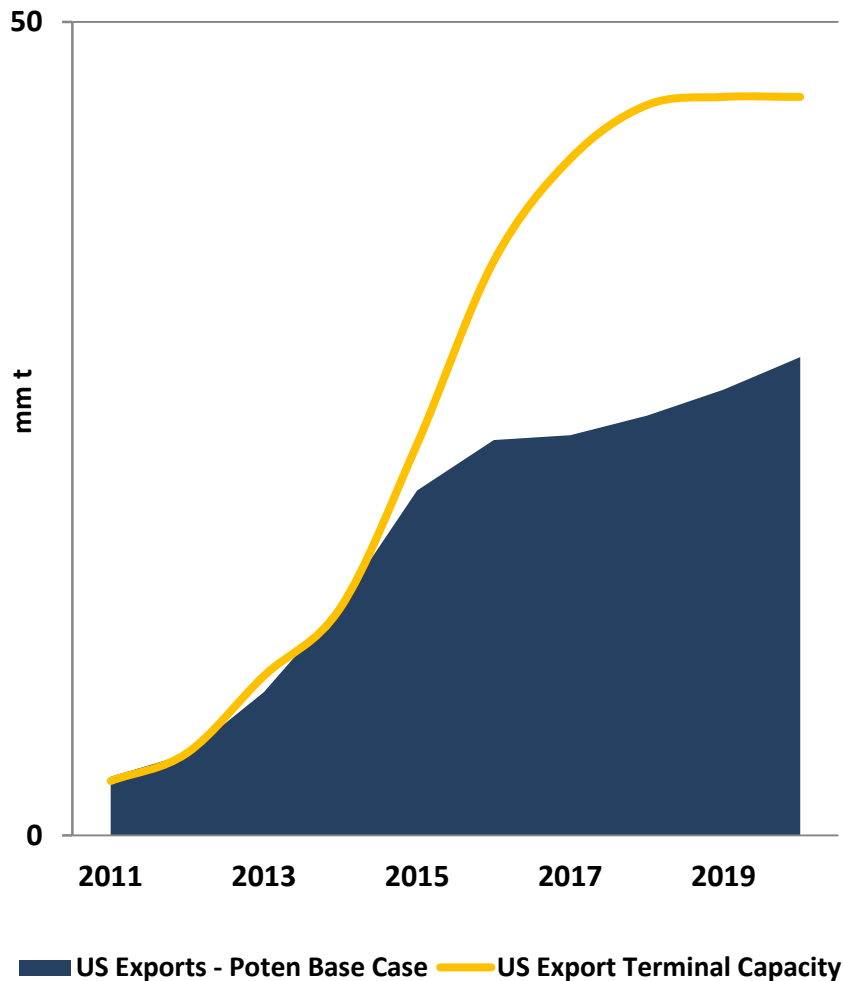


— Source, Poten & Partners

*Base case scenario

US exports will define global supply growth to 2020...

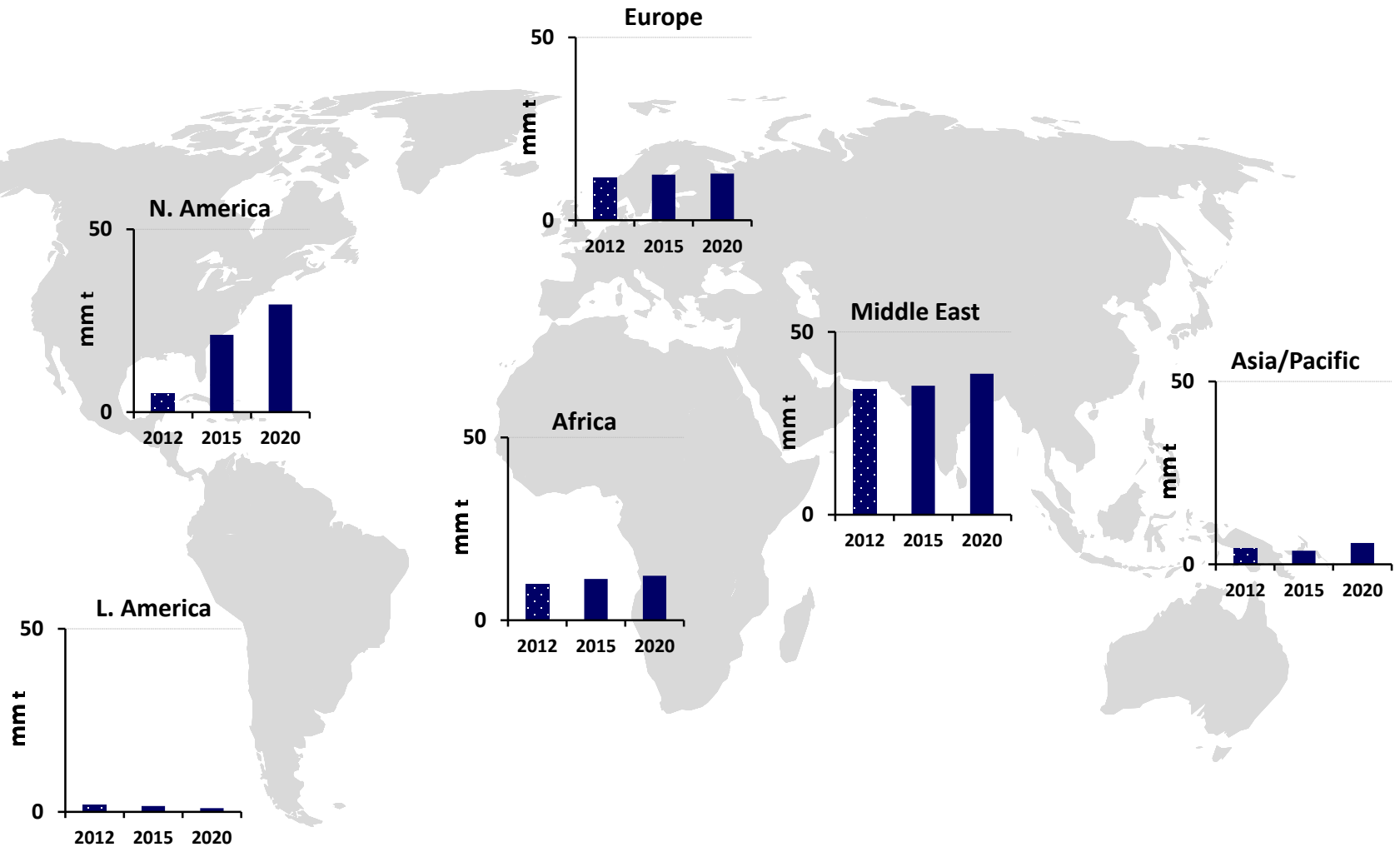
US LPG Terminal Capacity vs Estimated Export Volumes



— Source, Poten & Partners

*Base case scenario

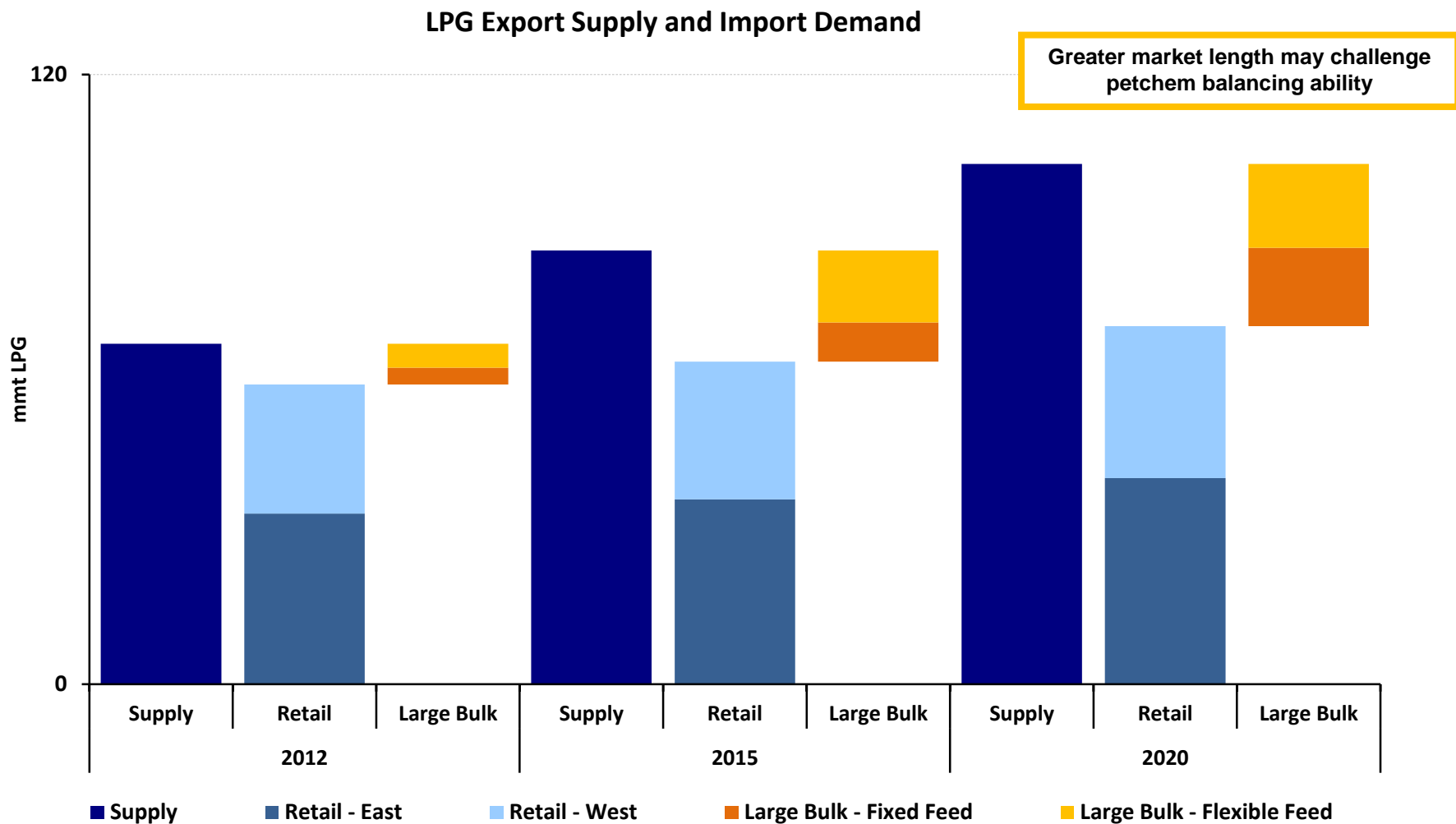
...while most other regions will grow moderately



— Source, Poten & Partners

*Base case scenario

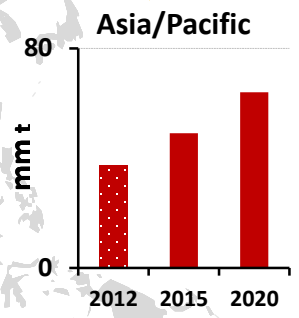
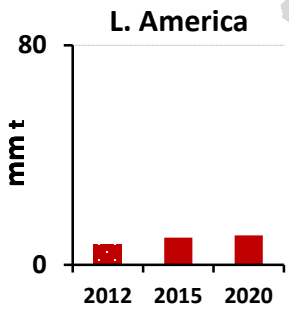
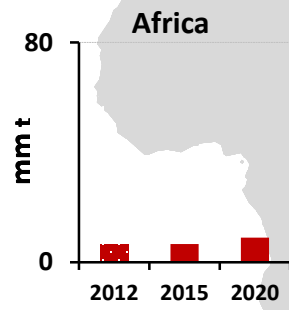
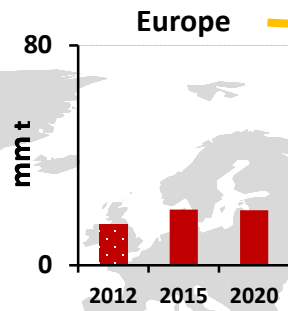
Balancing global LPG trade could prove challenging...



**Base case scenario*

...with Asia destined to be the “marginal” LPG consumer

Petchem demand and economics in Asia and Europe is expected to be largely the balancing mechanism of the LPG market



India's retail demand growth another important determinant

Main factors

- Further retail demand growth
- The impact of subsidies
- Import infrastructure constraints

China is estimated to be the major demand pull of the LPG market towards 2020.

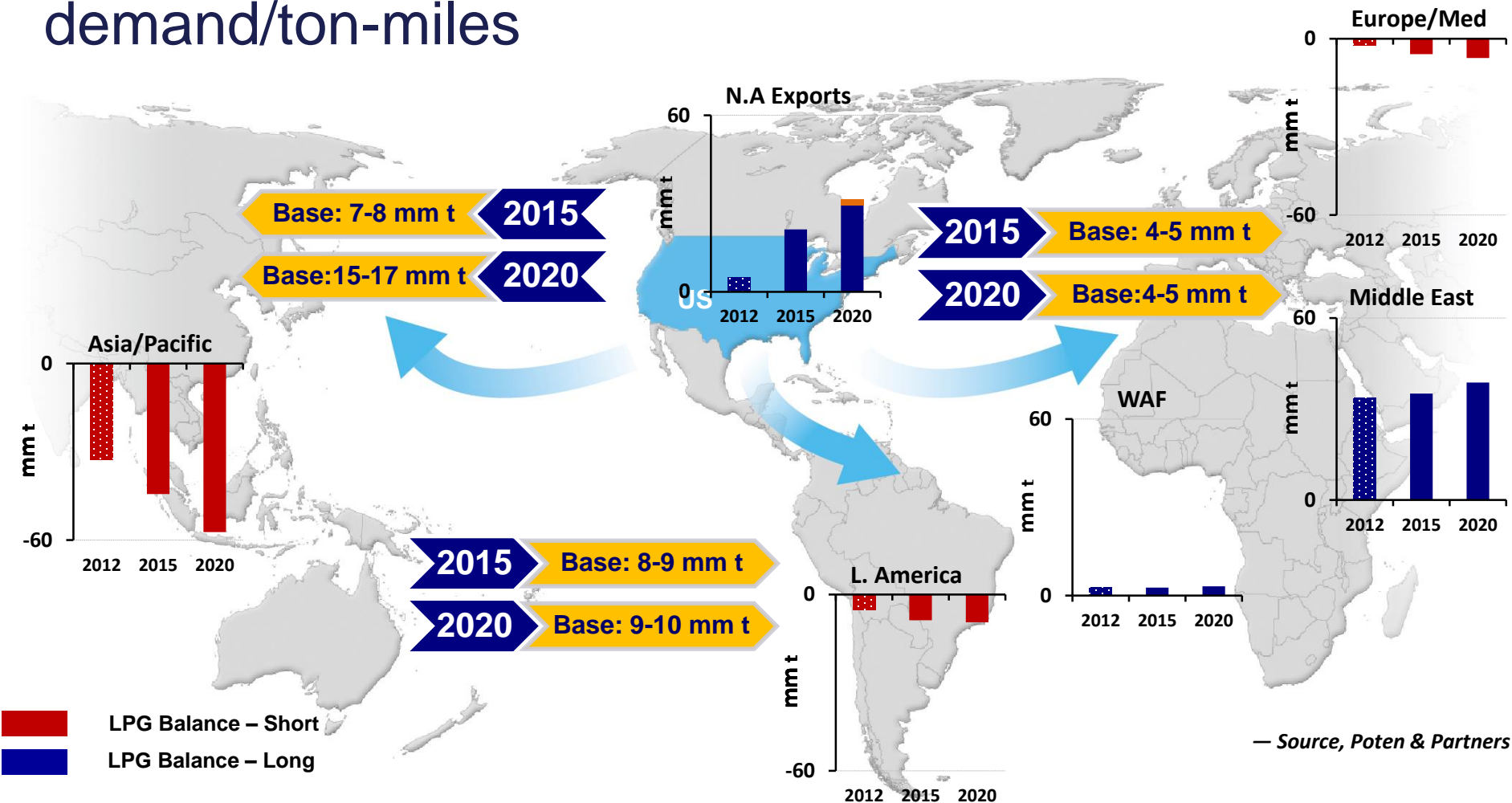
Main factors

- PDH demand and economics
- The potential of butane demand in gasoline components/petchems

— Source, Poten & Partners

*Base case scenario

US LPG volume destinations will define shipping demand/ton-miles

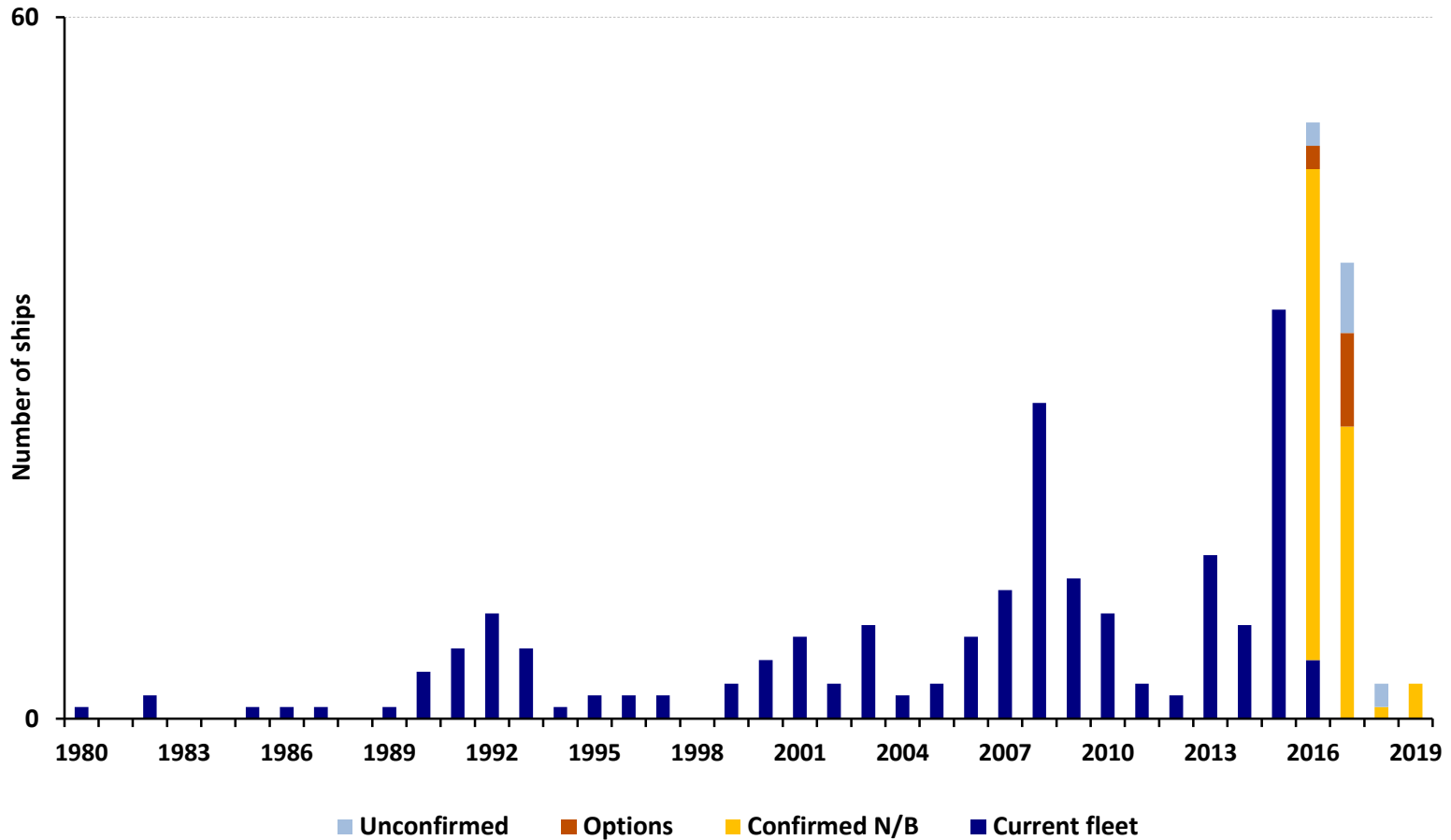


— Source, Poten & Partners

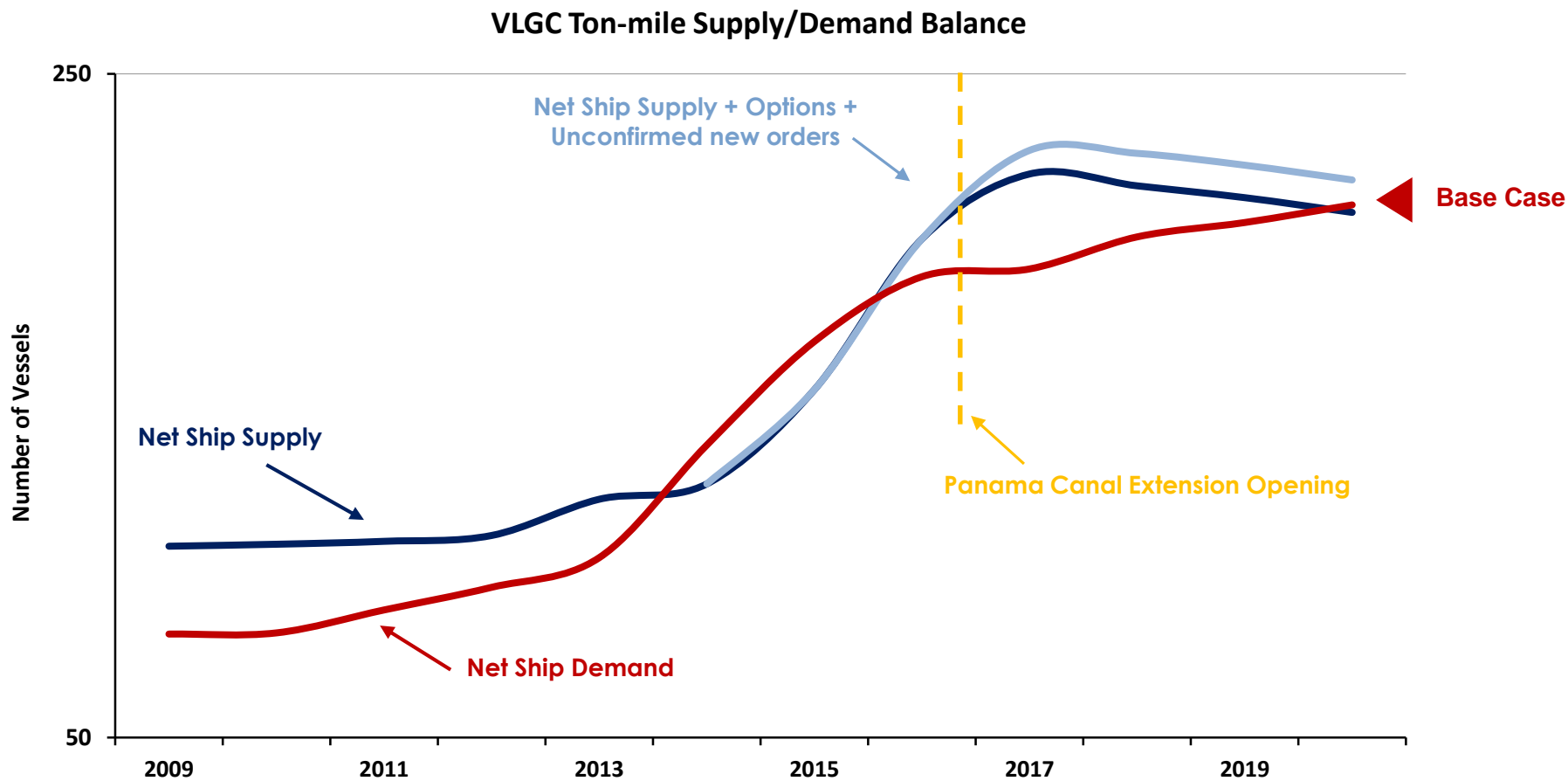
*Base: Represents our base case scenario of volumes exported from US to other regions

Heavy VLGC N/B delivery schedule expected...

The VLGC Fleet - Feb 2016



... which will put downward pressure to freight levels



— Source, Poten & Partners



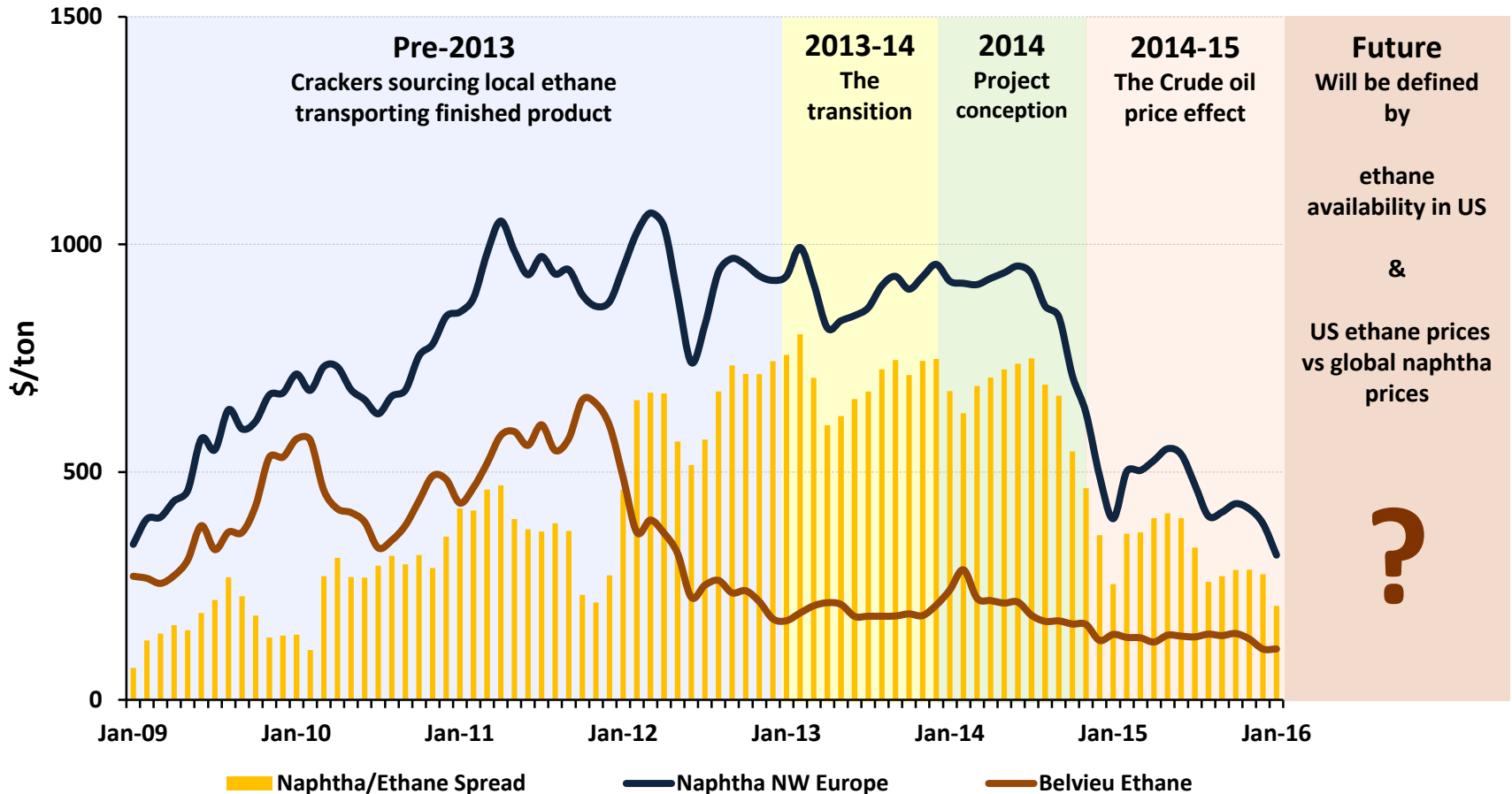
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2 - Ethane Market



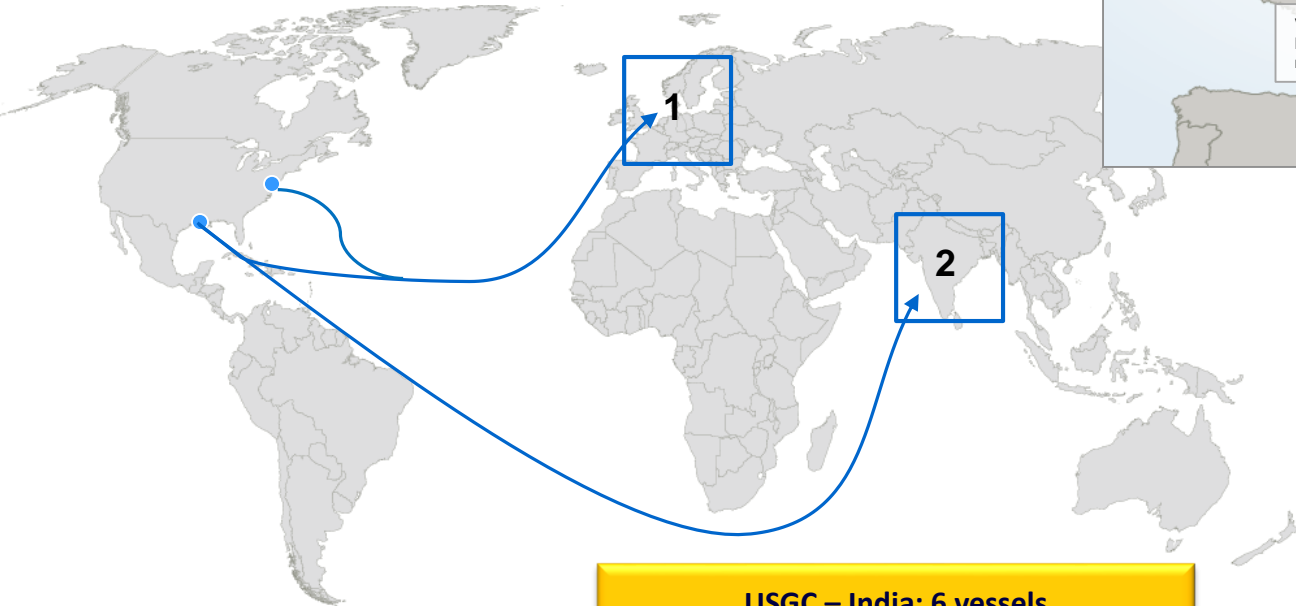
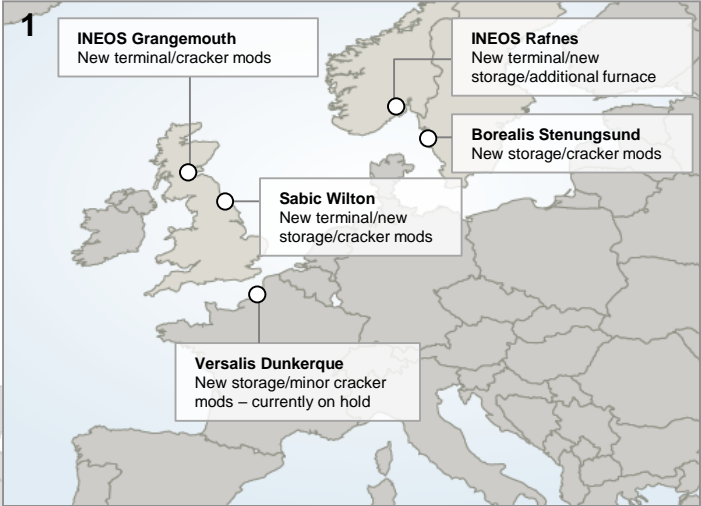
The phases & creation of the ethane seaborne market

Mont Belvieu Ethane vs NW Europe Naphtha Prices

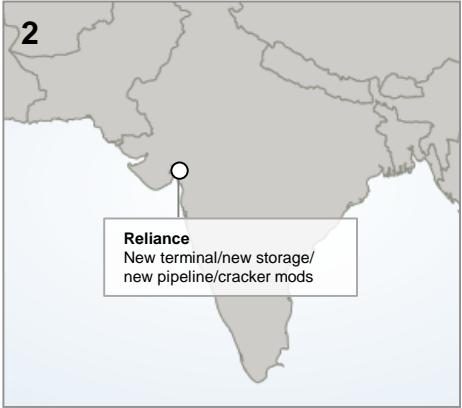


Current market snapshot

USEC – North Sea: 7 vessels
USGC – North Sea: 3 vessels
Estimated ethane contracts: 60-70 kb/d



USGC – India: 6 vessels
USGC – Far East: 5 vessels*
Estimated ethane contracts: 45-50 kb/d

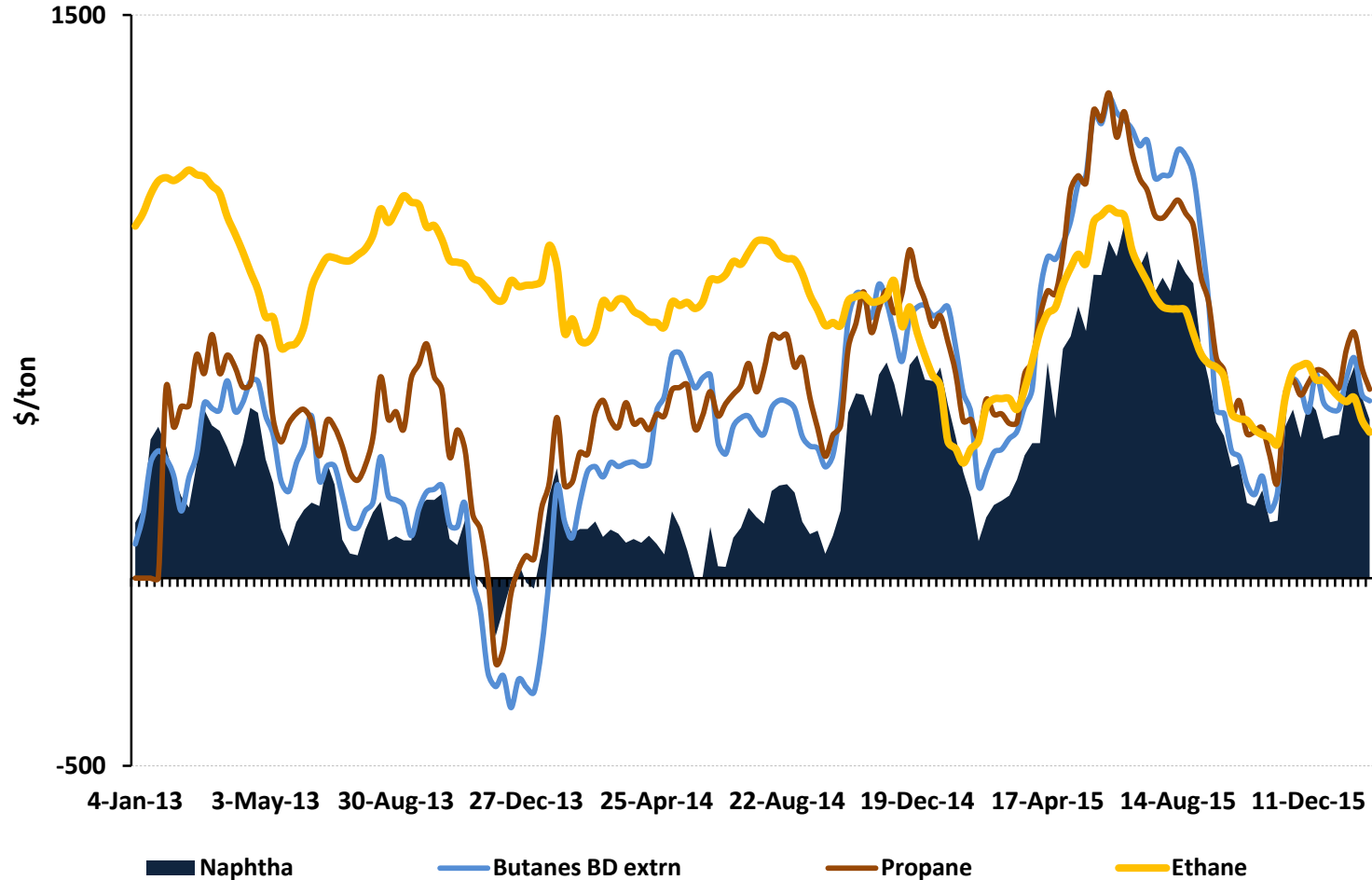


*Vessels reportedly ordered, but as of Jan 16 no US supply contract was confirmed

— Source, Poten & Partners

Cracking MB-priced US ethane in Europe no longer so attractive

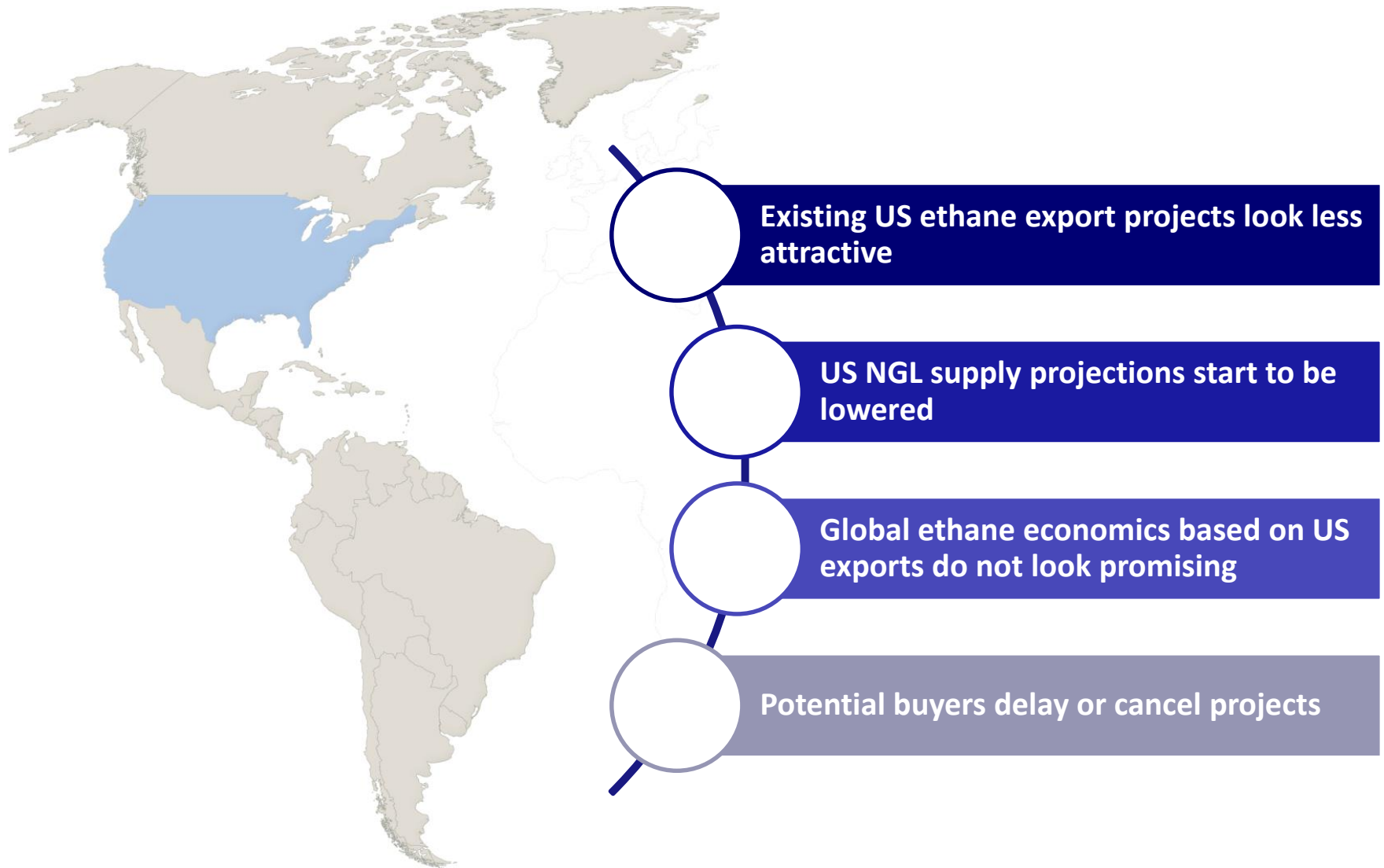
NW Europe Cracker Margins by Feedstock



*Ethane delivered price: MB + terminal fees + shipping + import costs

— Source, *Poten & Partners*

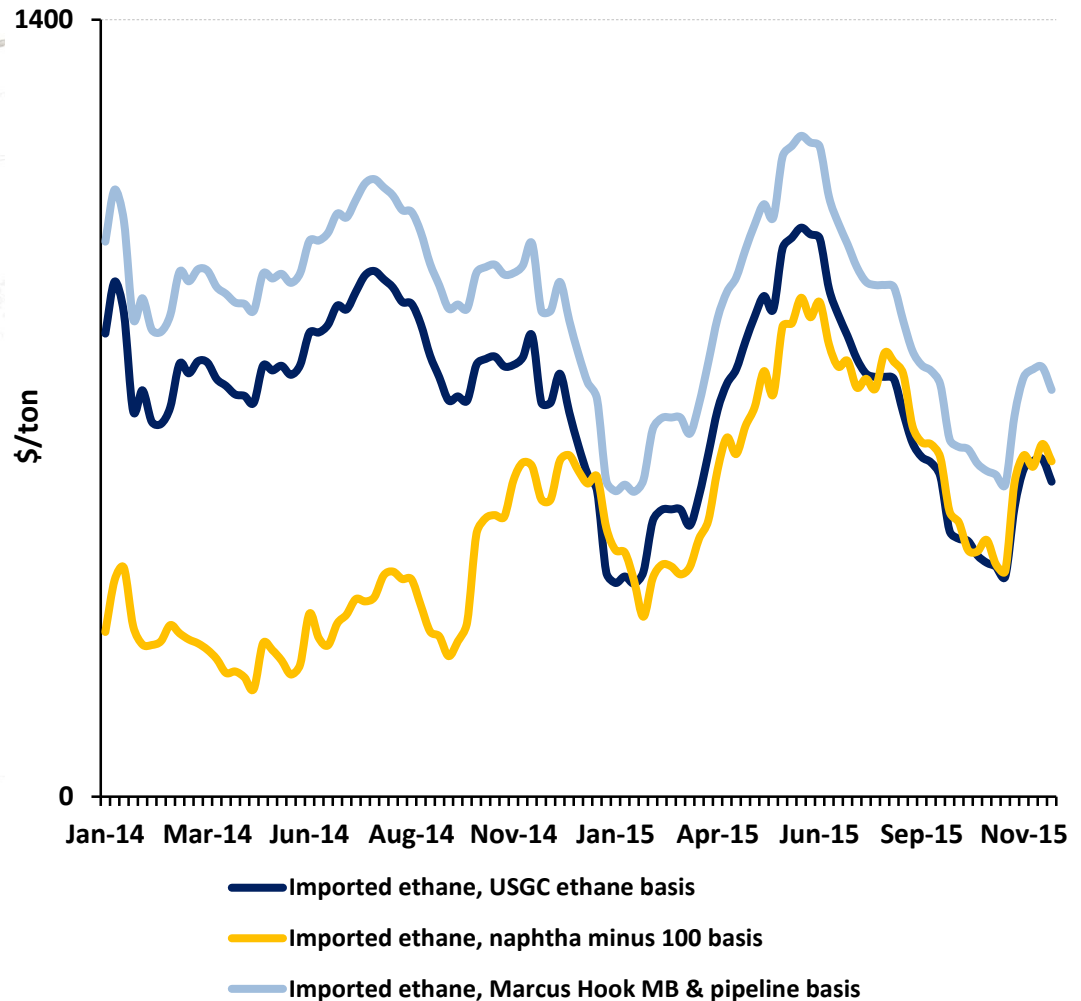
... the result is to *'shake up the market'*



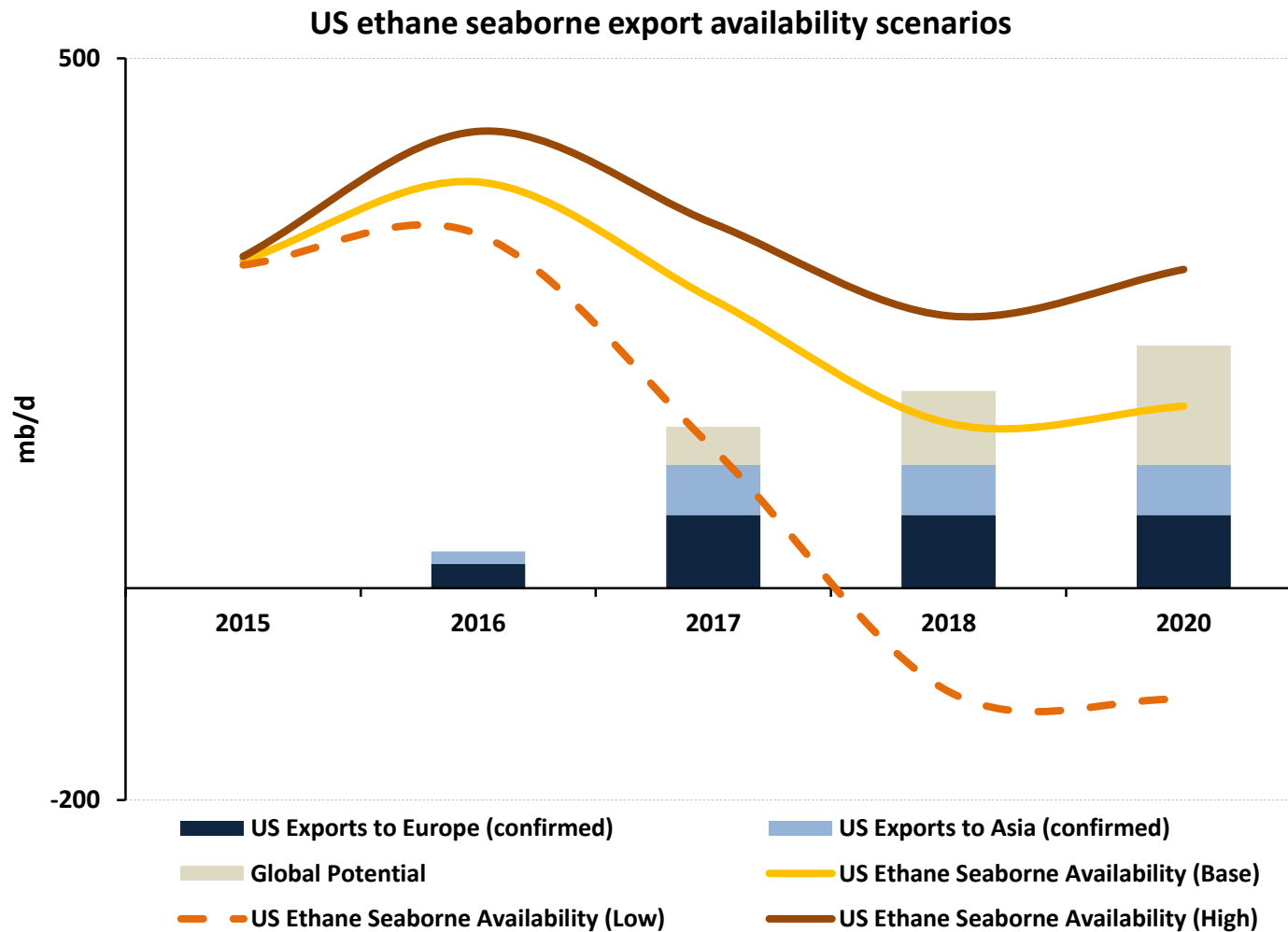
Note: Economics/export potential differ between USGC & USEC



NW Europe Ethylene Plant Incremental Margins



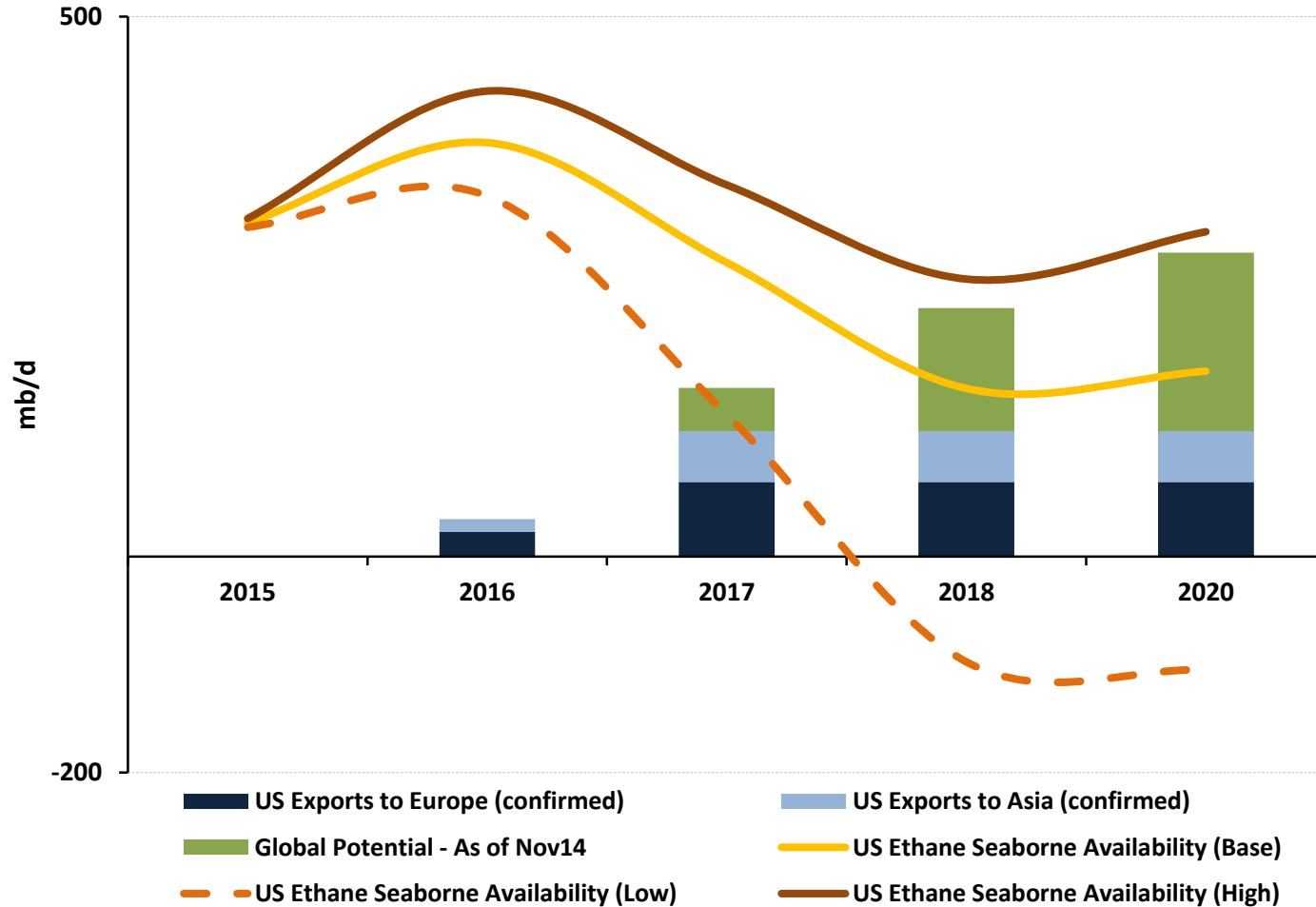
Ethane availability sufficient for current projects



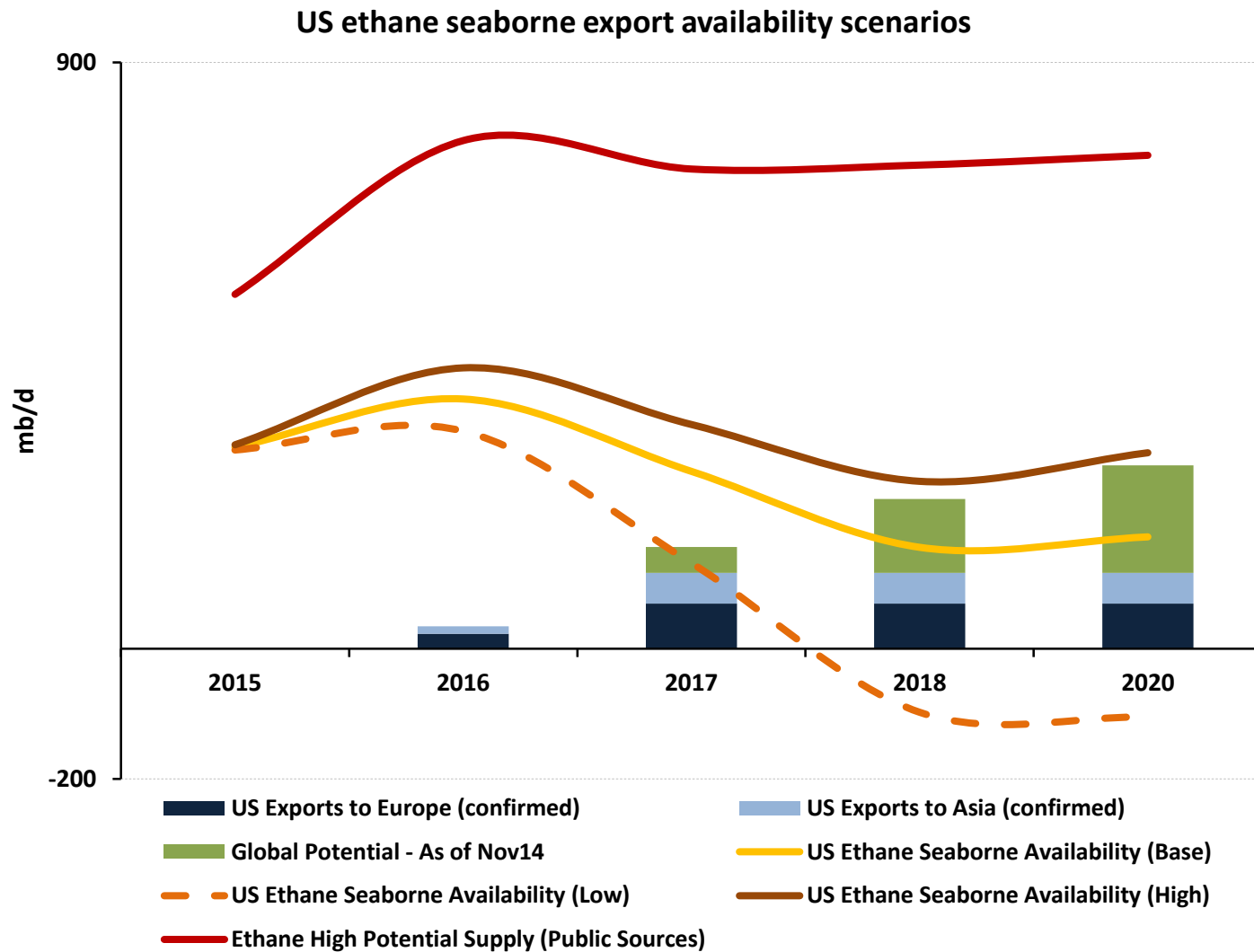
Earlier export estimations theoretically viable:

It all comes down to crude projections and drilling economics

US ethane seaborne export availability scenarios

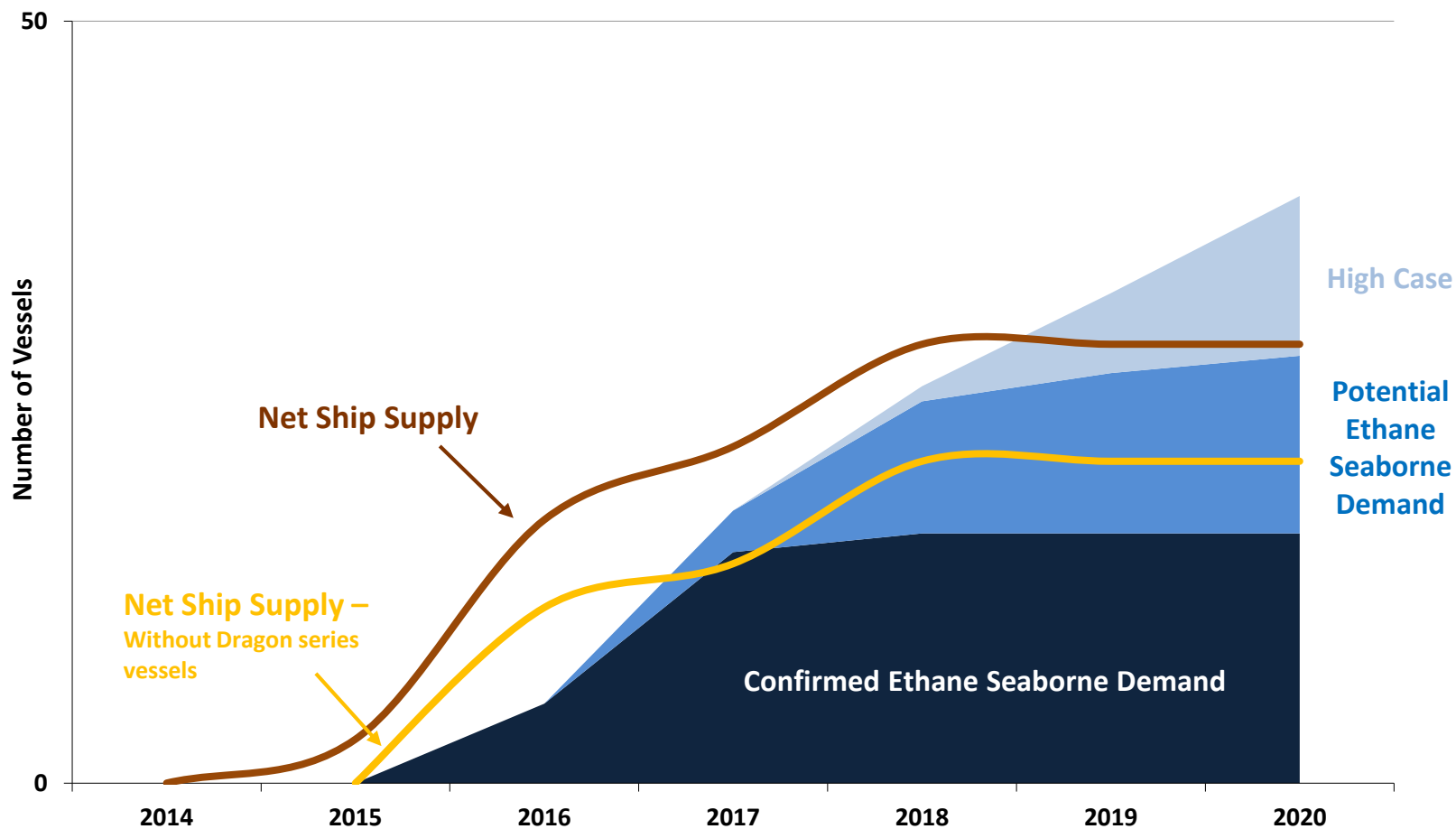


An alternative scenario: Unlocking the export door



Ethane shipping already in place for current contracts

Ethane Shipping Supply/Demand Balance





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3 - Closing Thoughts



Closing thoughts

LPG

- Global LPG seaborne export availability increases, especially out of US
- Western markets are fundamentally long and the excess supply will need to move towards the retail and petchem markets of Asia
- Shipping rates have already started to weaken and will remain weak toward 2018-19

Ethane

- Ethane seaborne market economics challenging at the moment
- Local Naphtha prices vs US ethane prices & US ethane export availability will largely define the future of the ethane seaborne market
- If both factors coincide, then ethane import demand could be created in Europe, Asia and L. America

Expect Uncertainty

Expect Volatility

Identify key short-term/long-term drivers

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