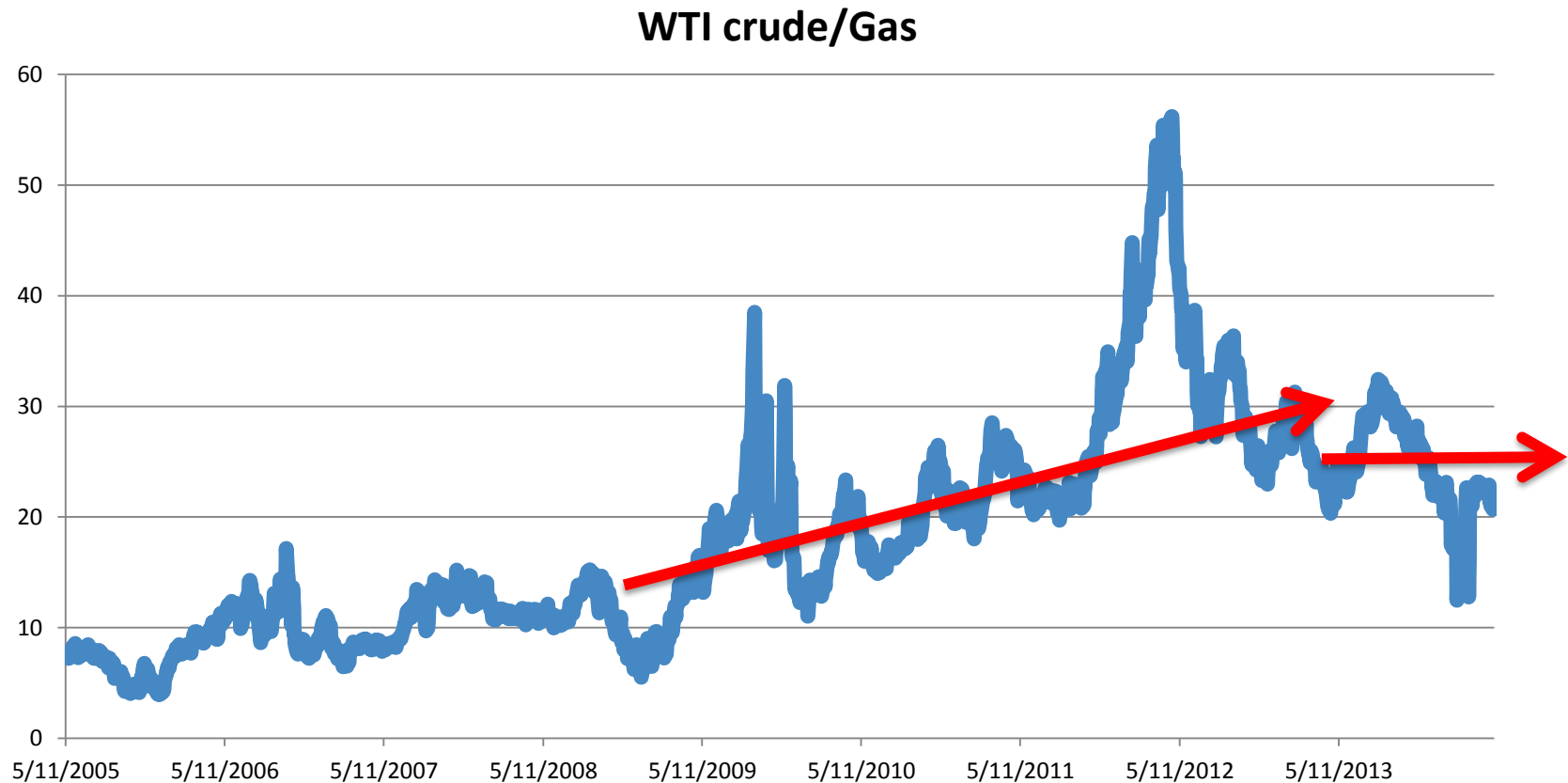


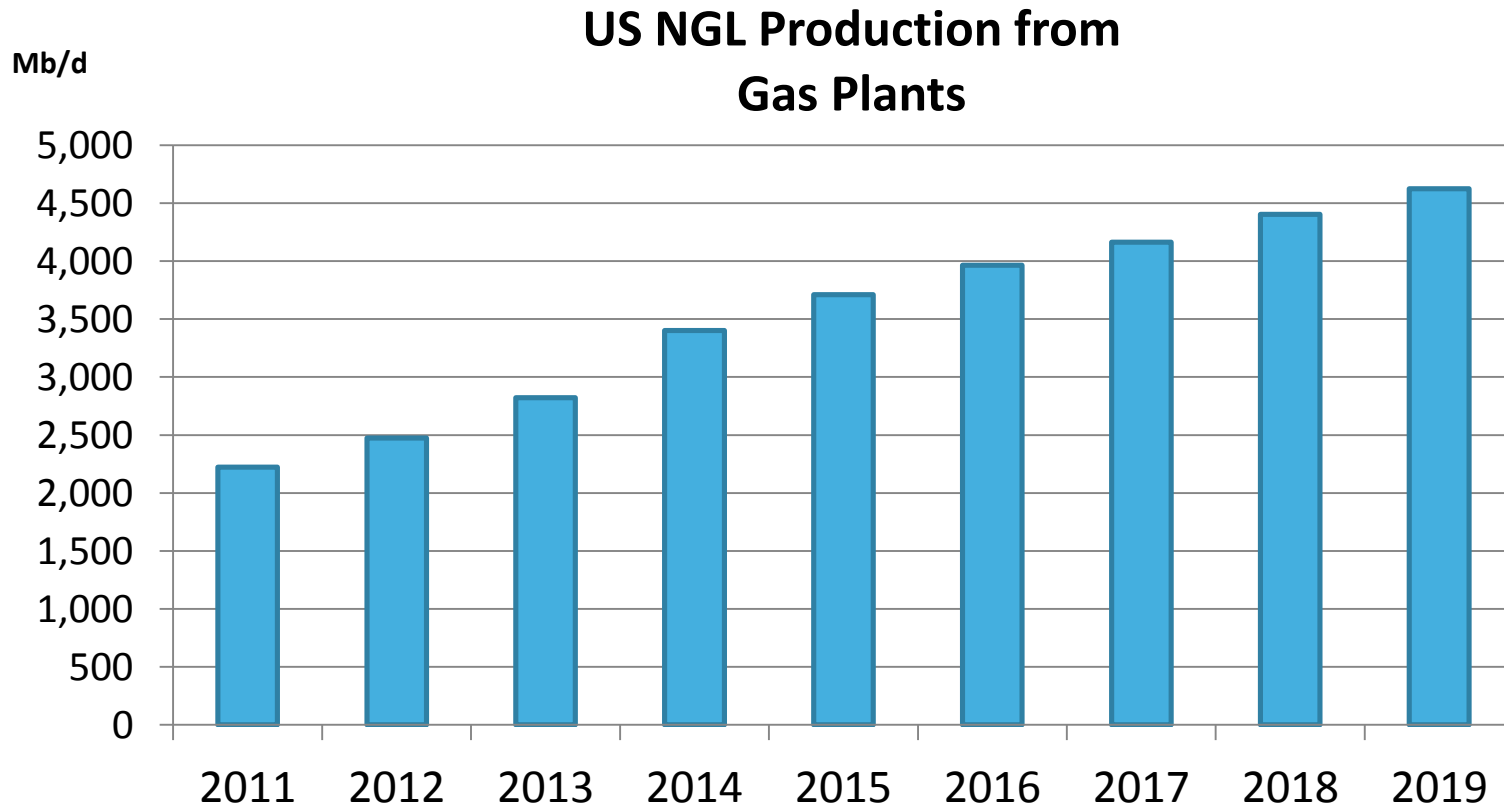
US NGL Market Update

Michael McCafferty, Petrochemical Analyst

- Why is the US producing so much petrochemical feedstock?
- Where is the US producing the NGLs?
- Where the NGLs are going?
- How have prices reacted recently?
- What is the longer term supply/demand balance for US NGLs?

- This relationship is core to the US NGL boom and the subsequent build out in North American petrochemical infrastructure
- Seen as one proxy for drilling activity in liquid rich shale plays

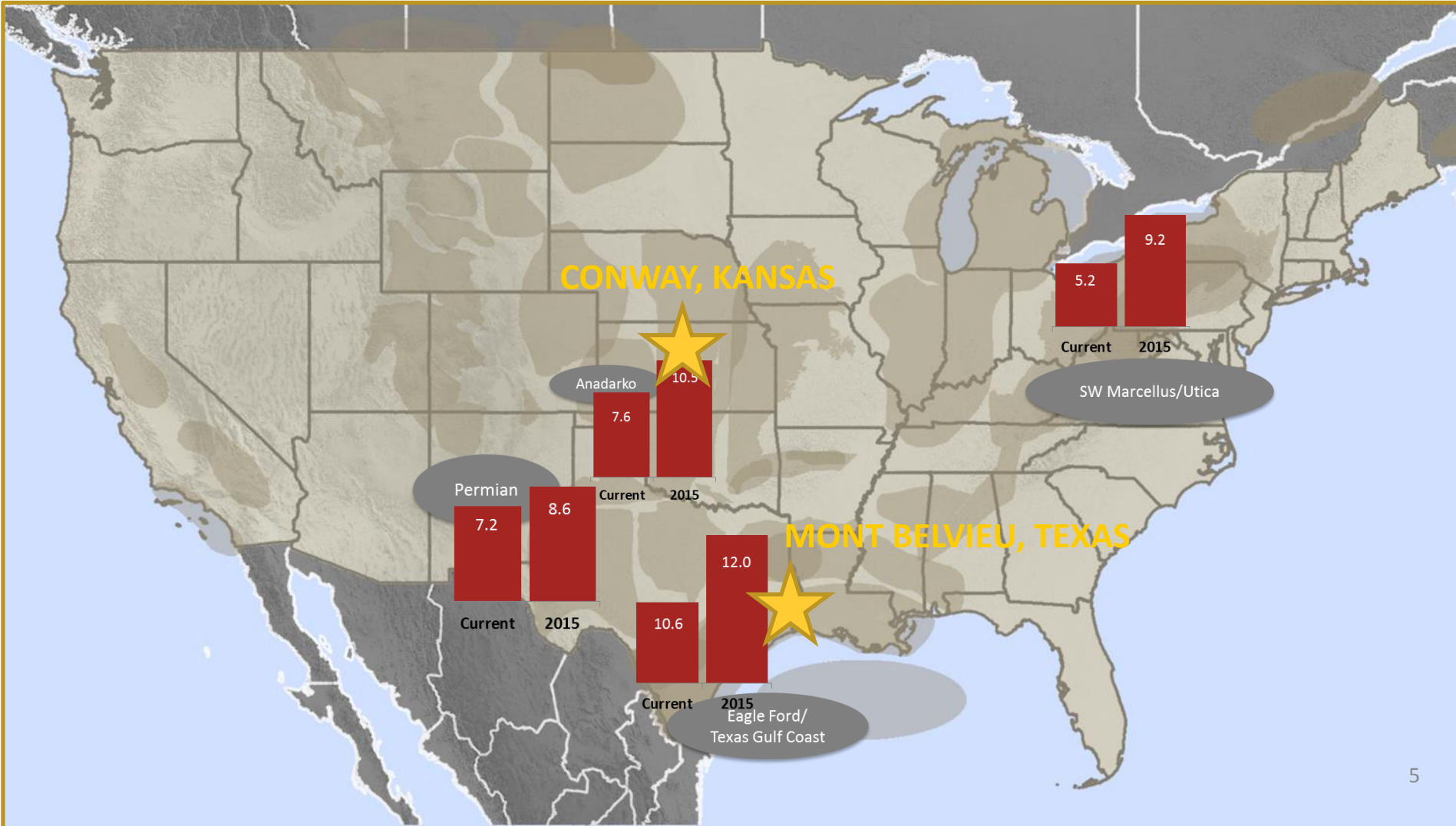




- **The growth in NGL production has mirrored a high crude-to-gas ratio**

Growth concentrated in four major areas

- Nearly all incremental NGL pipeline infrastructure is pointed to the Gulf Coast with some North East capacity heading for the Atlantic Ocean and Canada.



Ethane supply/demand balance

Rejection continues, exports on the horizon.

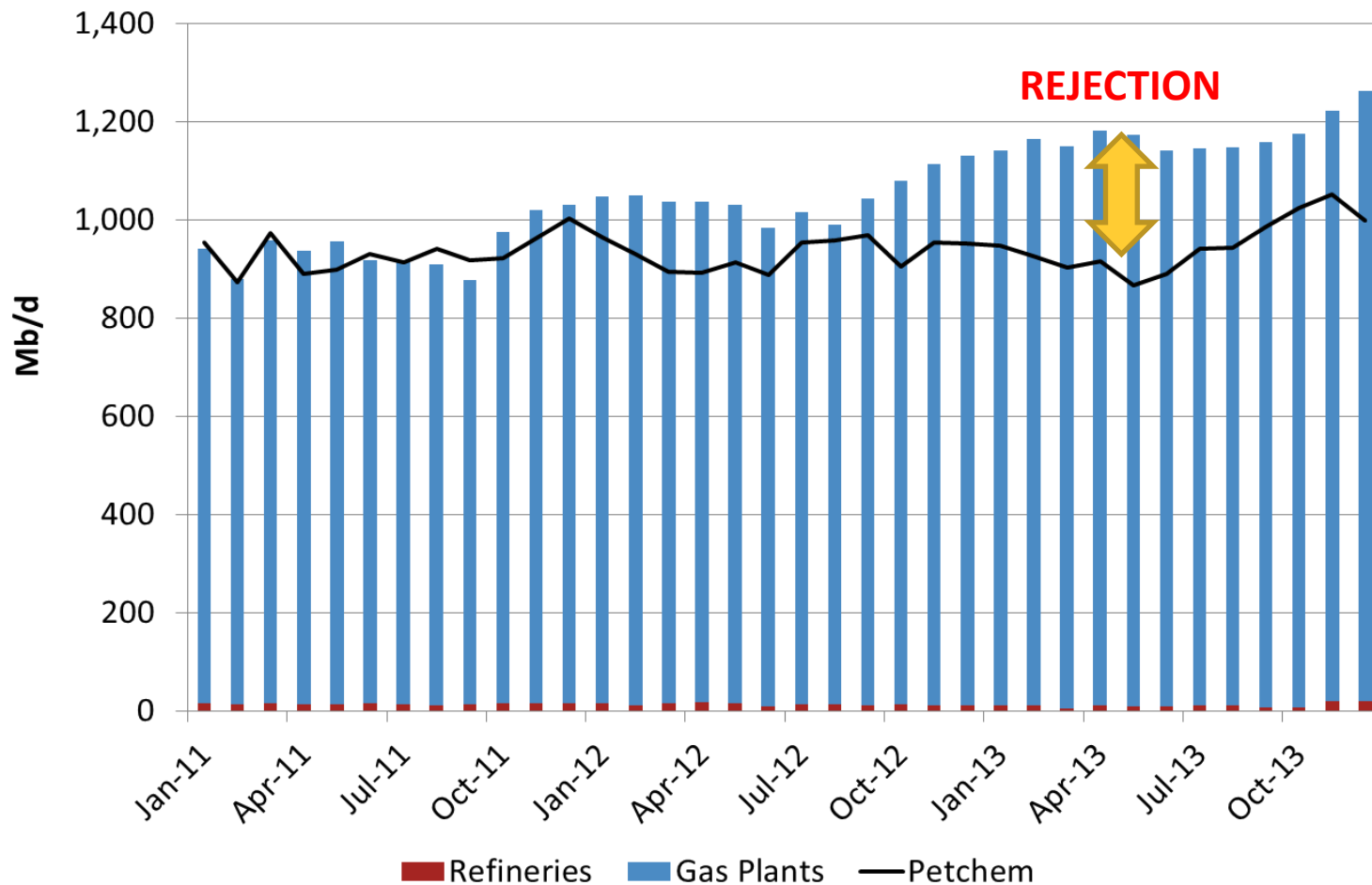


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Ethane continues to be oversupplied

Ethane Supply vs. Petchem Demand

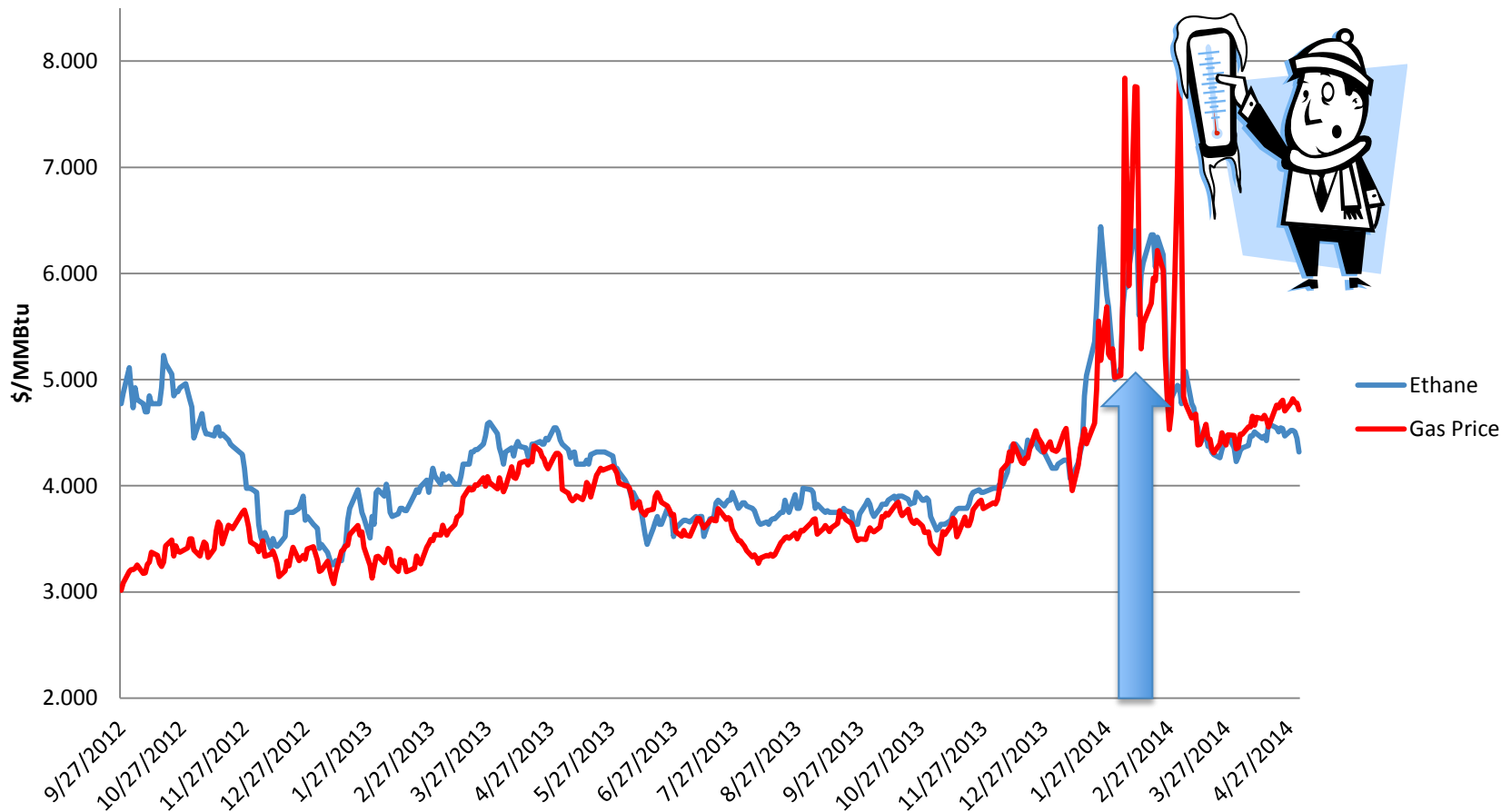


- “Rejection” is leaving ethane in the natural gas stream instead of purifying it out for individual sale.

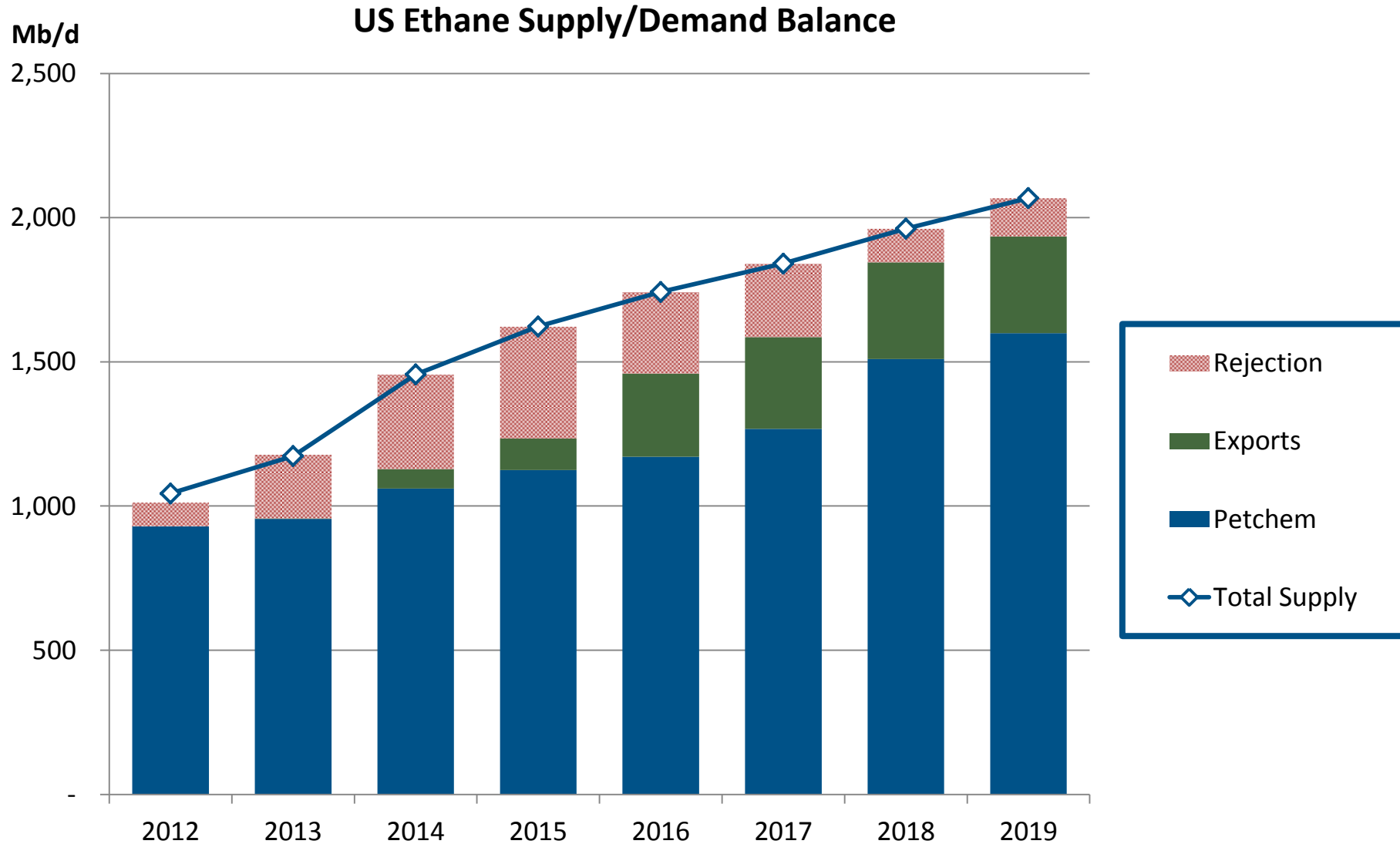
Rejection occurs when downstream demand is inadequate

- Ethane prices: gas floor with no place to go

Ethane's BTU value



Rejection continues to ramp up, then falls

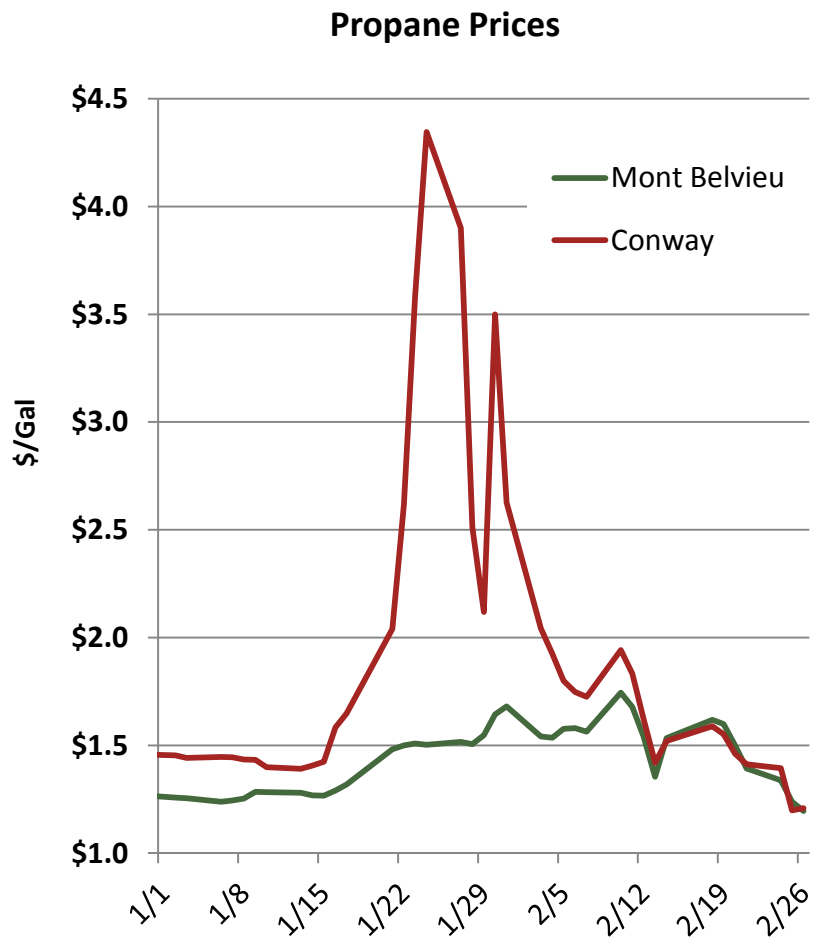
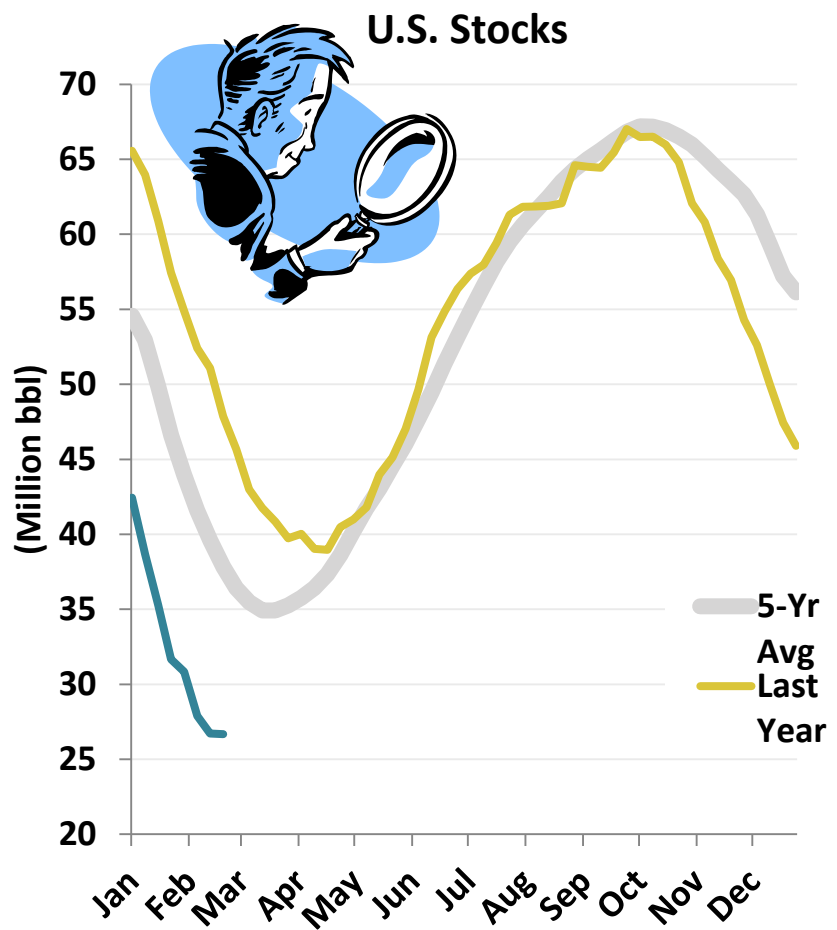


- Ethane at mercy of gas prices
- Recently cold winter spiked gas prices and ethane followed suit
- In longer term (2018-2020) the export market and petrochemical demand offer upward support and disconnect from gas.

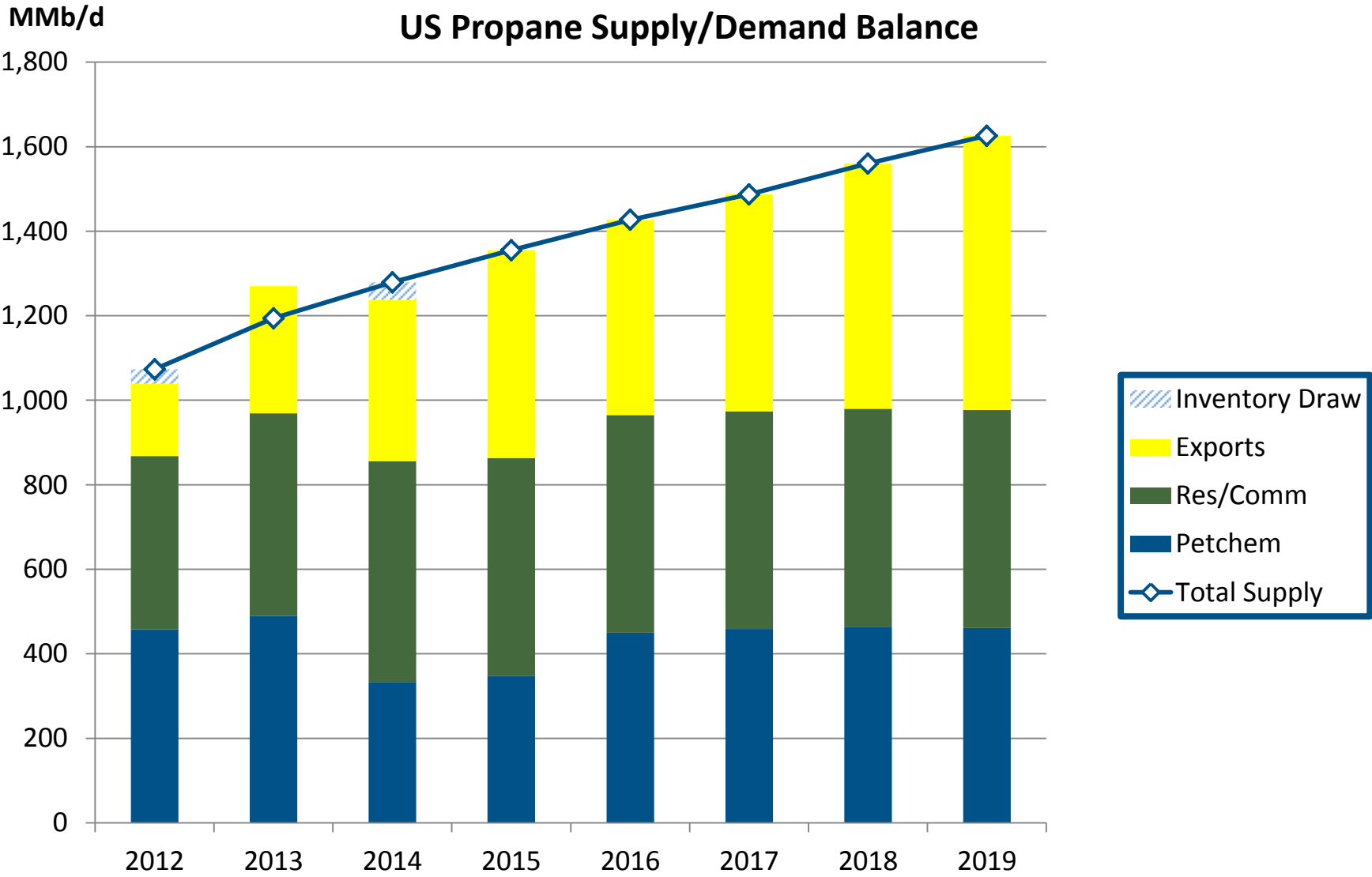
LPG Market: exports, exports, exports

Exports tighten domestic market, move prices closer to Intl' markets

Propane stocks fall on multiple factors, prices spike



Propane s/d balance, exports growing



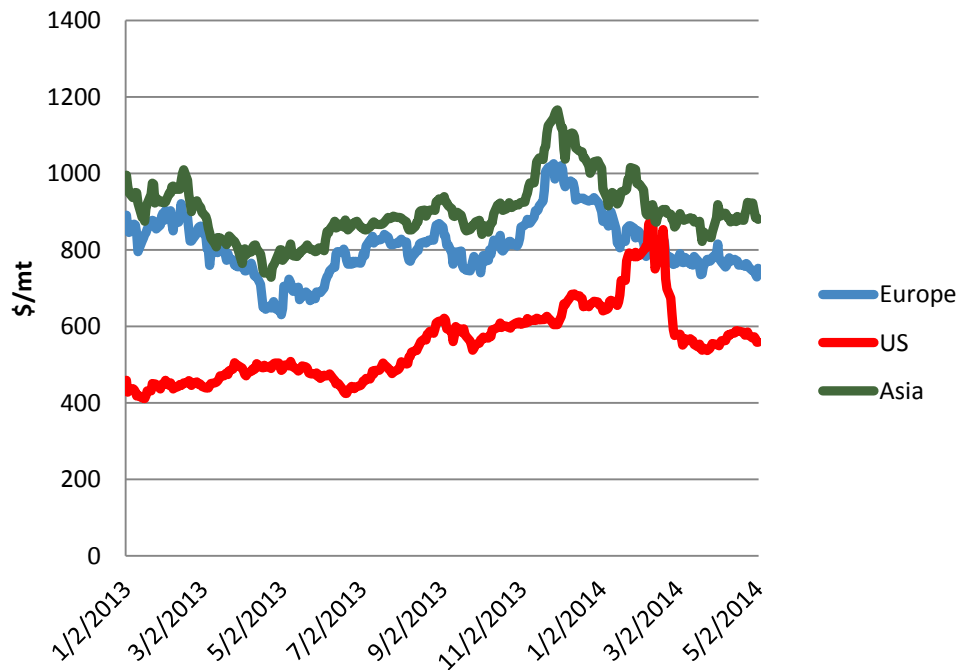
Asia emerges to take additional volumes

Company	Project Name	State	LPG Export Capacity (Mb/d)	In-Service Date
Existing LPG Export Terminals			400	
Enterprise	Enterprise	TX	130	NA
Enterprise	Enterprise Expansion I	TX	120	2013
Targa	Galena Park	TX	50	NA
Targa	Galena Park Expansion Phase I	TX	83	2013
Sunoco Logistics	Marcus Hook	PA	17	NA
Brownfield Expansions			490	
Enterprise	Enterprise Expansion II	TX	50	2015
Enterprise	Enterprise Expansion III	TX	233	2015
Targa	Galena Park Expansion Phase II	TX	67	2014
Sunoco Logistics	Marcus Hook Expansion I	PA	70	2014
Sunoco Logistics	Marcus Hook Expansion II	PA	70	2015
Greenfield -- New Builds			517	
Occidental Chemical	Oxy	TX	150	2015
Mariner South	Mariner South	TX	200	2015
Crosstex Energy LP	Crosstex	LA	NA	2015
Repurpose			147	
Phillips 66	Freeport LPG	TX	147	2016

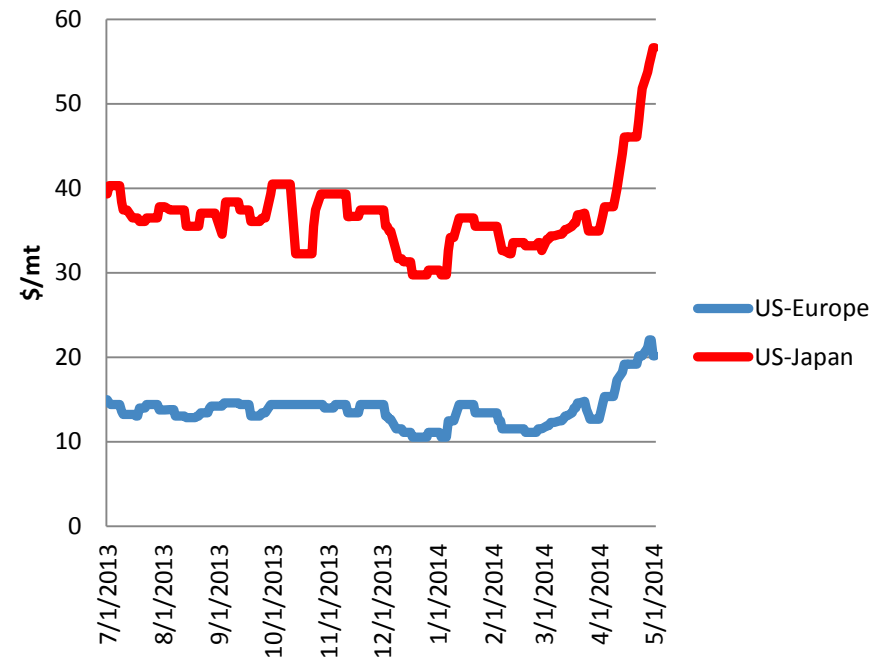
International propane prices starting convergence



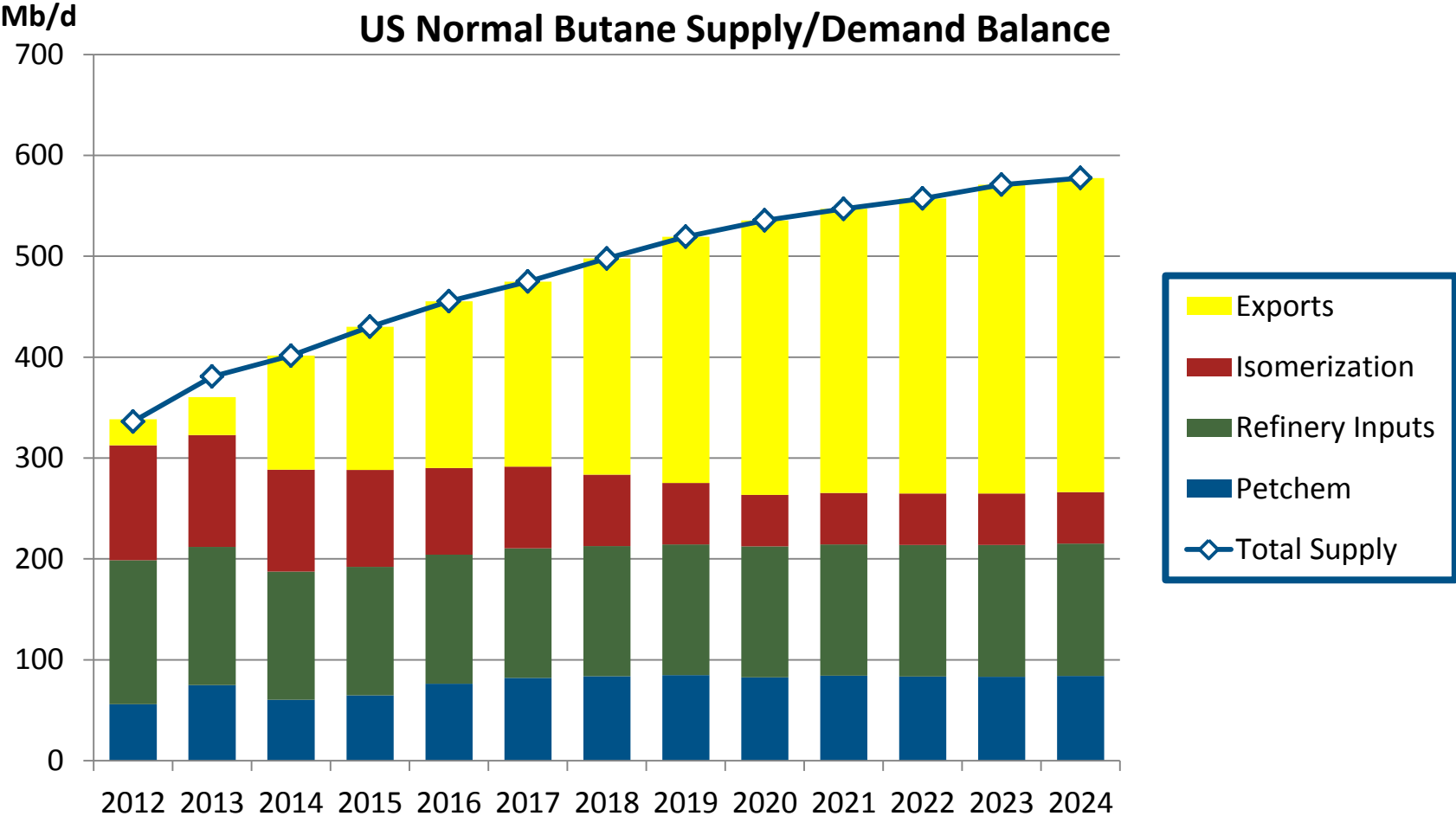
Int'l propane prices



US Gulf Coast LPG freight

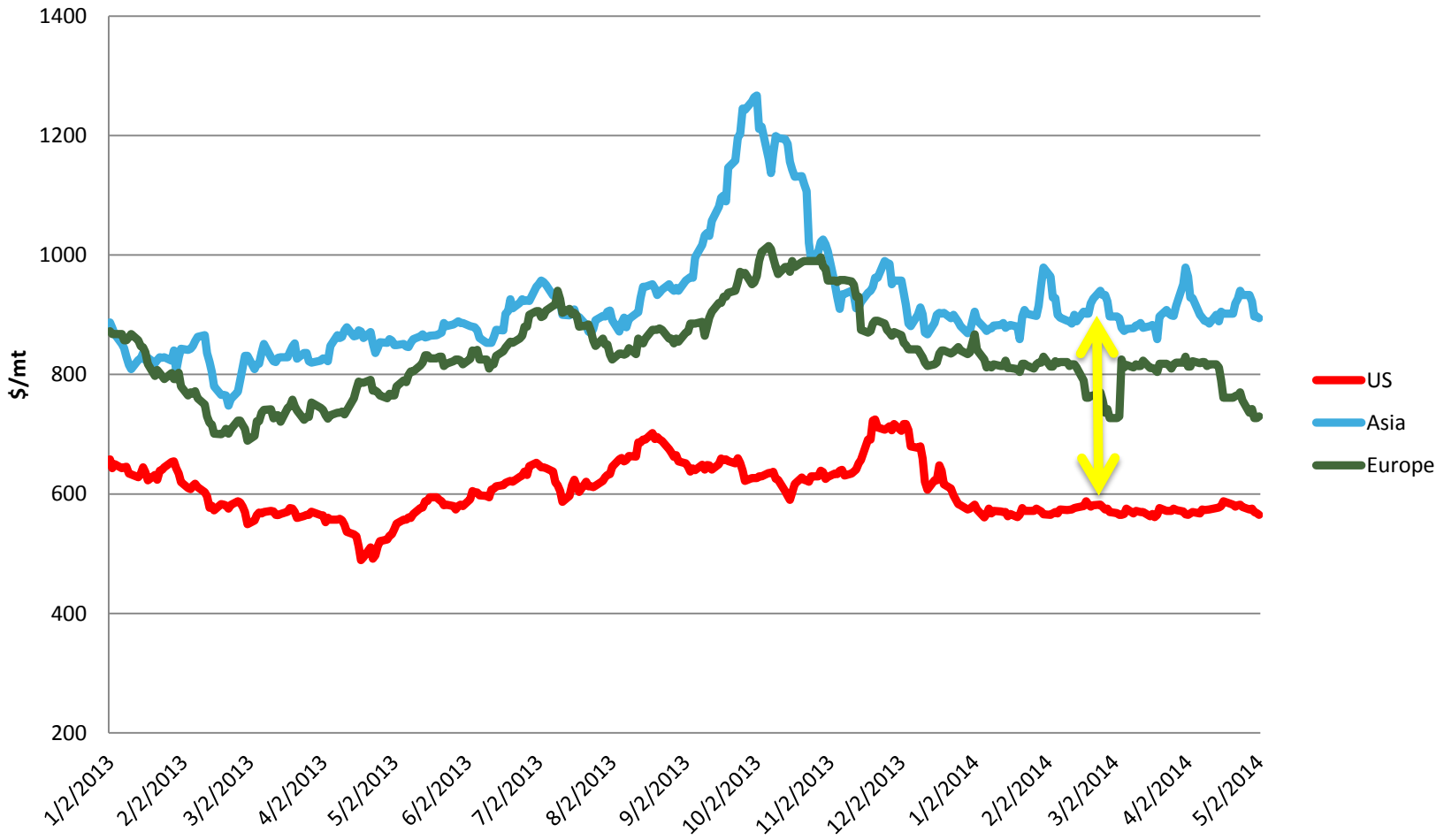


Butane supply/demand balance



Butane price differentials remain wide

Int'l Butane Prices

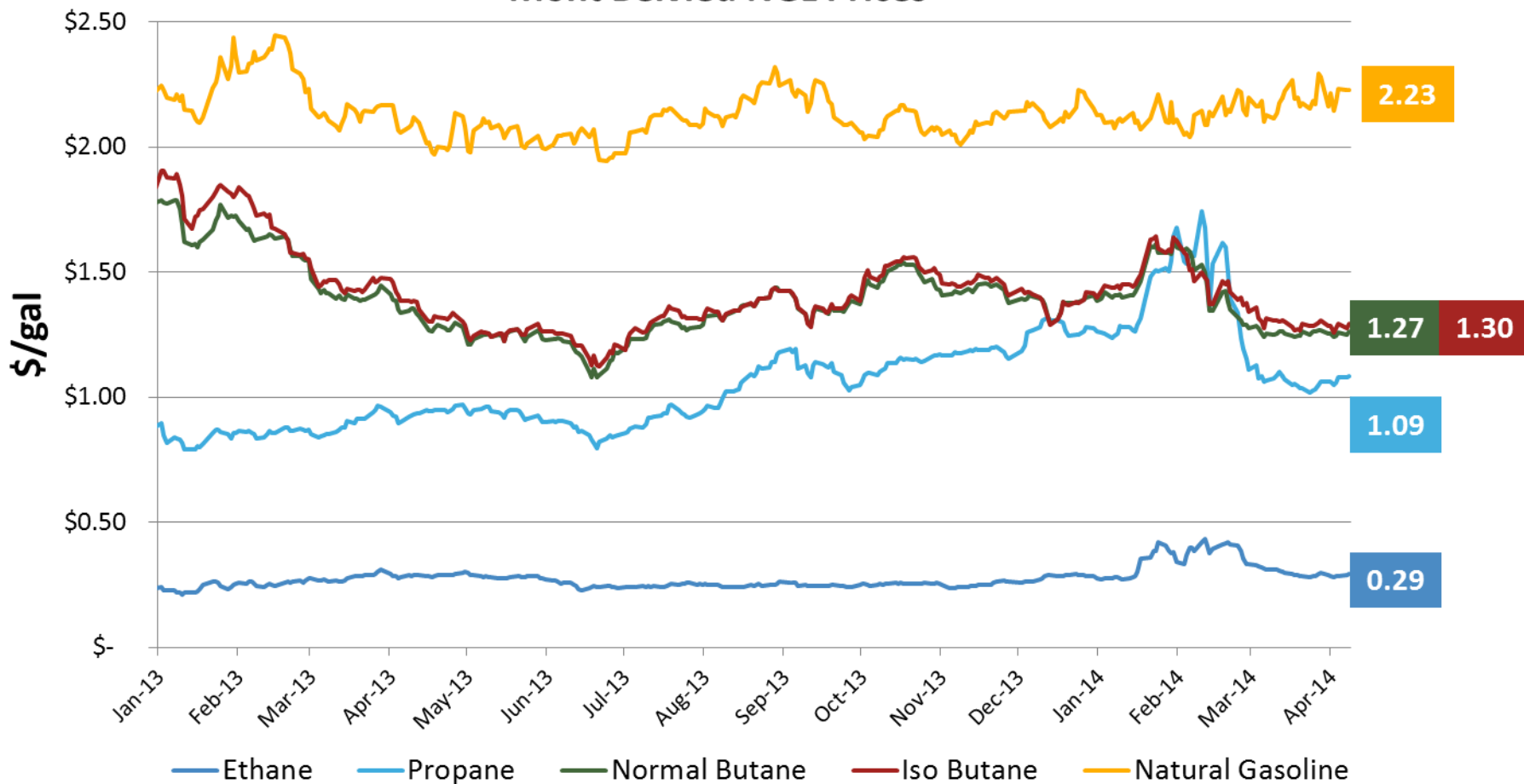


- US NGL production continues to grow on favorable drilling economics
- Weather will always create short-term challenges/opportunities that models cannot predict
- Exports will be the key factor to balance the market. Prices remain depressed otherwise.
- Meaningful demand will materialize in the 2015-2018 time frame
 - New steam crackers
 - LPG export facilities
 - PDH units
- Market Risks
 - Timing and completion of large, capital and labor-intensive projects
 - The ability of the global market to absorb incremental NGLs
 - Maintaining a wide crude-to-gas ratio

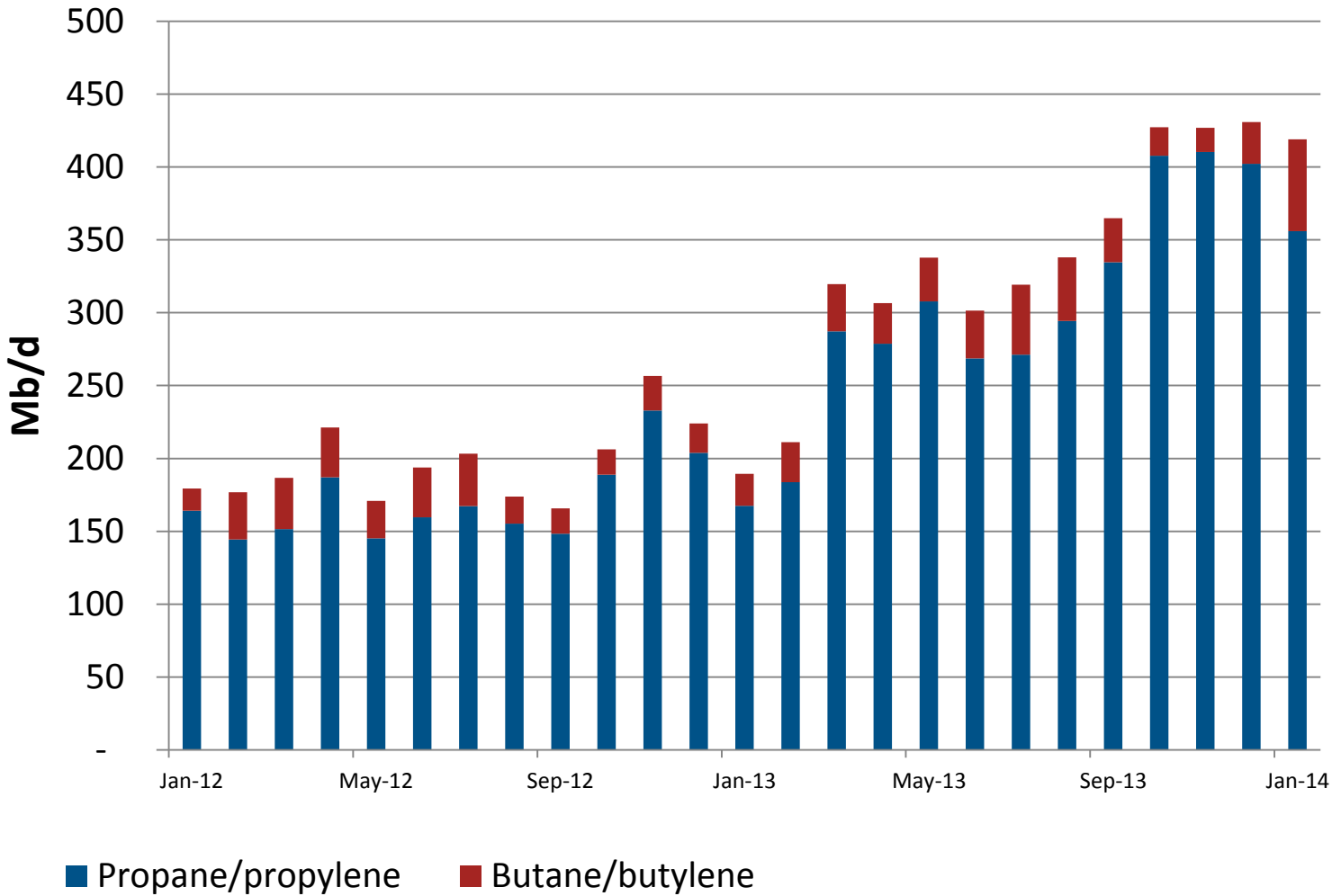
Thank you!

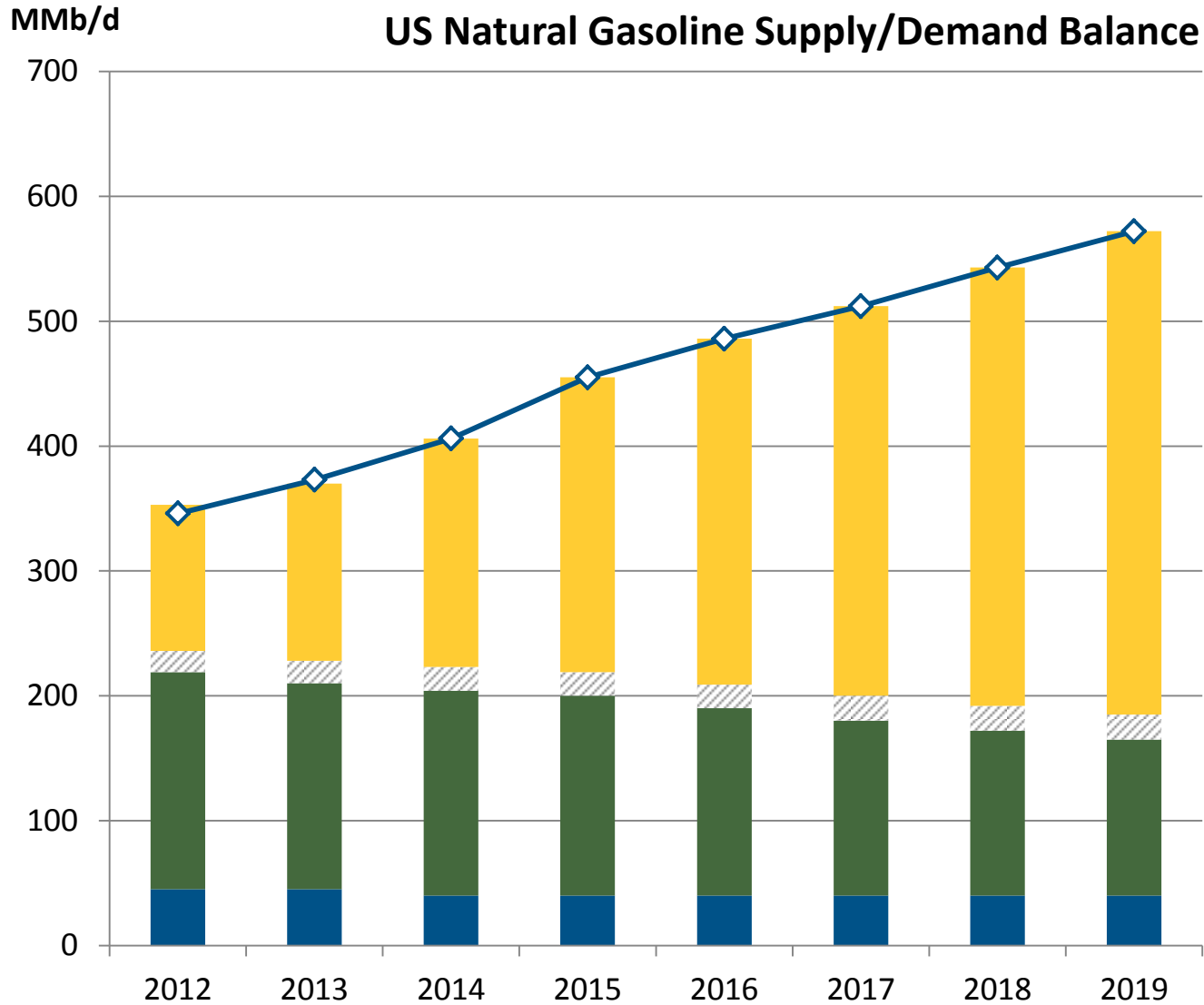
Michael.mccafferty@platts.com

Mont Belvieu NGL Prices



LPG Export Volumes





Percent of US LPG export to Brazil/Mexico

