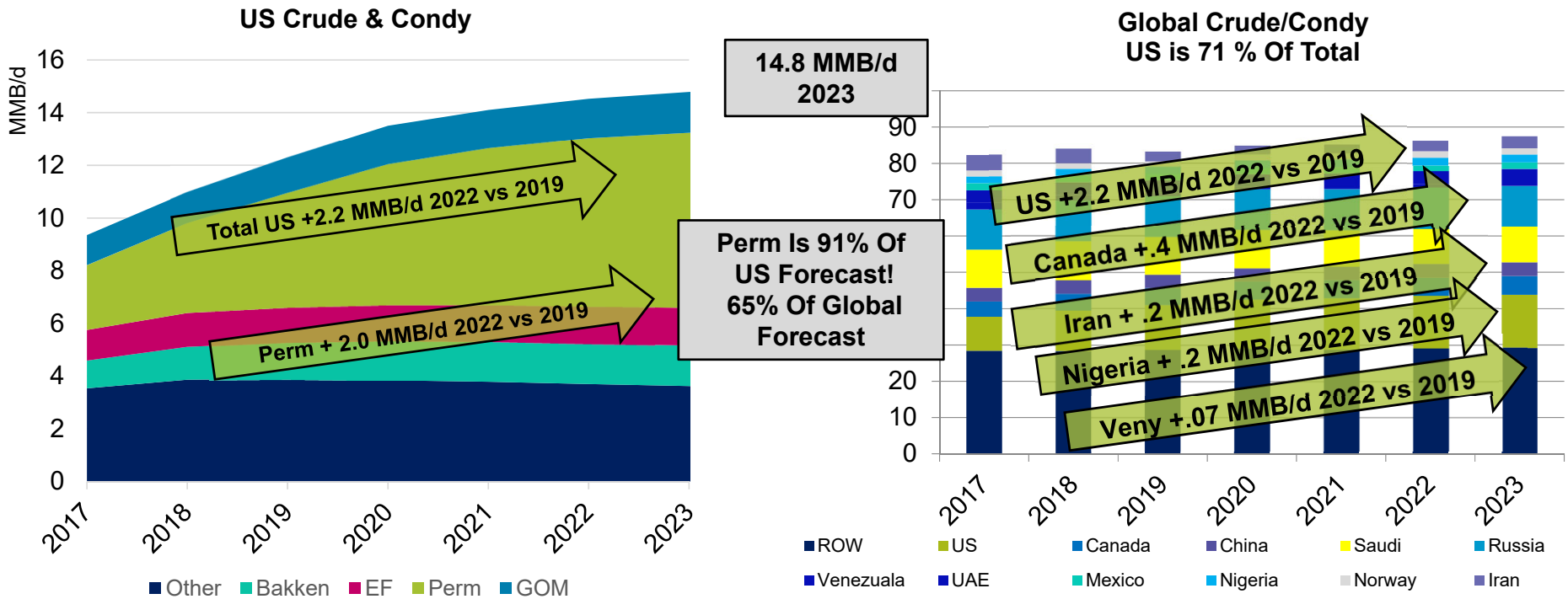


US Natural Gas Goes Global Driven By US Permian Crude

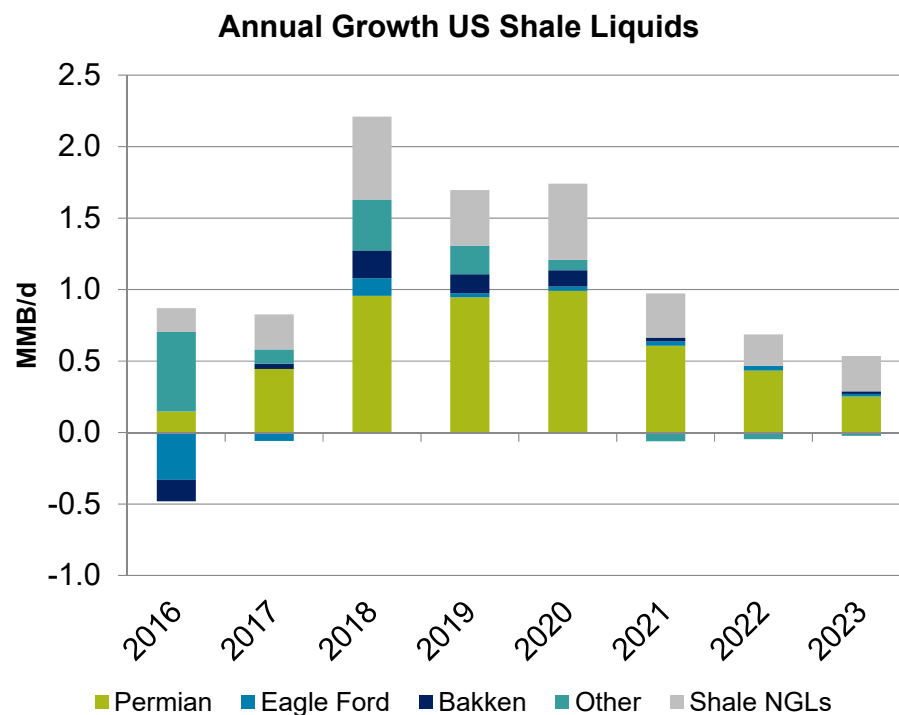
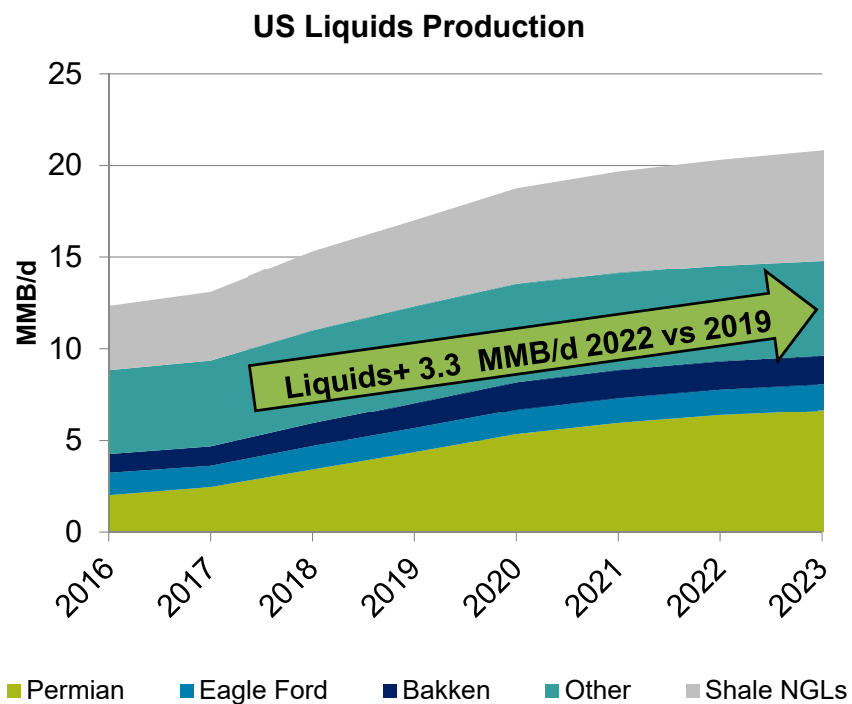
November 2019

US Is 2.2 MMB/d Of Global 3.1 MMB/d Forecast 2022 vs 2019

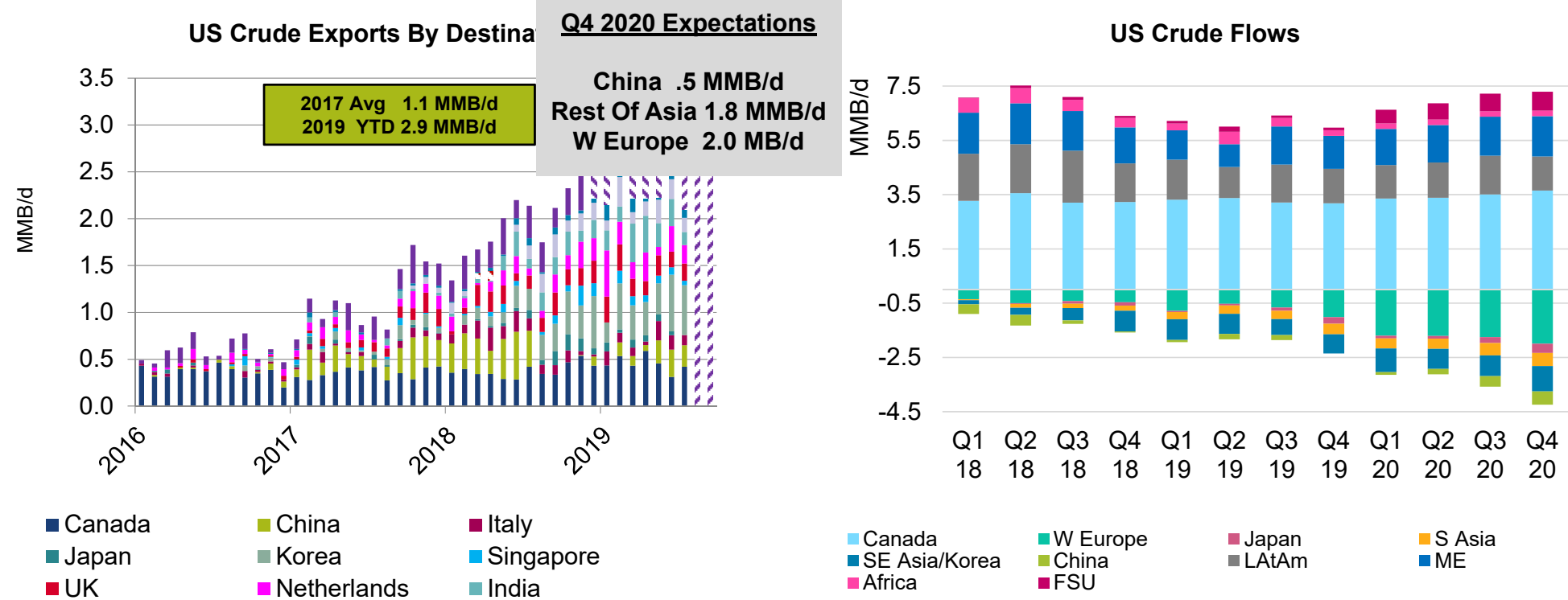
Sept 19 US Production Is 12.4 MMB/d With Perm 4.6 MMB/d (Global 82.8)



While Growth Is Expected – Rate Of Growth From US Slows – NGLs Comprise 34% Of Liquids Production

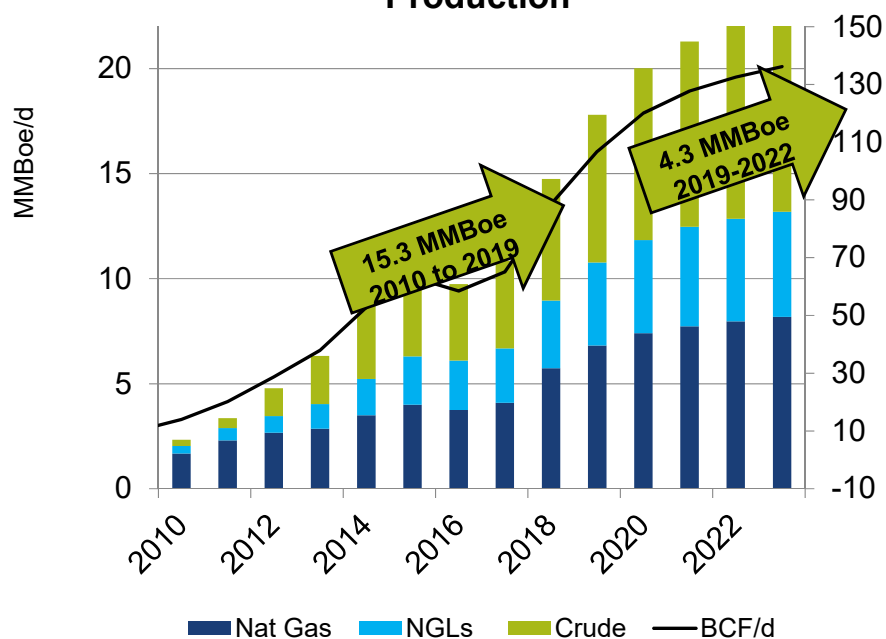


US Crude Flows Continue To Accelerate - Exports Reach 4.3 MMB/d In Q4 2020 – Europe Takes Brunt Of Incremental Flows

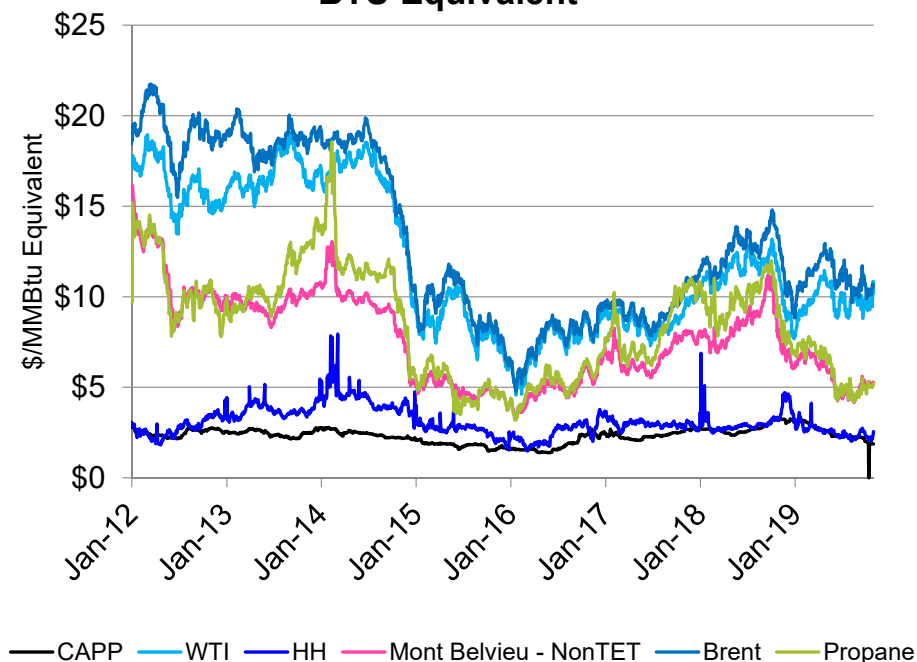


U.S. Liquids and Gas Combined Output Expected to Increase An Additional 4.3 MMBoe/d by 2022 - Oil drives margins But gas and NGLs account for 60% of US output - All BTUs Compete For Market Share

Incremental Annual Liquids & NG Production

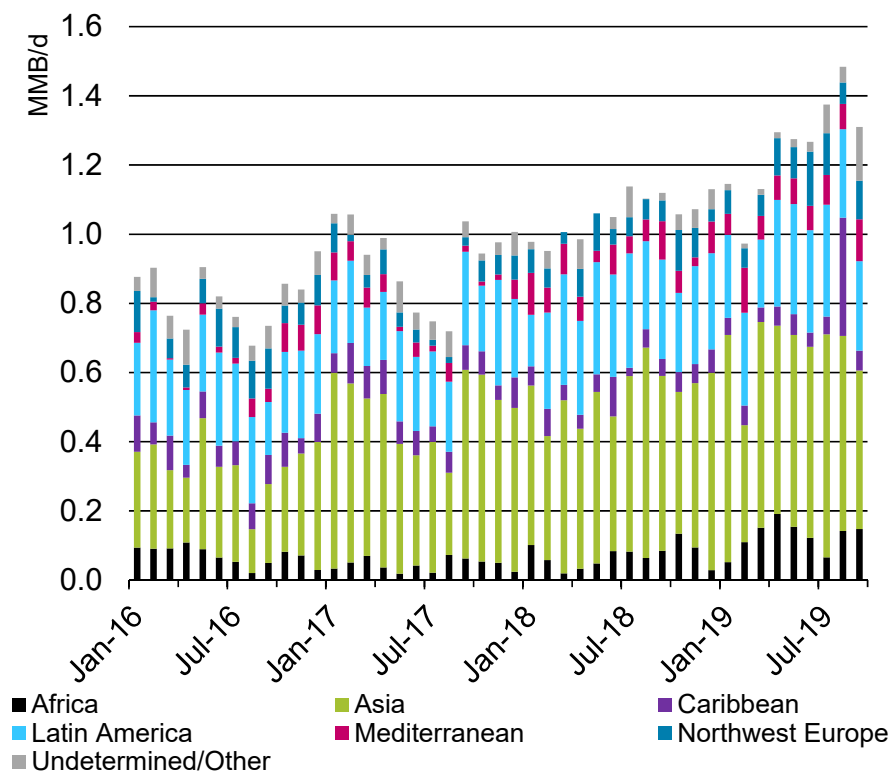


BTU Equivalent

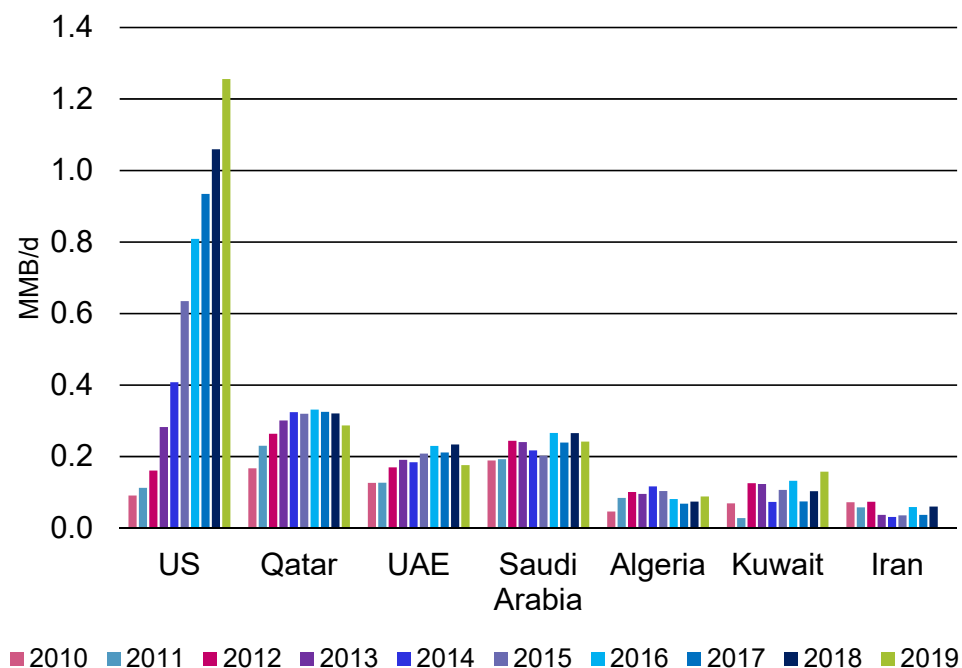


US Waterborne Exports Continue To Grow & Exceed ME Countries Combined - Almost Half Go To Asia - Seasonality Of Exports Diminishes As Supply Outweighs Seasonal Demand

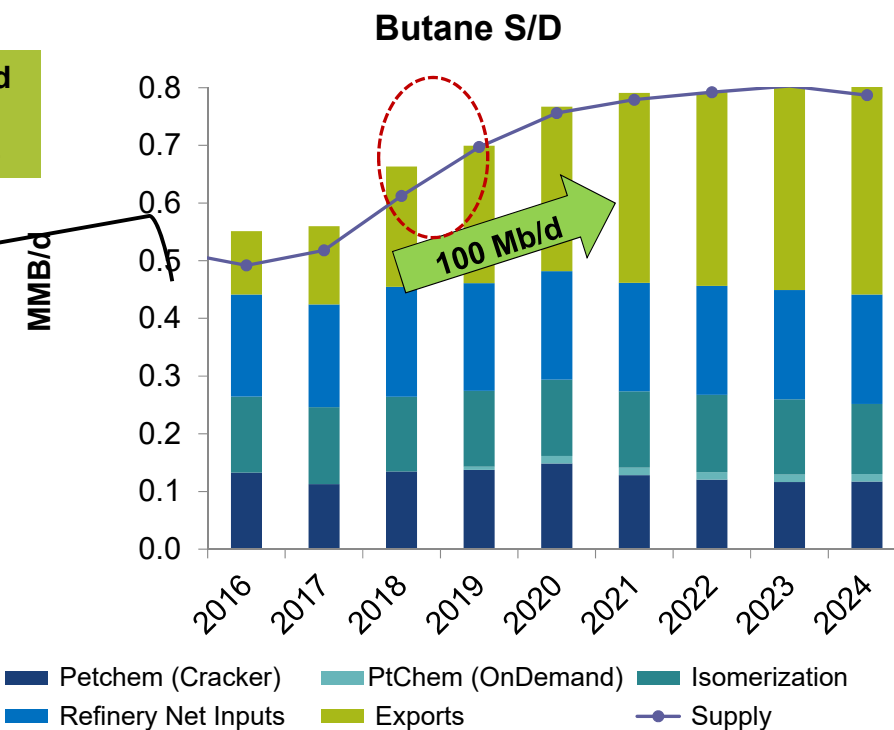
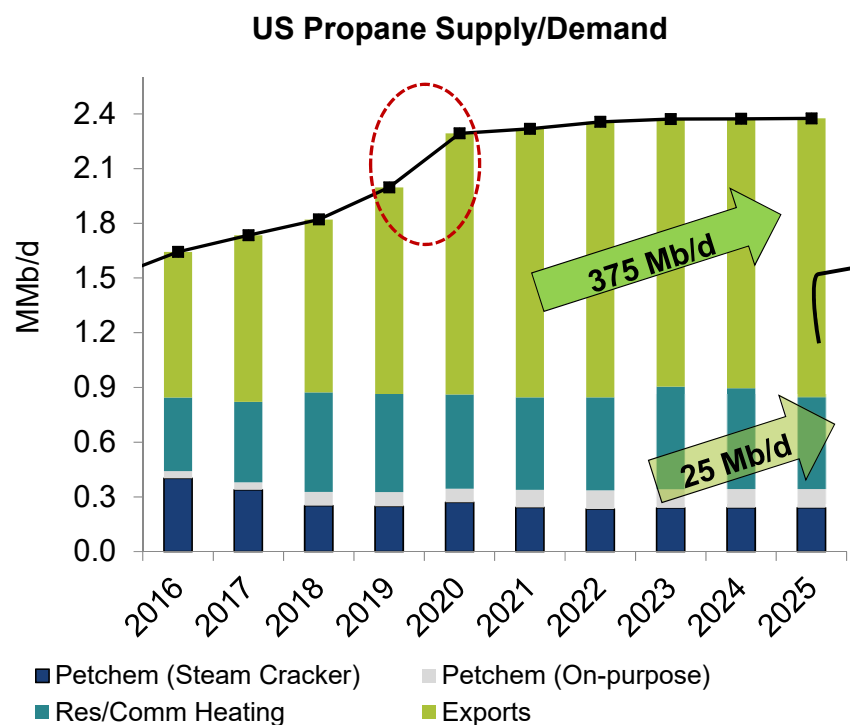
US LPG Exports By Destination



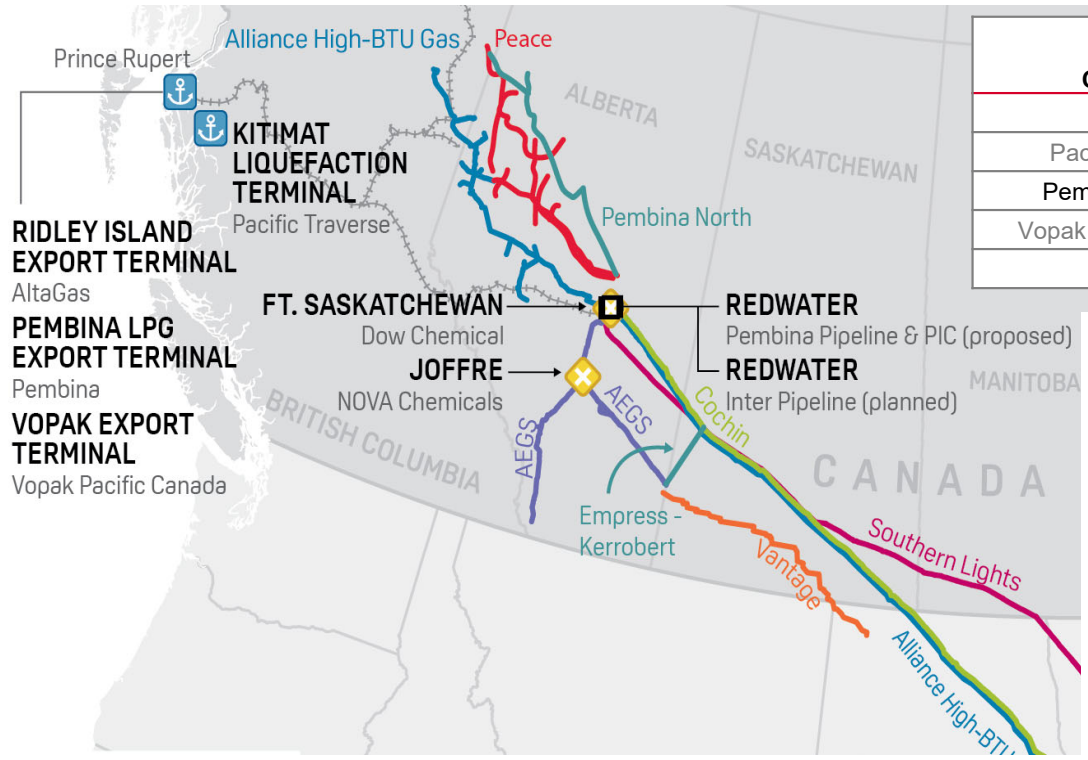
LPG Export By Country



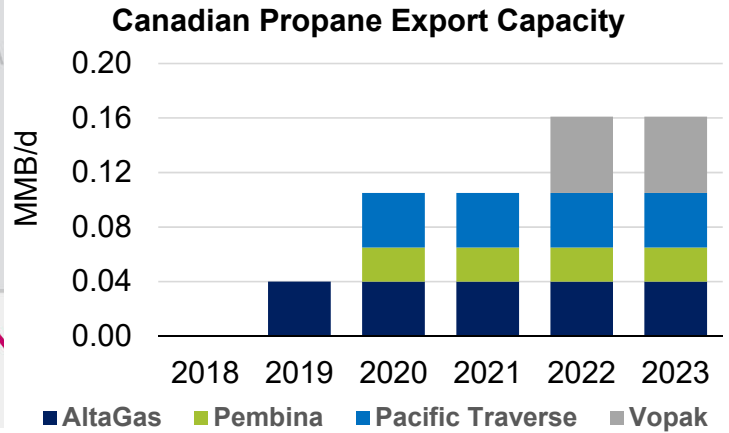
US LPG Exports Grow 475 MB/d - Growth Not Consumed Domestically Will Attempt Export – (2019 vs 2022 Expectations) Majority Comes in 2020



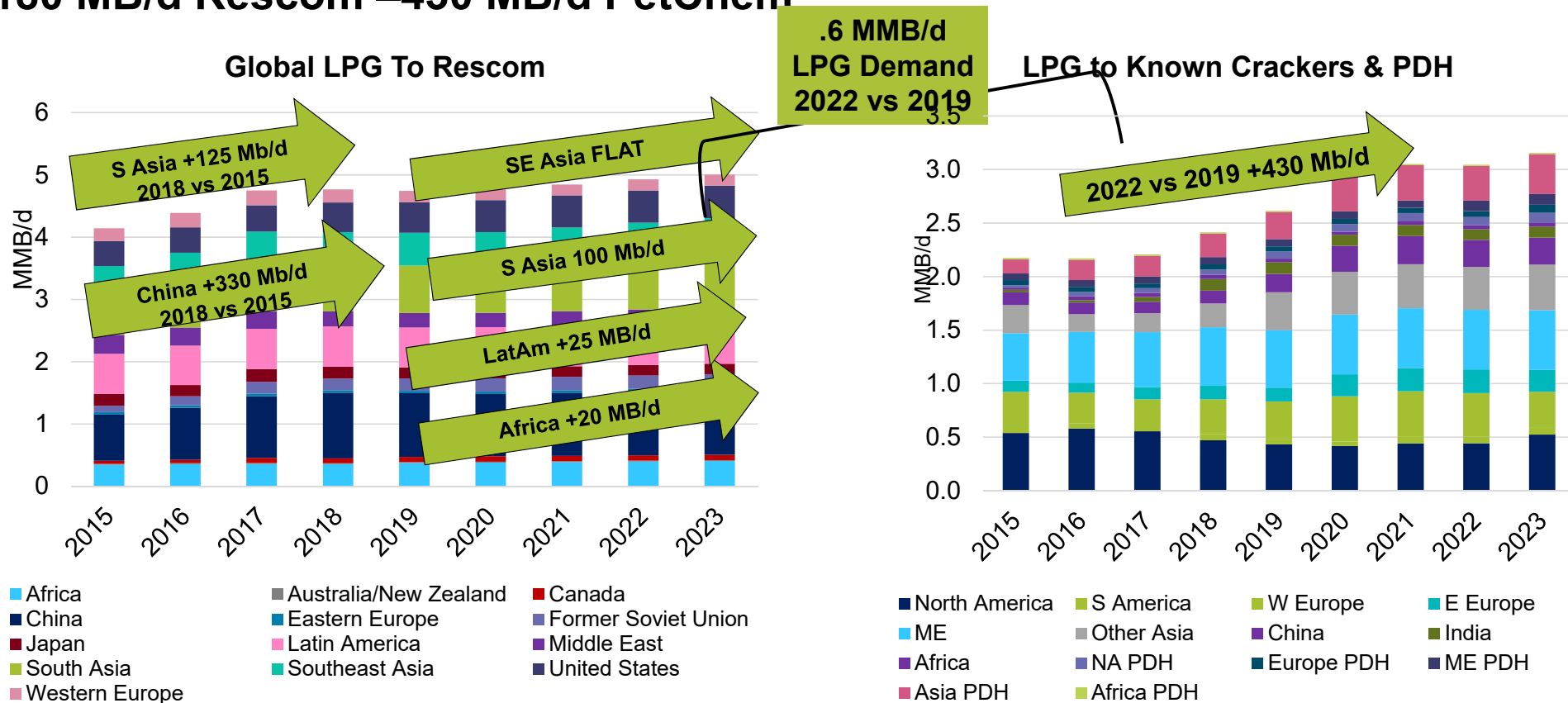
The “Other” North America - Canadian Propane Export Projects Will Add Supply Diversity to the Asian Market - Reduce Railed LPG Into US



Company	Location	Propane Capacity, b/d	In-Service Date
AltaGas	Ridley Island	40,000	1Q 2019
Pacific Traverse	Kitimat	40,000	2H 2020
Pembina Pipeline	Prince Rupert	25,000	2H 2020
Vopak Pacific Canada	Ridley Island	56,000	2H 2022
TOTAL		161,000	

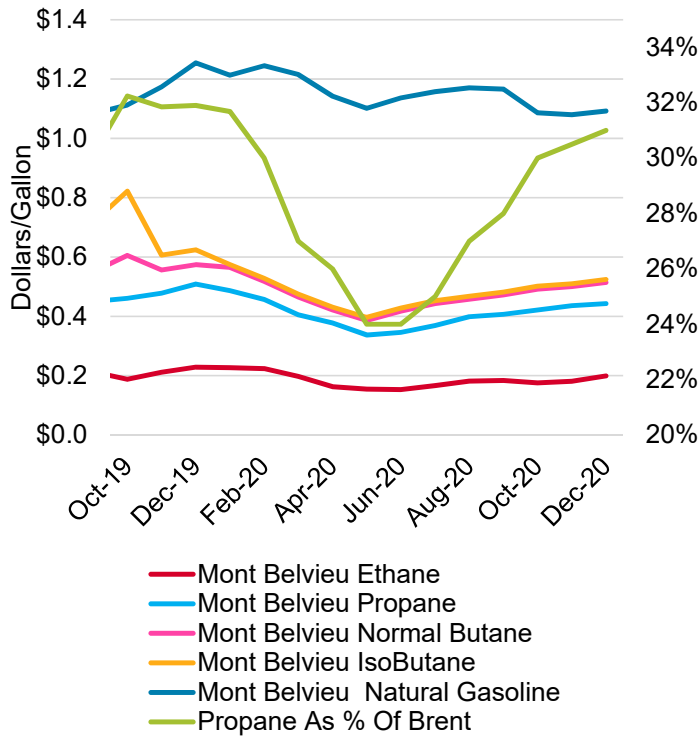


After Surging 15% 2015-2018 LPG To Rescom Demand Rate Of Growth Slows To 4% In 3 Year Forecast - Petchem Driven By Asia (avg 2022 vs 2019) 180 MB/d Rescom –430 MB/d PetChem

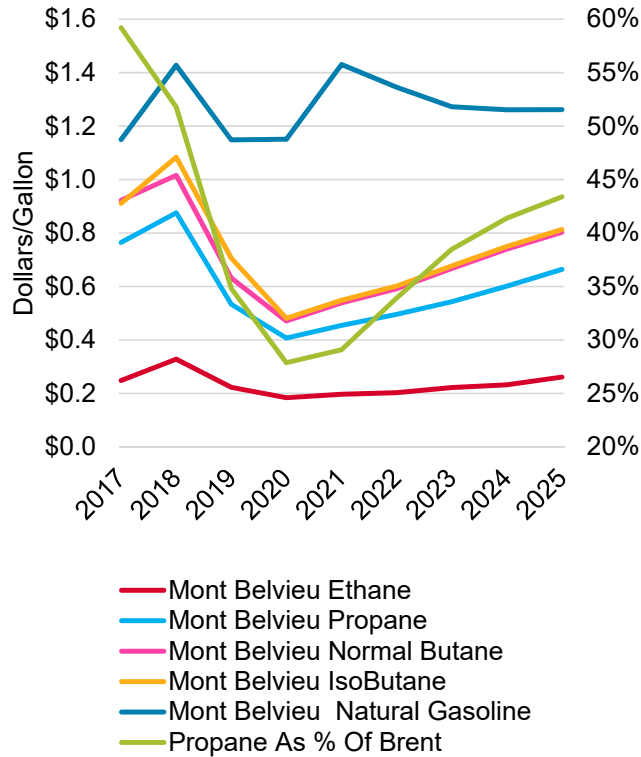


NGL Prices, With The Exception Of Ethane Are Forecasted As Percentage Of Crude – Expect Lower Prices Into 2020

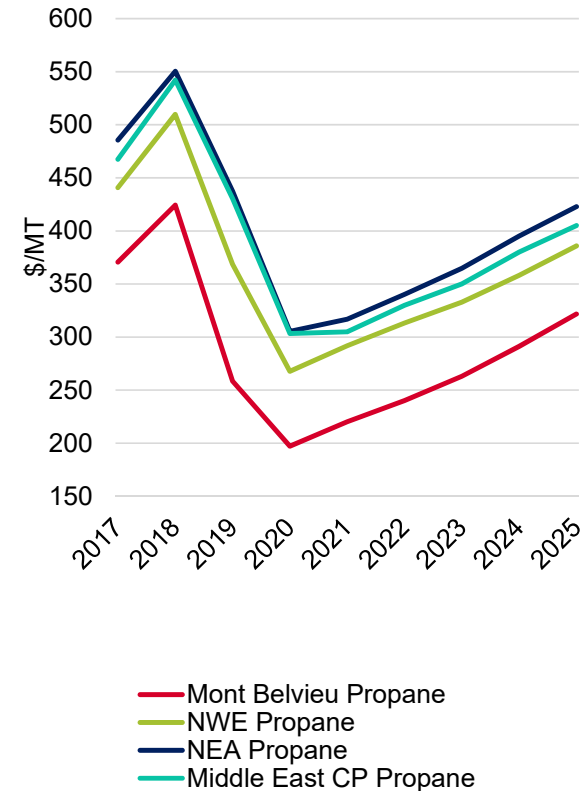
Near Term Prices USGC



Long Term Prices USGC

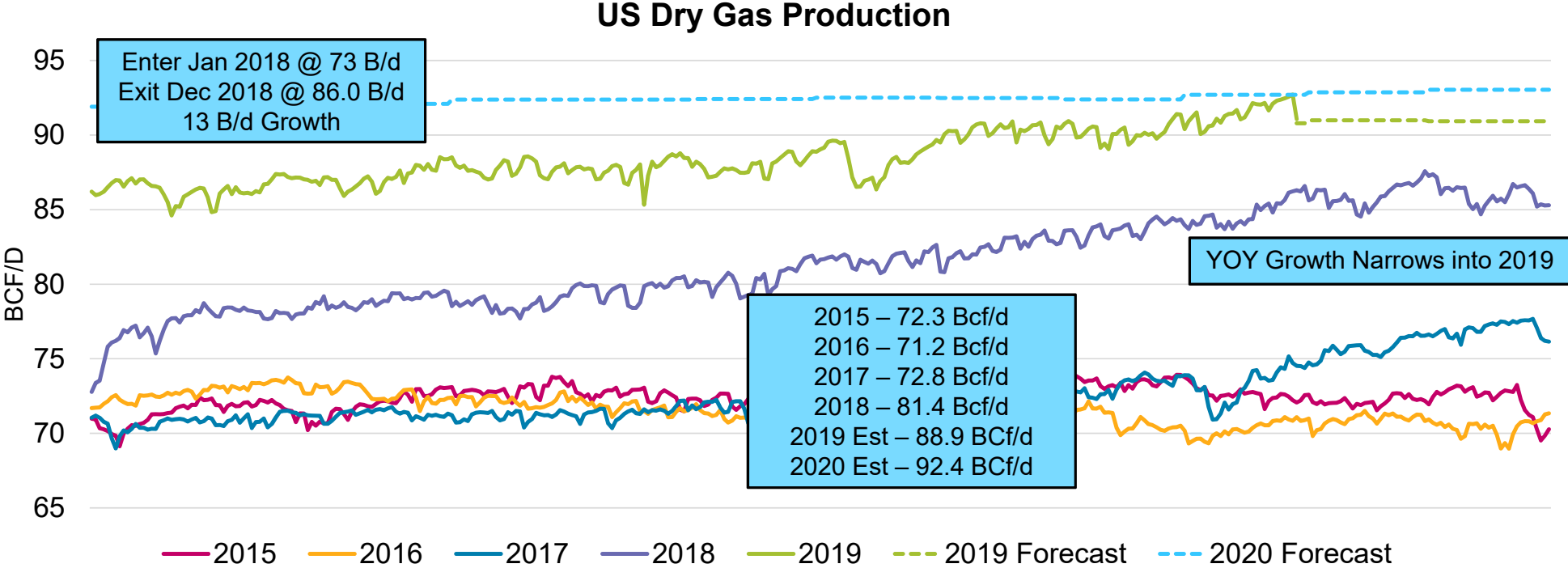


LT Propane Price Forecast

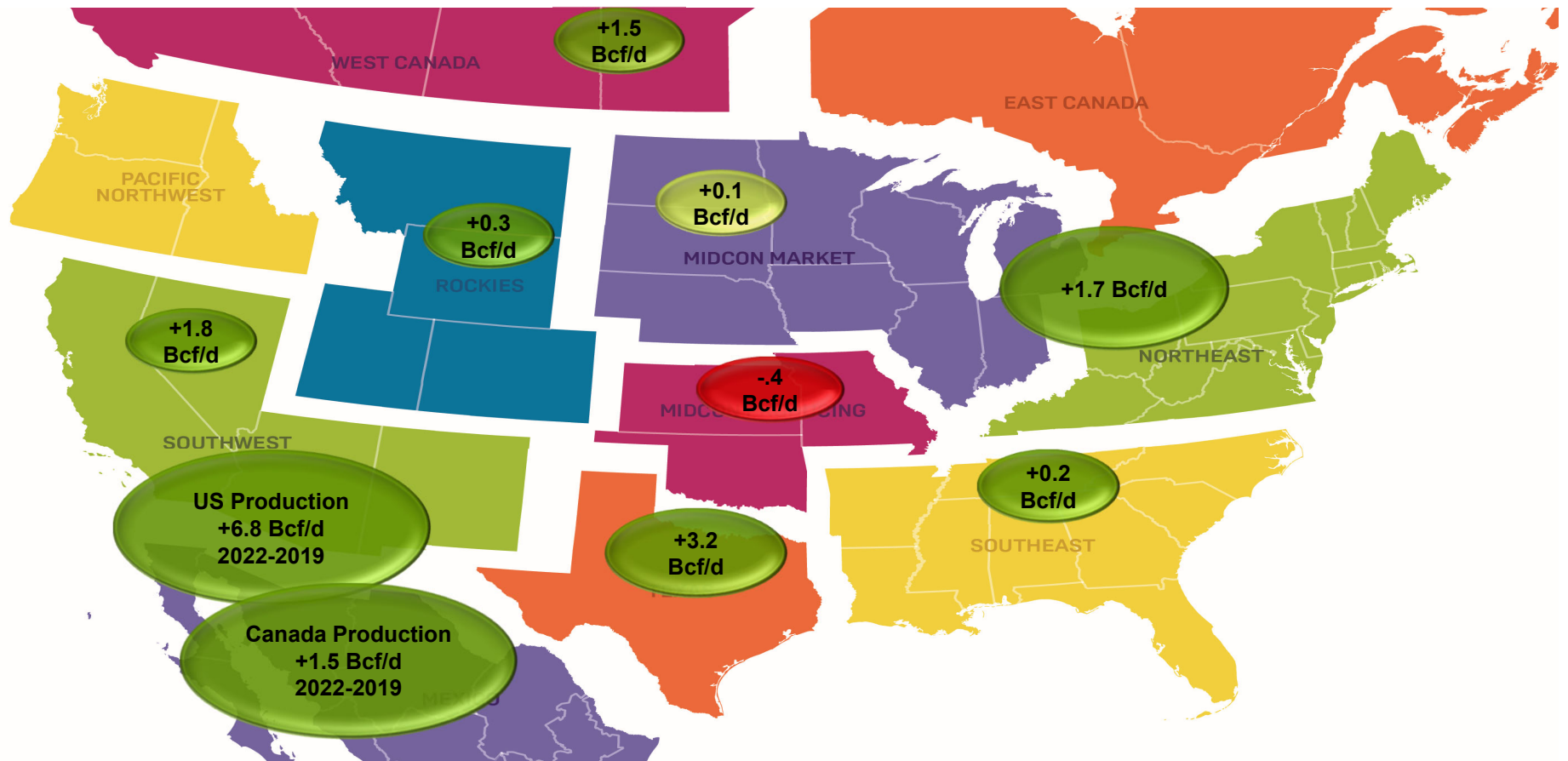


Natural Gas

2018 Posts Largest YOY Gain In US History – Growth Rate Slows Into 2019 Exiting at 90.9 BCf/d – Still Adds 7.5 BCF/d YOY

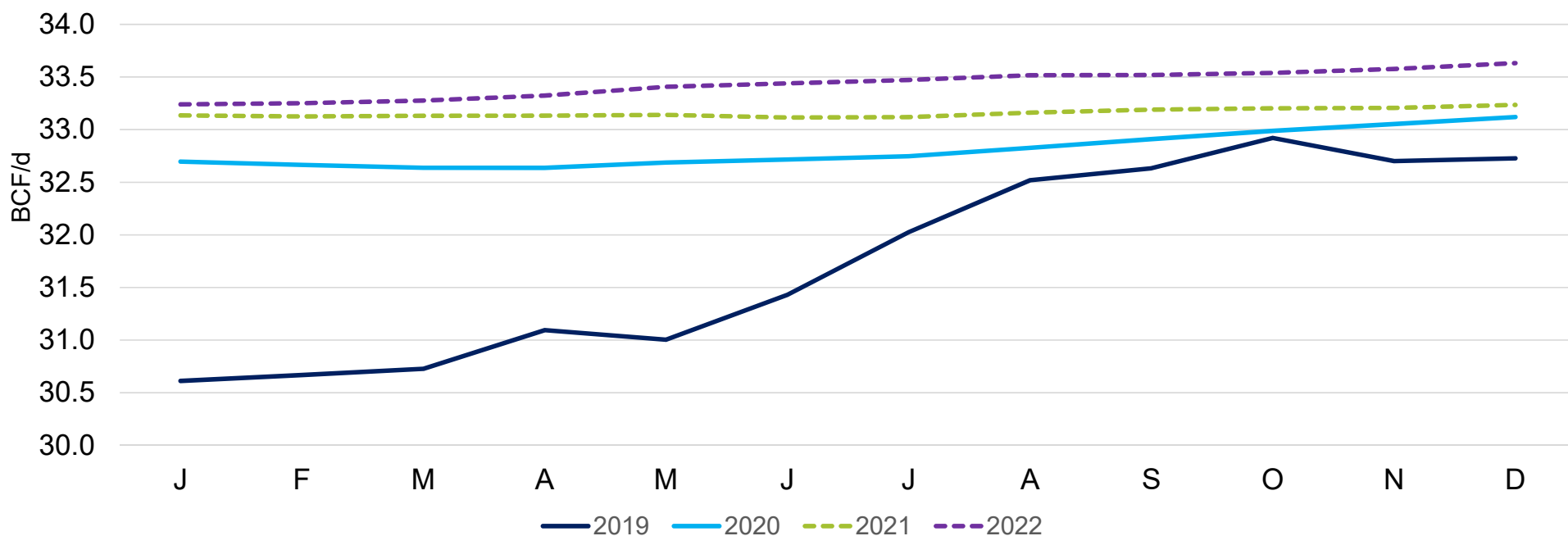


US Grows To 92.5 BCF/d 2022 Average - Permian Growth Exceeds NE

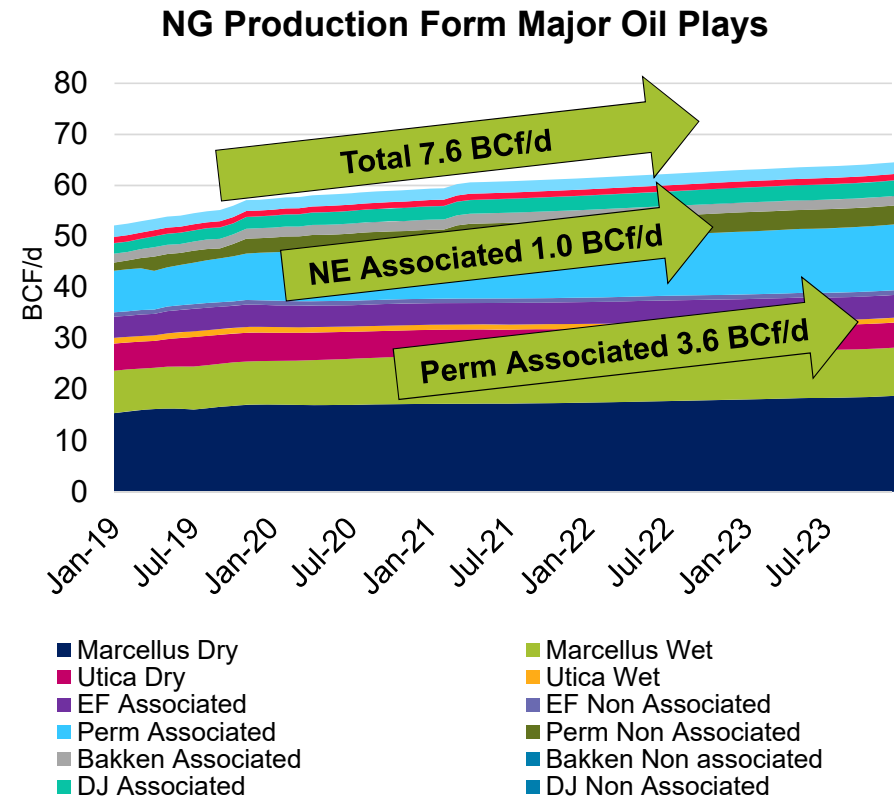
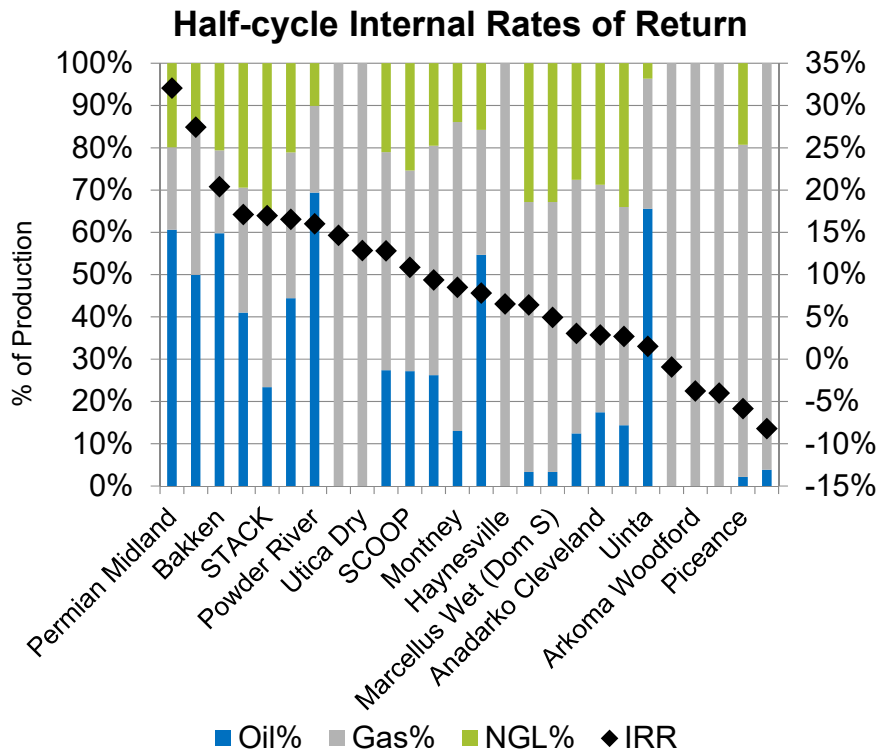


2022 vs 2019 Average For NE Is Misleading – Majority Of Growth Has Already Occurred. Downside Risk In Forecast

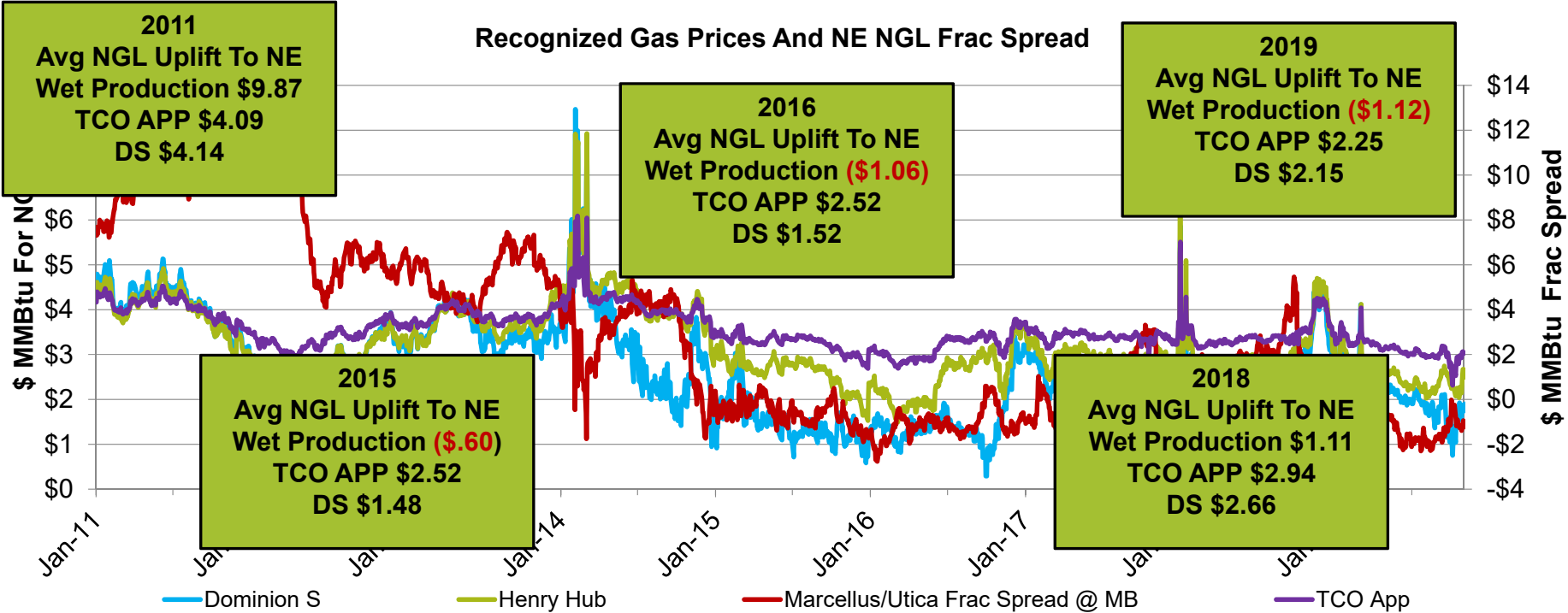
NE Production Forecast



US Gas Is Increasingly Majority Associated To Permian Crude & Less from NE NGLs

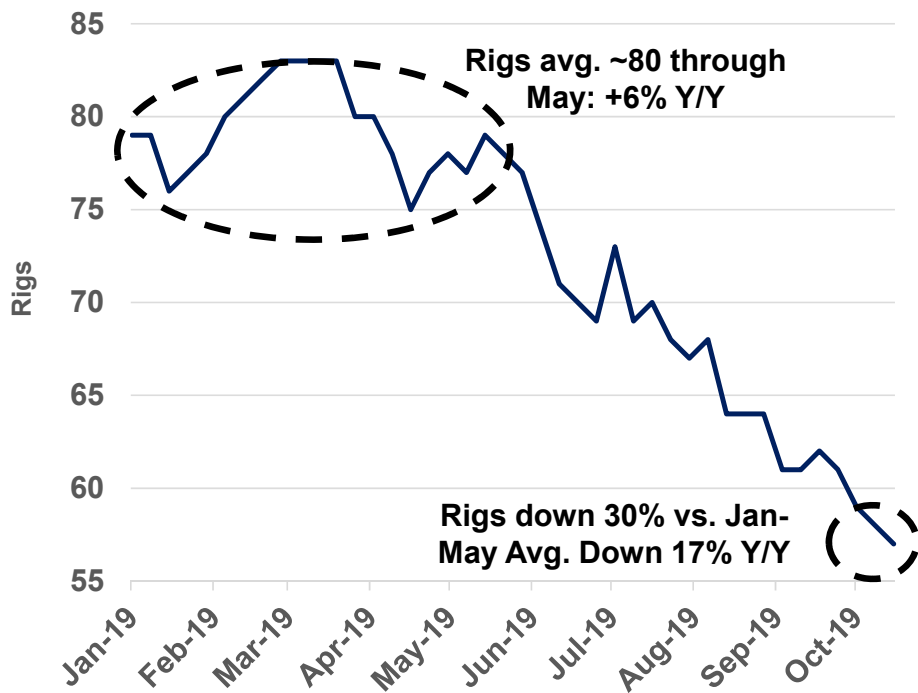


The NE Producer Survived Negative Pricing Once – Can They Do It Again Or Has The Producer Profile Changed Too Much Since 2014?

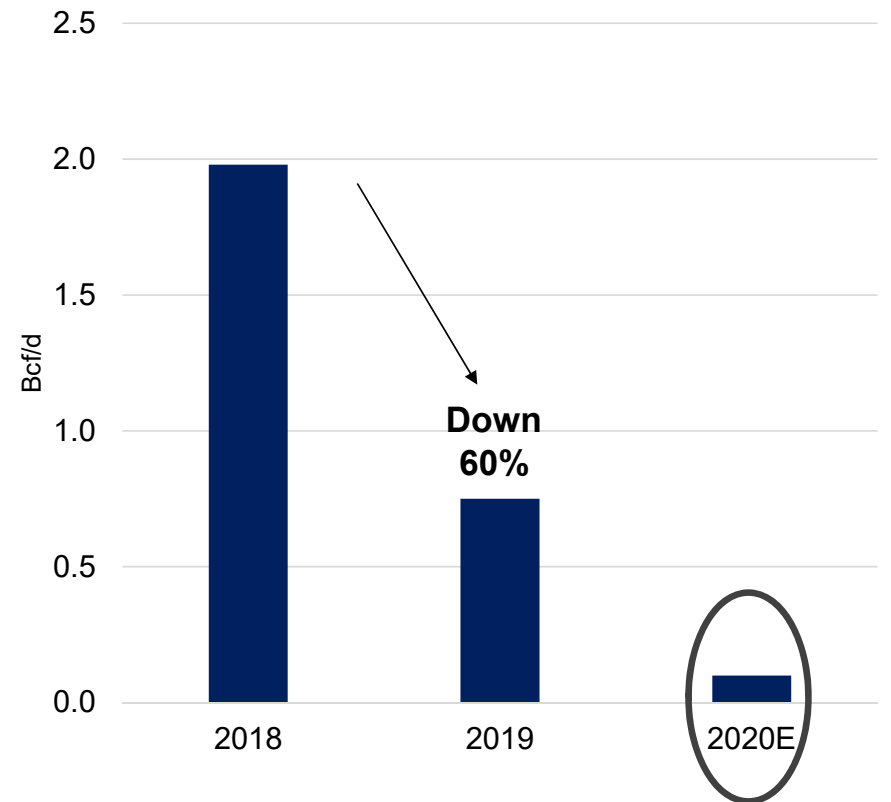


Northeast Rigs Under Pressure - Declines Accelerate In Recent Months

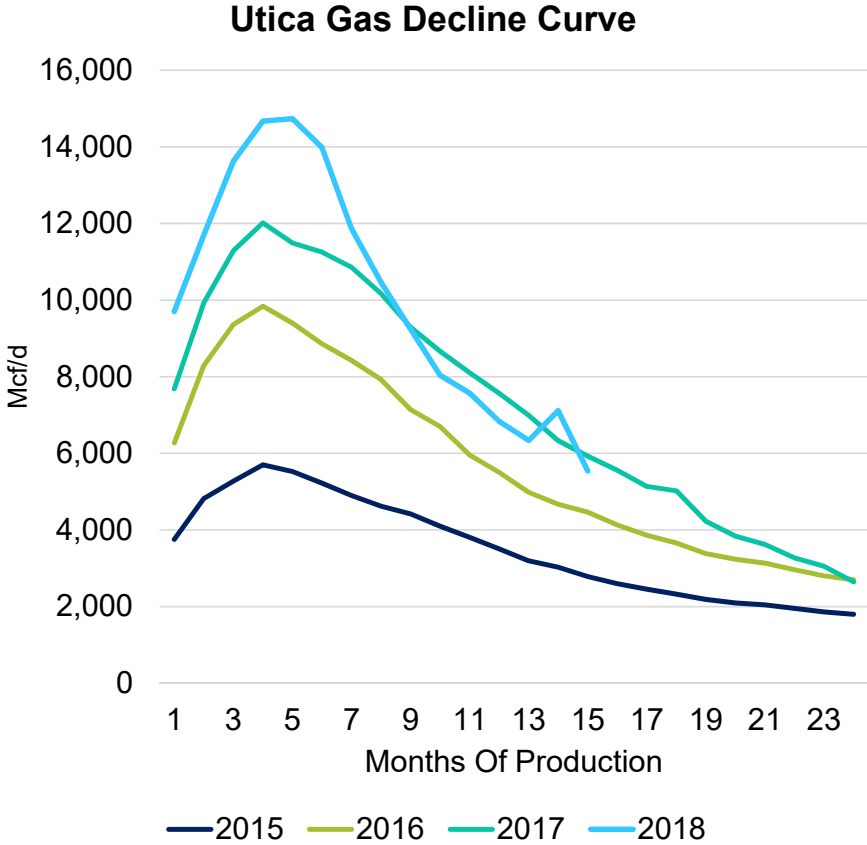
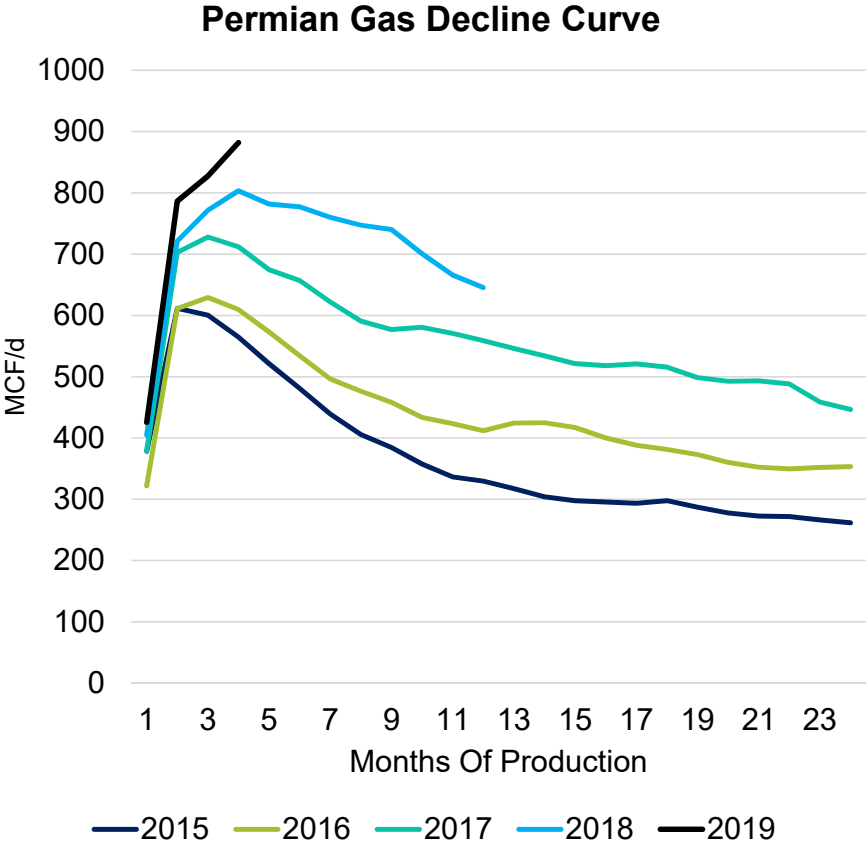
Northeast rig declines have accelerated since May



Avg. Production Growth vs. Prior Year Exit-Rate

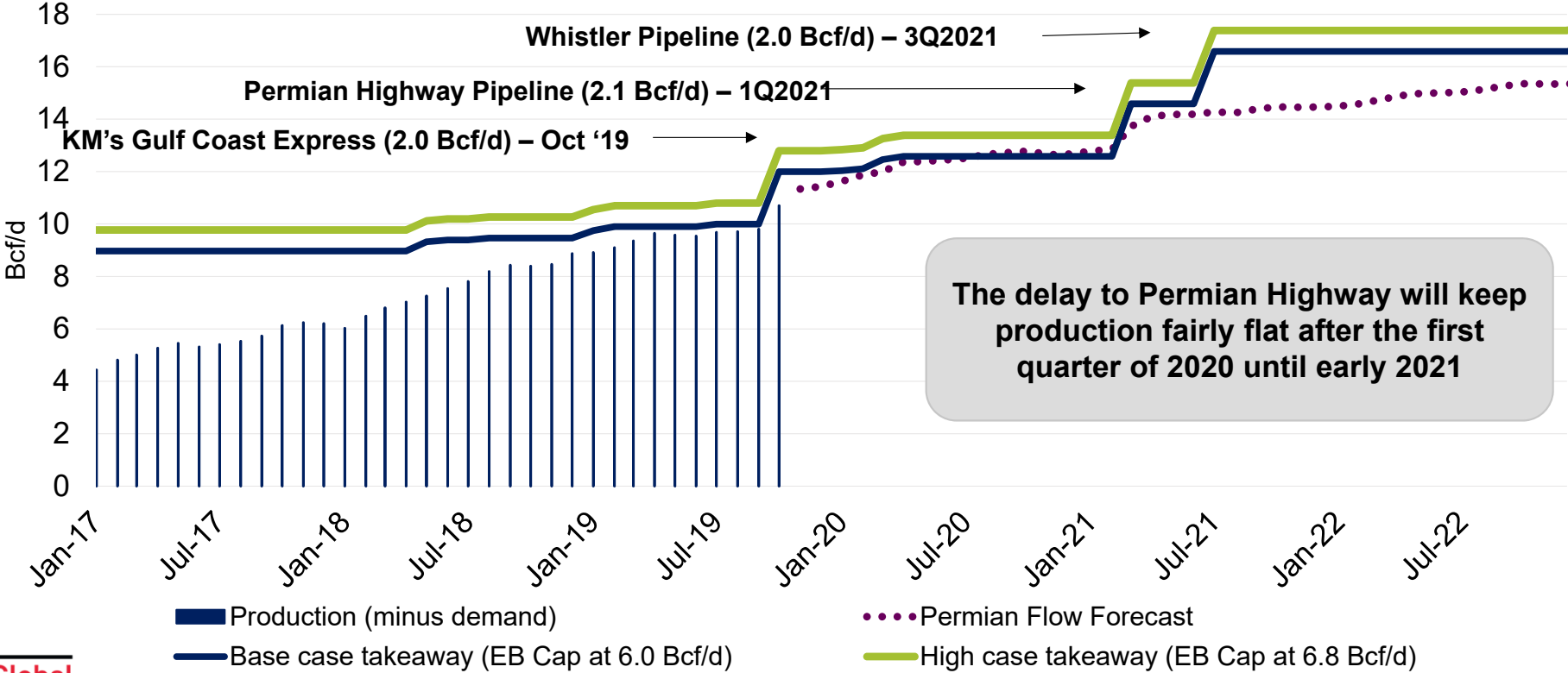


How Much Does Rig Count Matter Anymore? Look At The IP Rates!



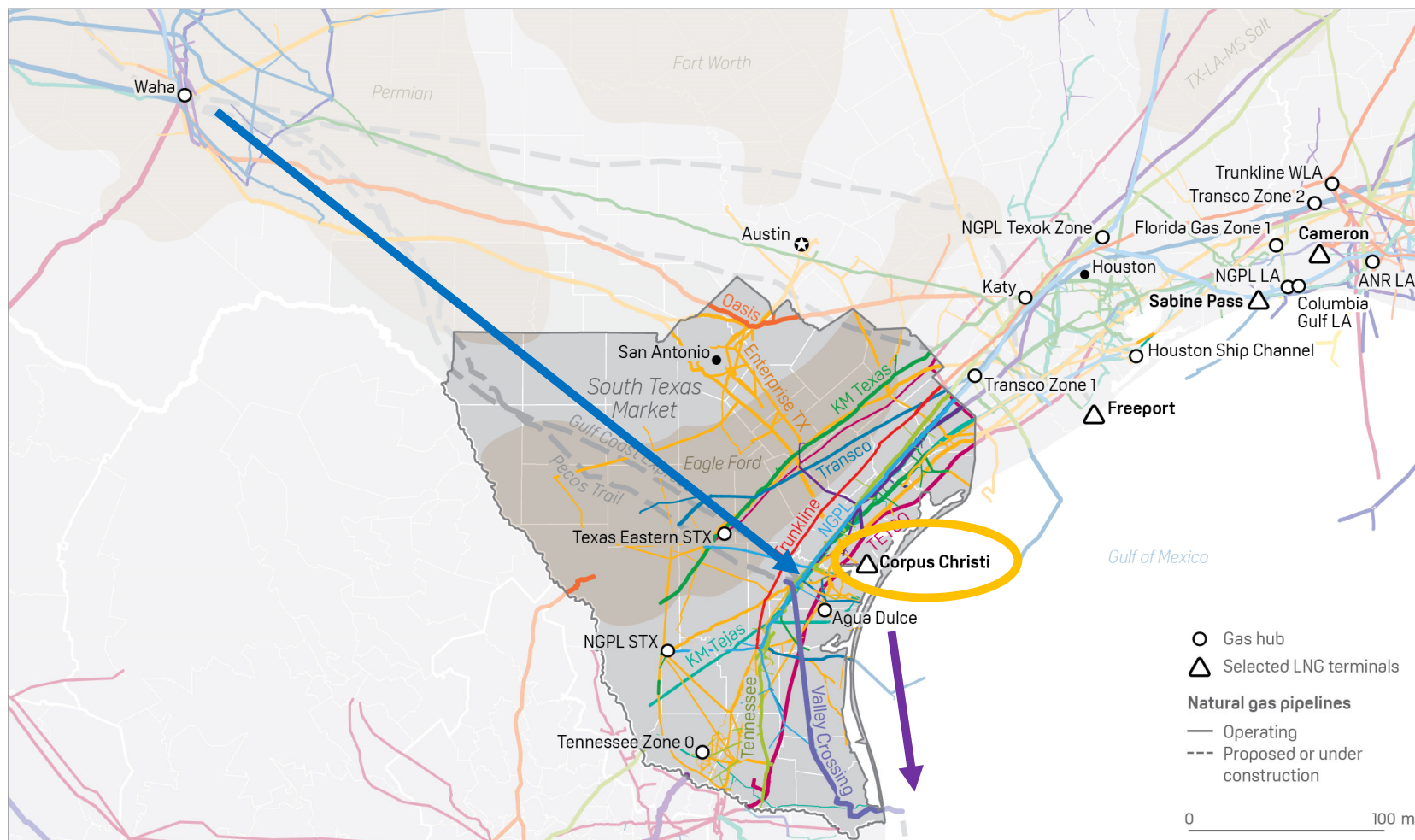
Permian Expected To Fill The Pipeline Grid By Spring 2020 – But It May Be Full Already... Production Forecast To Reach 14.5 BCf/d By Q1 2021

Permian Production versus Takeaway Capacity



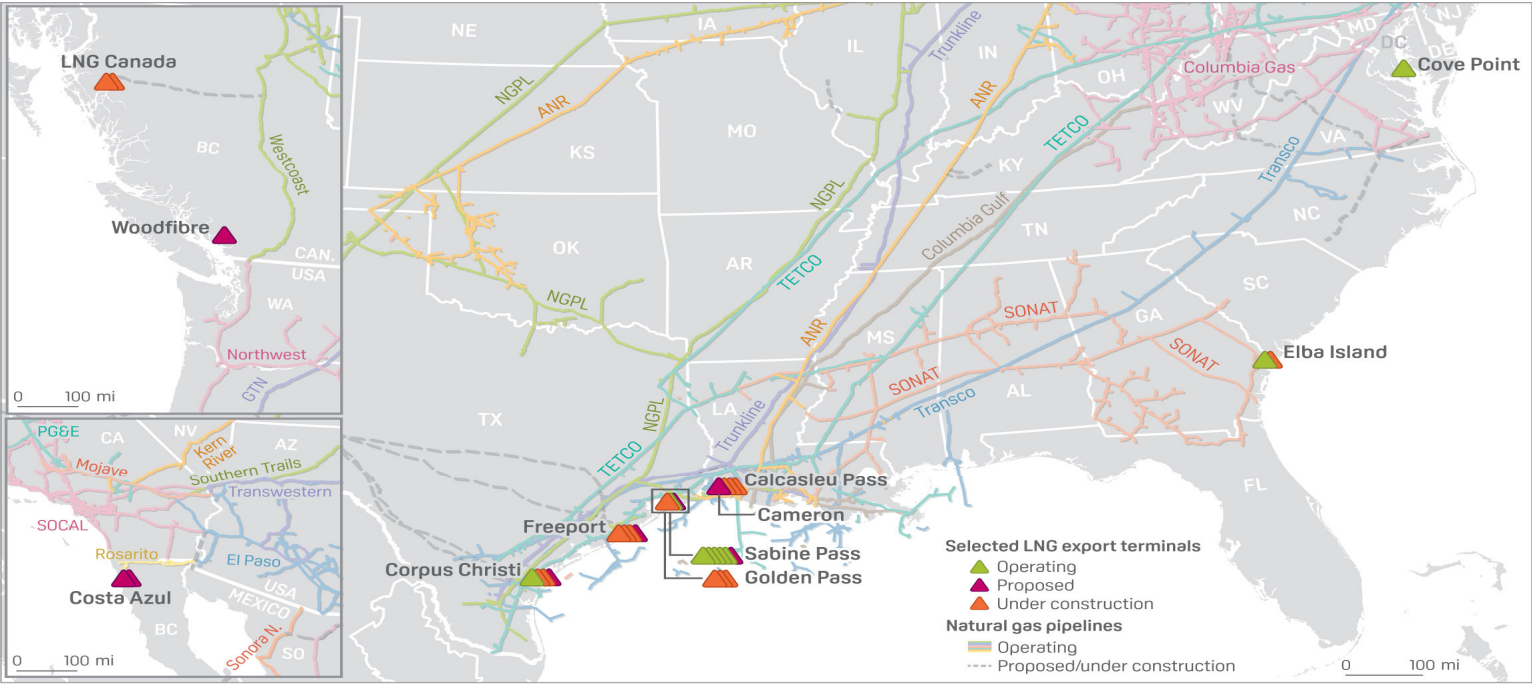
Permian Pipe Build Out Gets Low Cost Supply To The USGC

SOUTH TEXAS GAS PIPELINES



Source: S&P Global Platts Analytics

The Majority Of North American LNG Is Built Along The US Gulf Coast

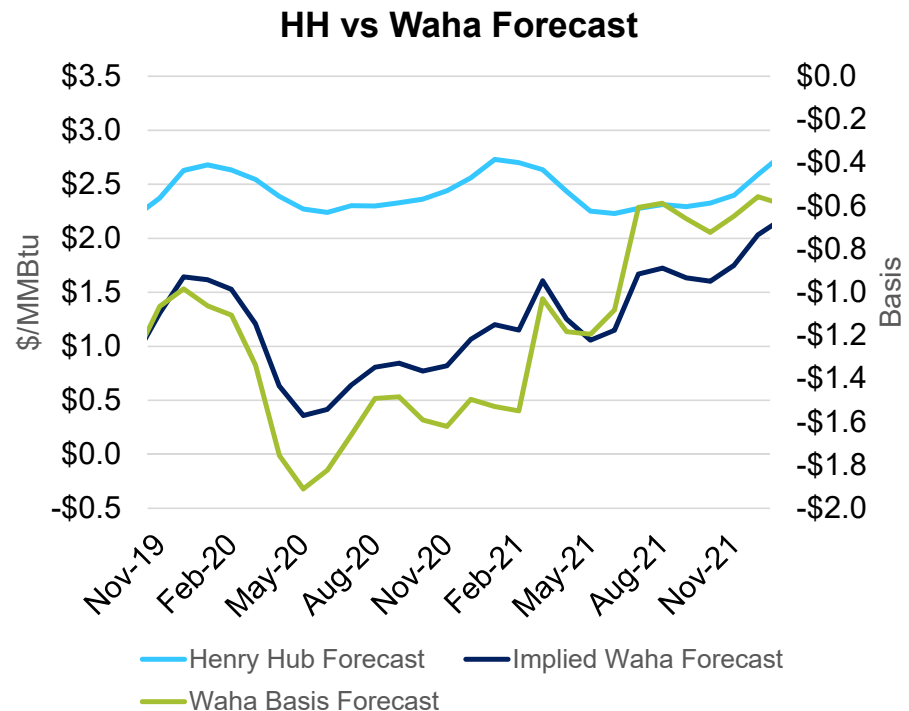
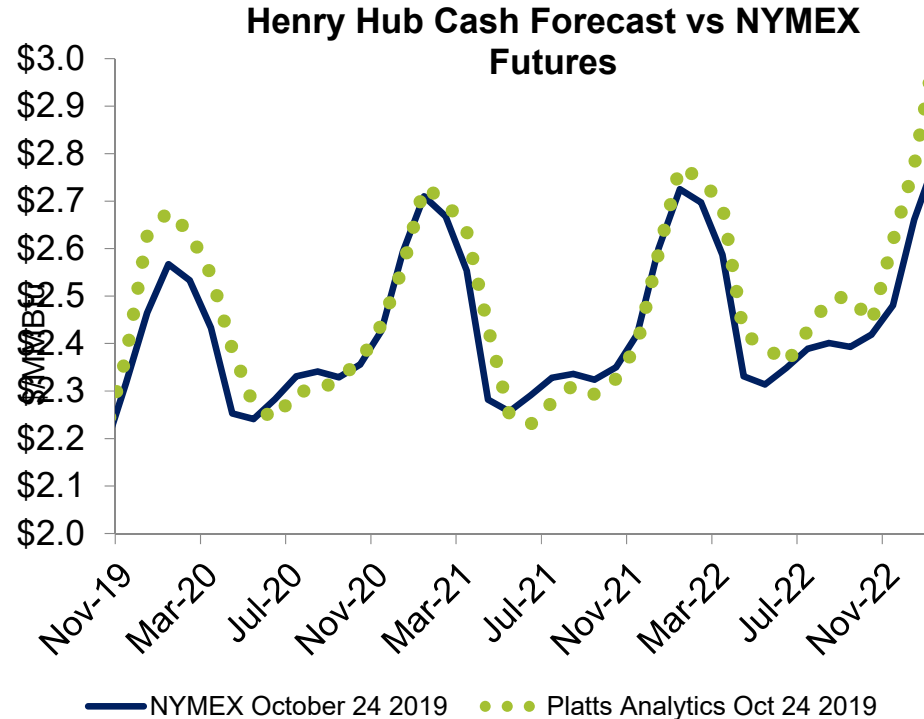


Source: S&P Global Platts Analytics

LNG feedgas

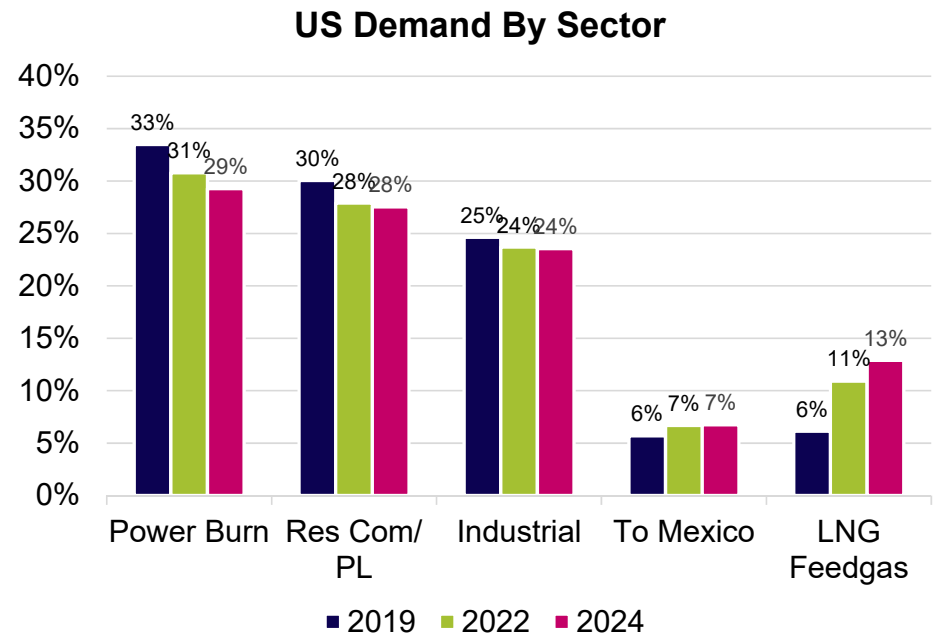
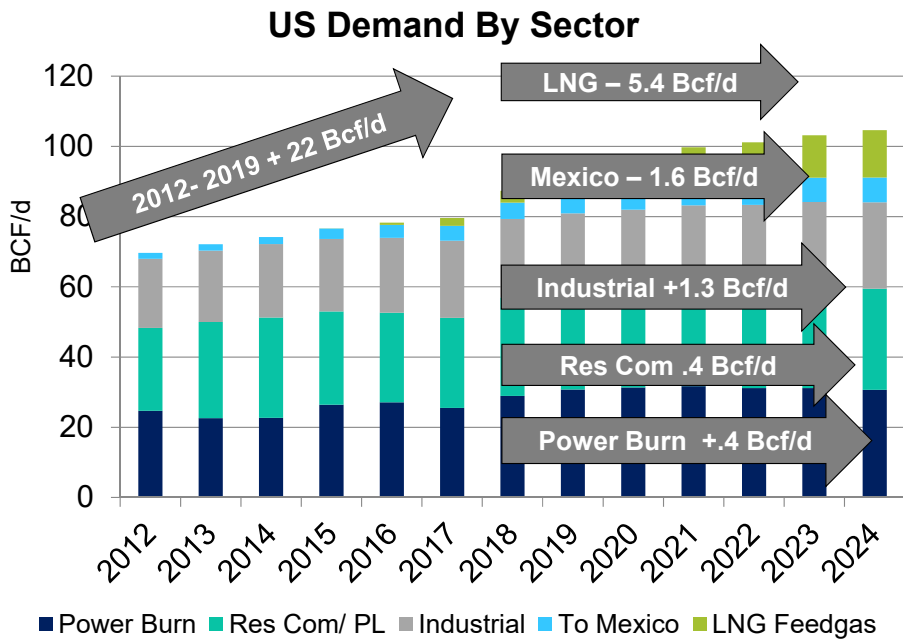


As Supply Growth Outpaces Demand Growth Prices Expected To Remain Moderate

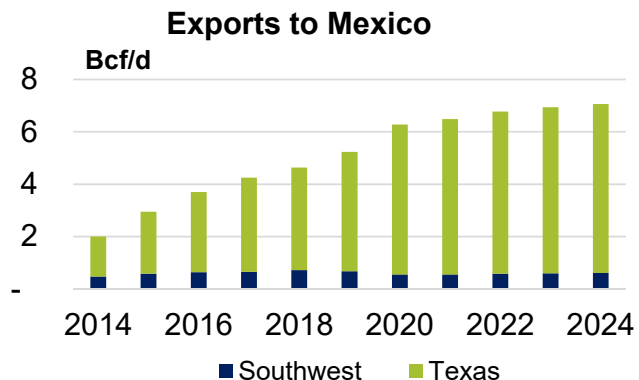


Demand

US Forecasted Growth NEEDS Export Markets To Happen (Incremental Demand of 9.1 Bcf/d 2019-2022 – 77% Exports) In Addition LNG Canada Expected Online 2023 – Reaching .4 BCf/d in 2024



Infrastructure Delays & Change In Political Climate In Mexico Cast Shadow On Growth Prospects



- Policy uncertainty threatens progress
- Pipelines under arbitration – we are revising downward our piped exports to Mexico near-term
- Exports have averaged 5.1 Bcf/d for July so far – about 0.4 Bcf/d lower than forecast

Source: Platts Analytics CellCast, Mexico Monthly

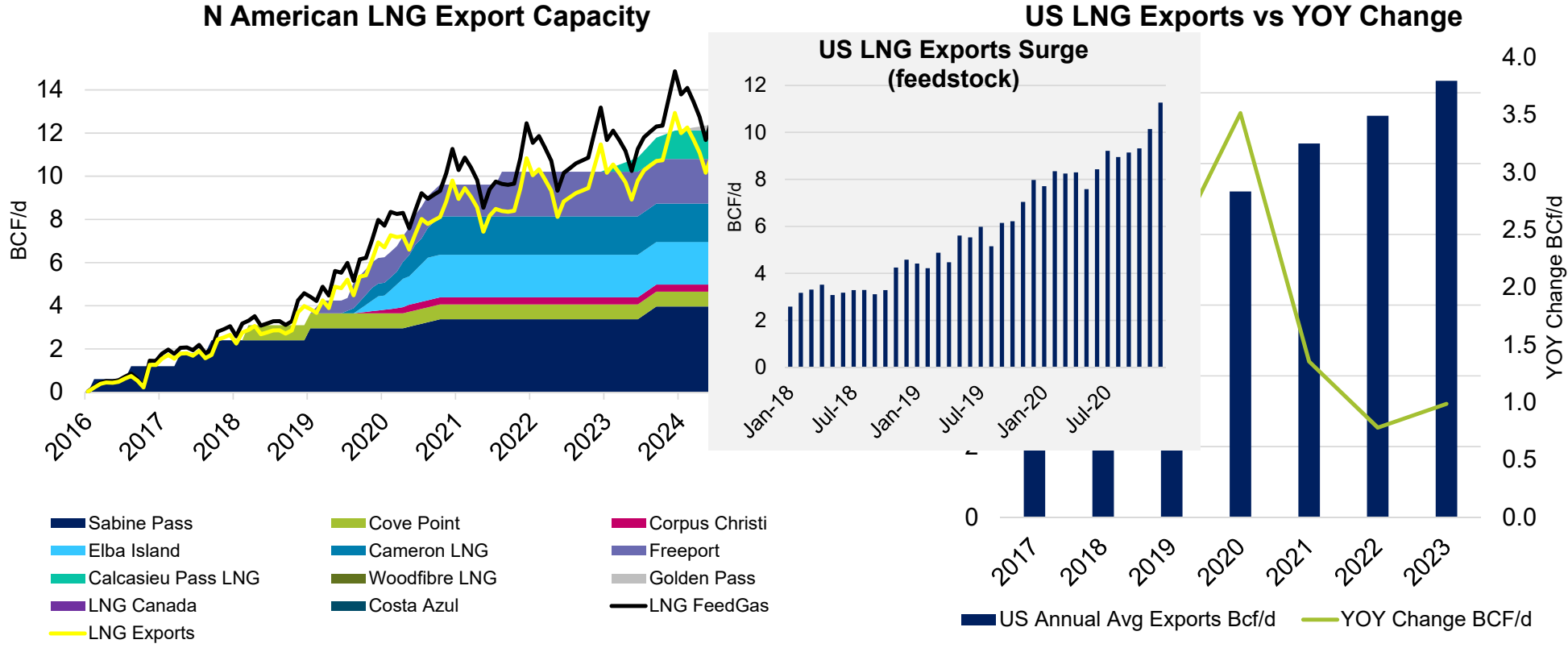
S&P Global
Platts



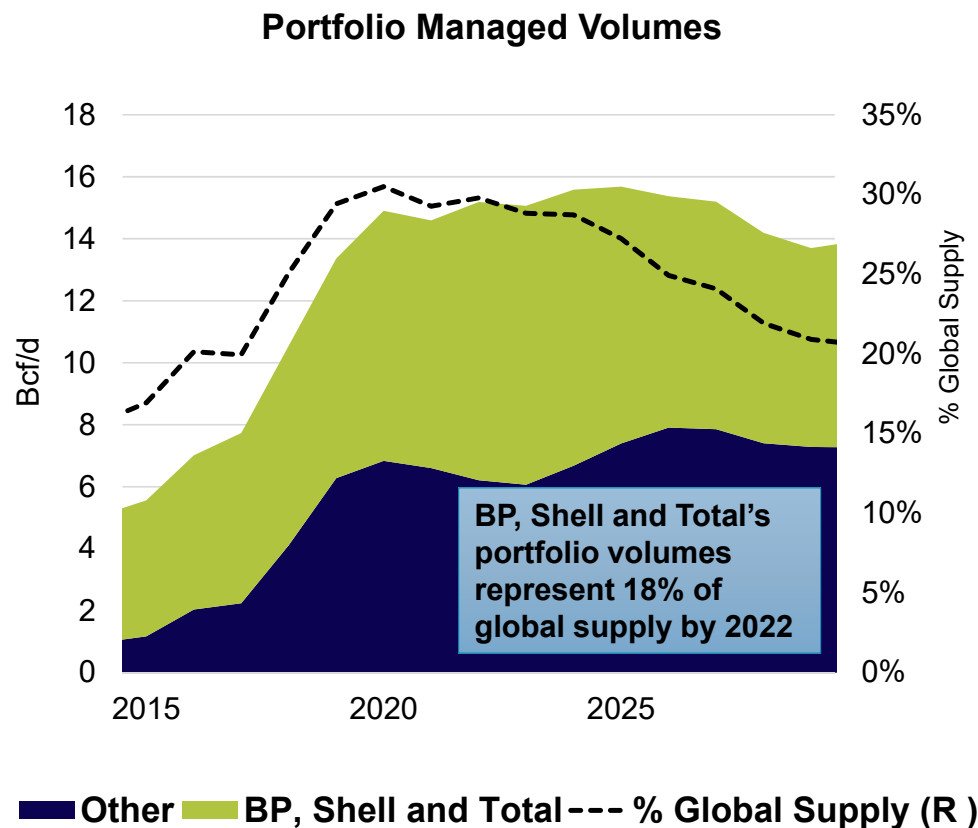
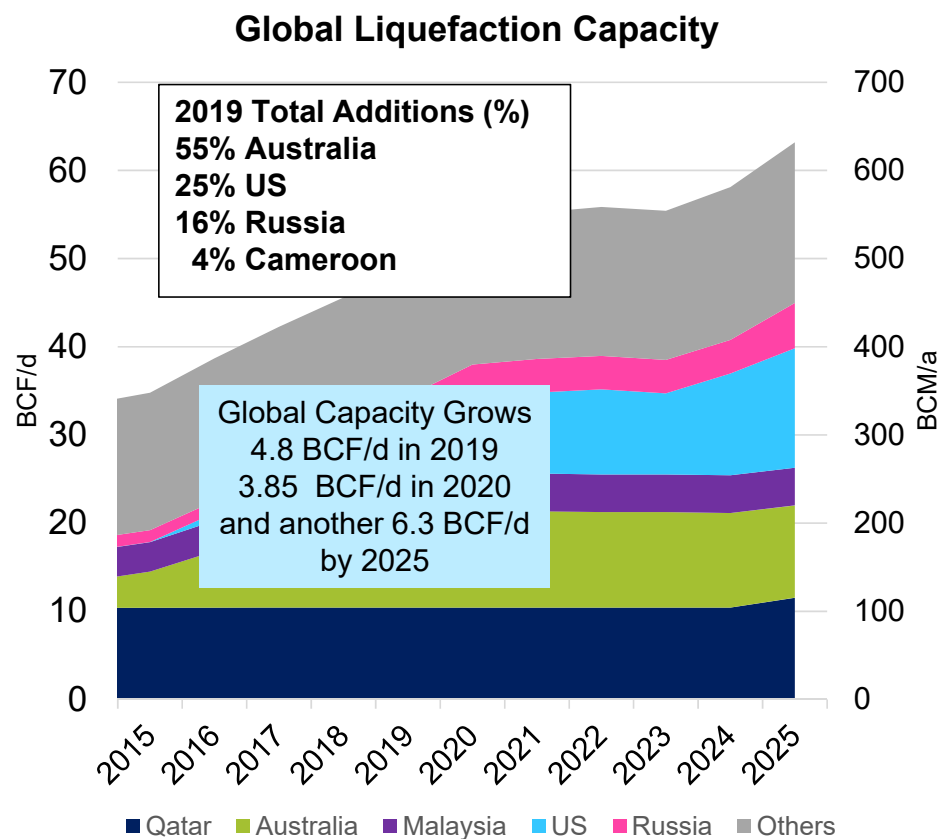
Source: S&P Global Platts Analytics

US LNG Exports Grow At Highest Annual Rate In 2019 & 2020

2.3 & 3.2 BCF/d Respectively – or 23 & 32 BCMa
Average 12. BCF/d By 2023 / 125 BCMa

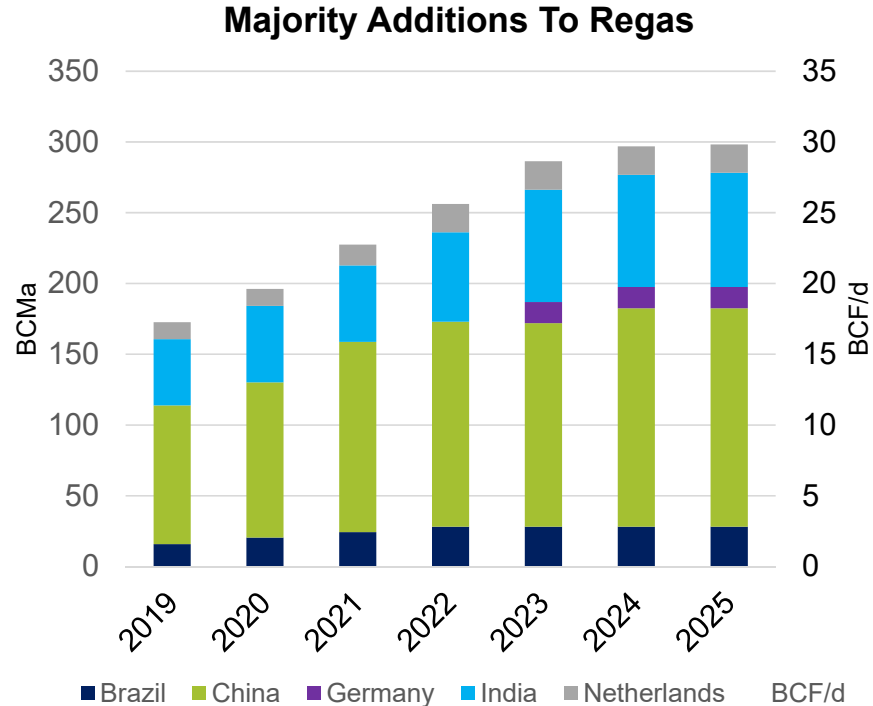
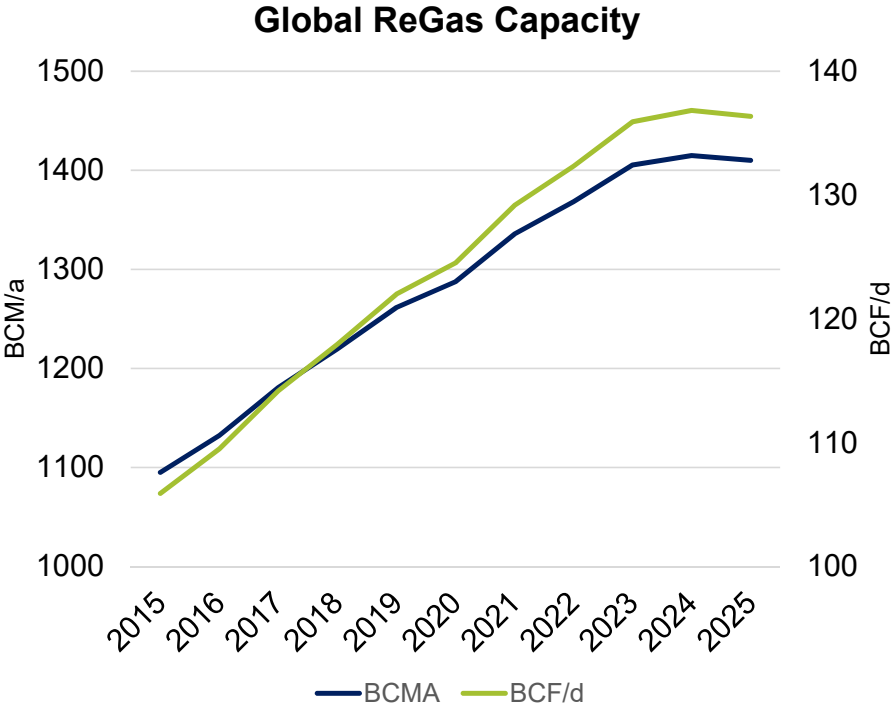


Supermajors Positioning To Dominate Global LNG Spot Market, Driving Liquidity & Price Convergence – Capacity Grows 20% 2025 vs 2019



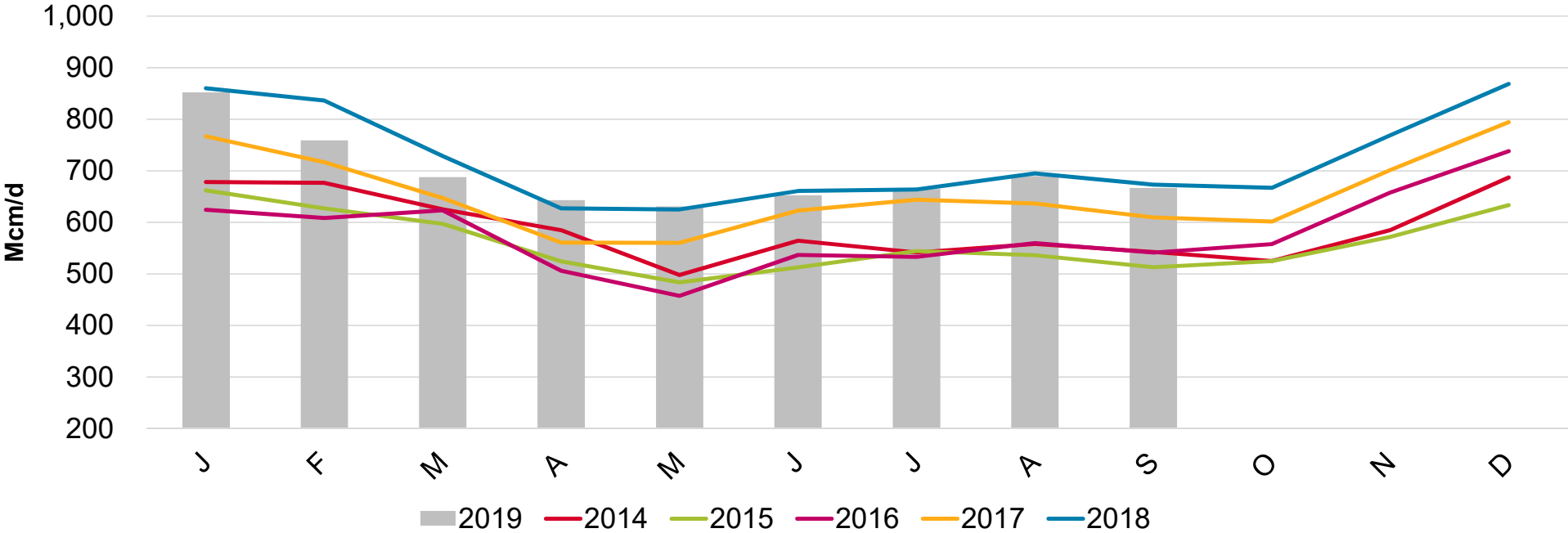
Global ReGas Adds 150 BCM/d By 2025 (14 BCF/d 2025 vs 2019)

Driven By China & India

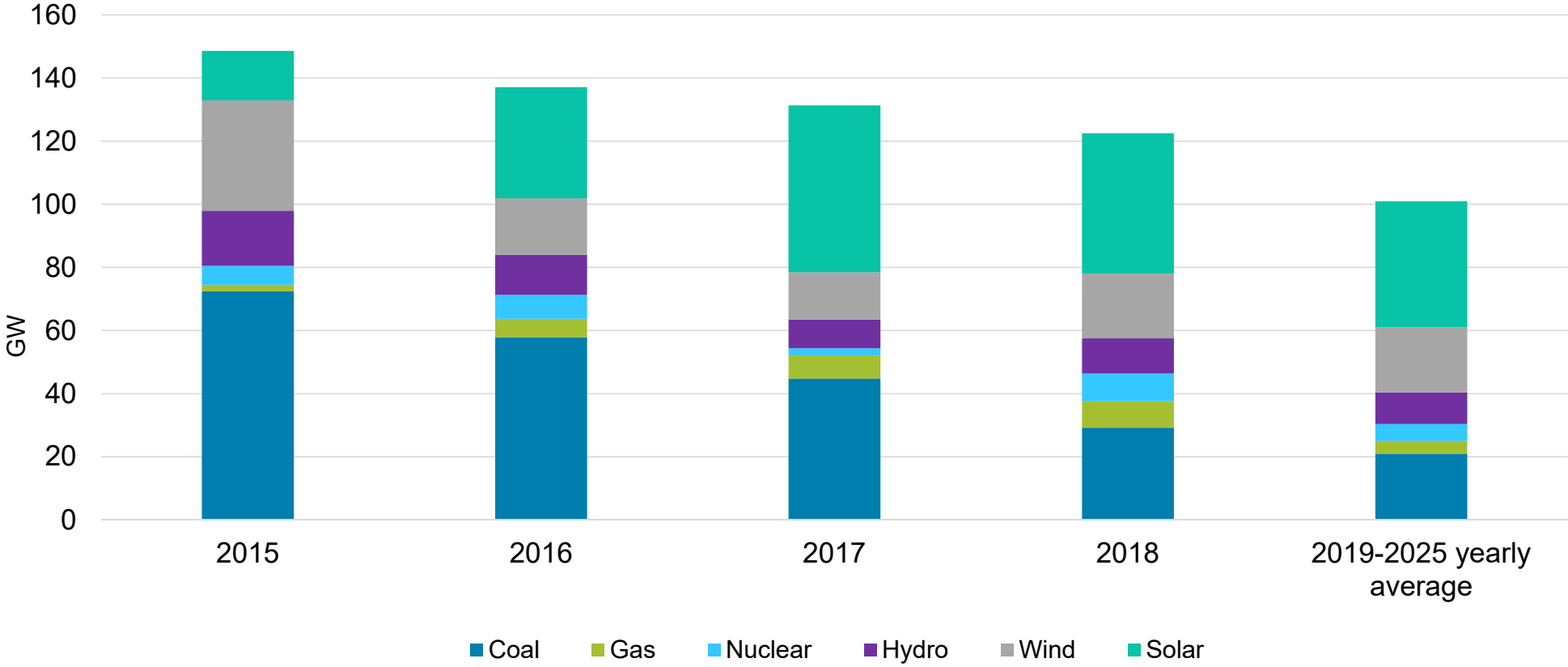


NE Asia Imports Fall Below Last Year - Growth Stalls China Still Positive YOY – Declines In Japan, Taiwan & S Korea

NE Asian LNG Imports

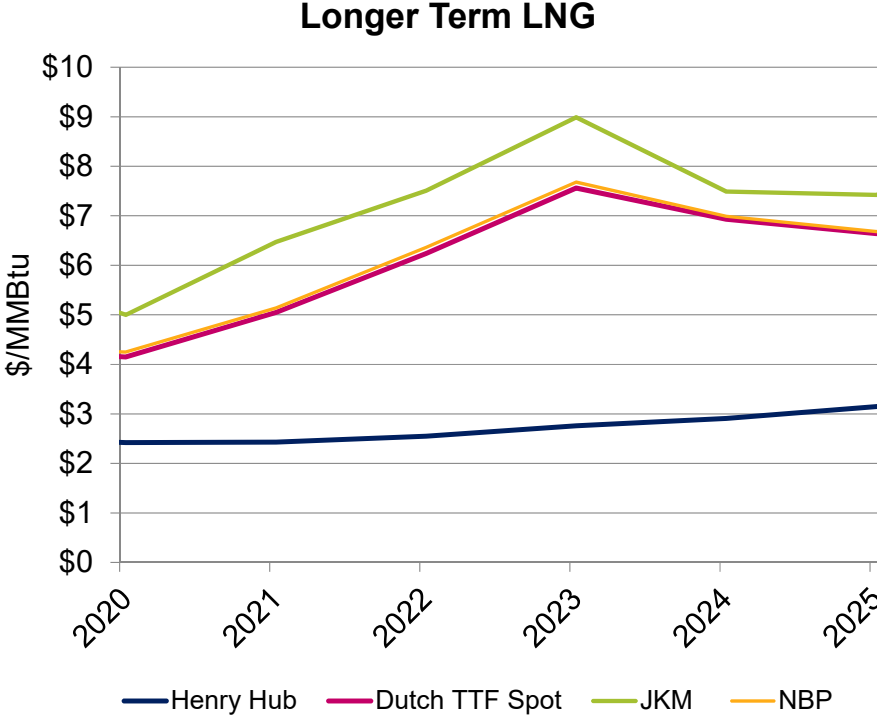
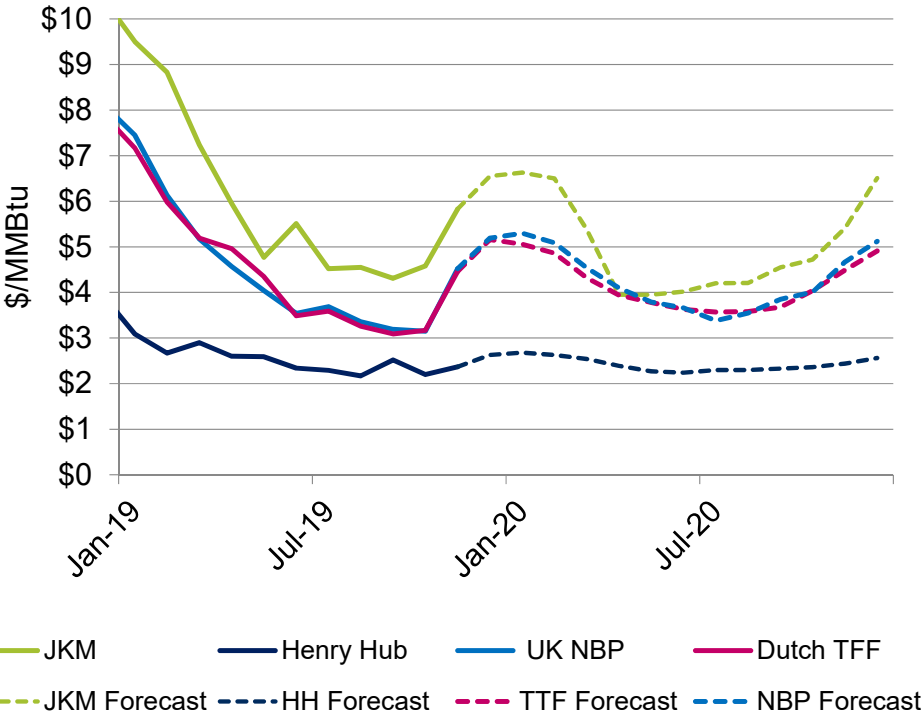


Going Forward – More Of The Same - Chinese Capacity Additions Dominated By Coal & Renewables - Gas Rate Slows From 2017& 2018

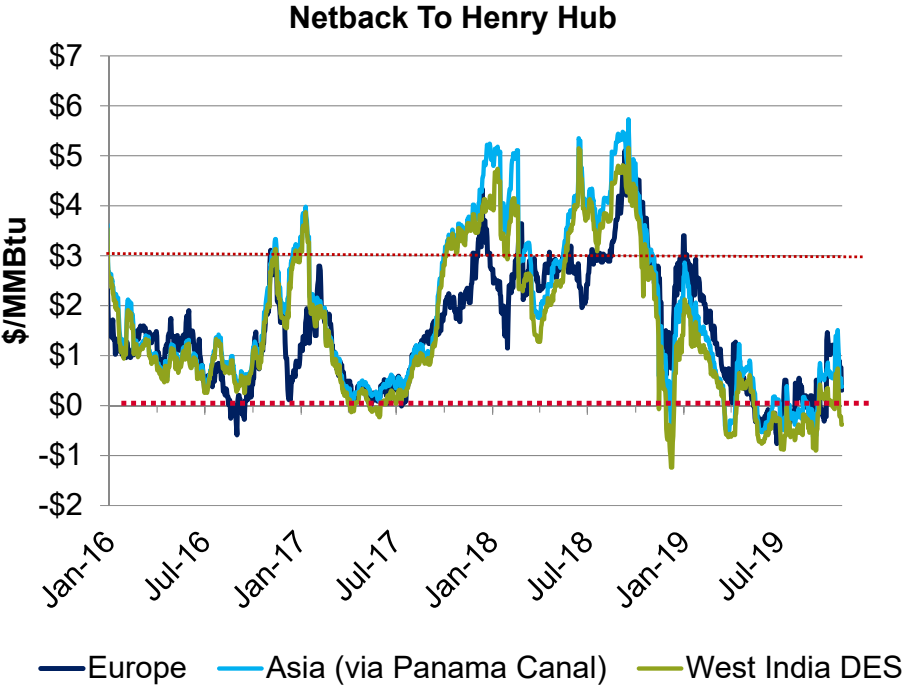
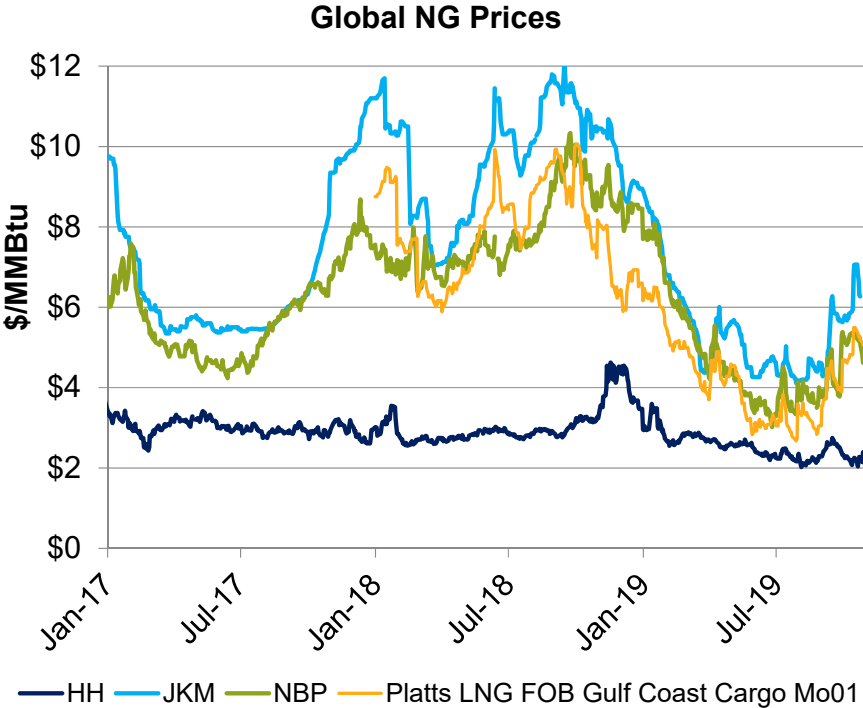


Source: Platts Analytics from NEA, CEC

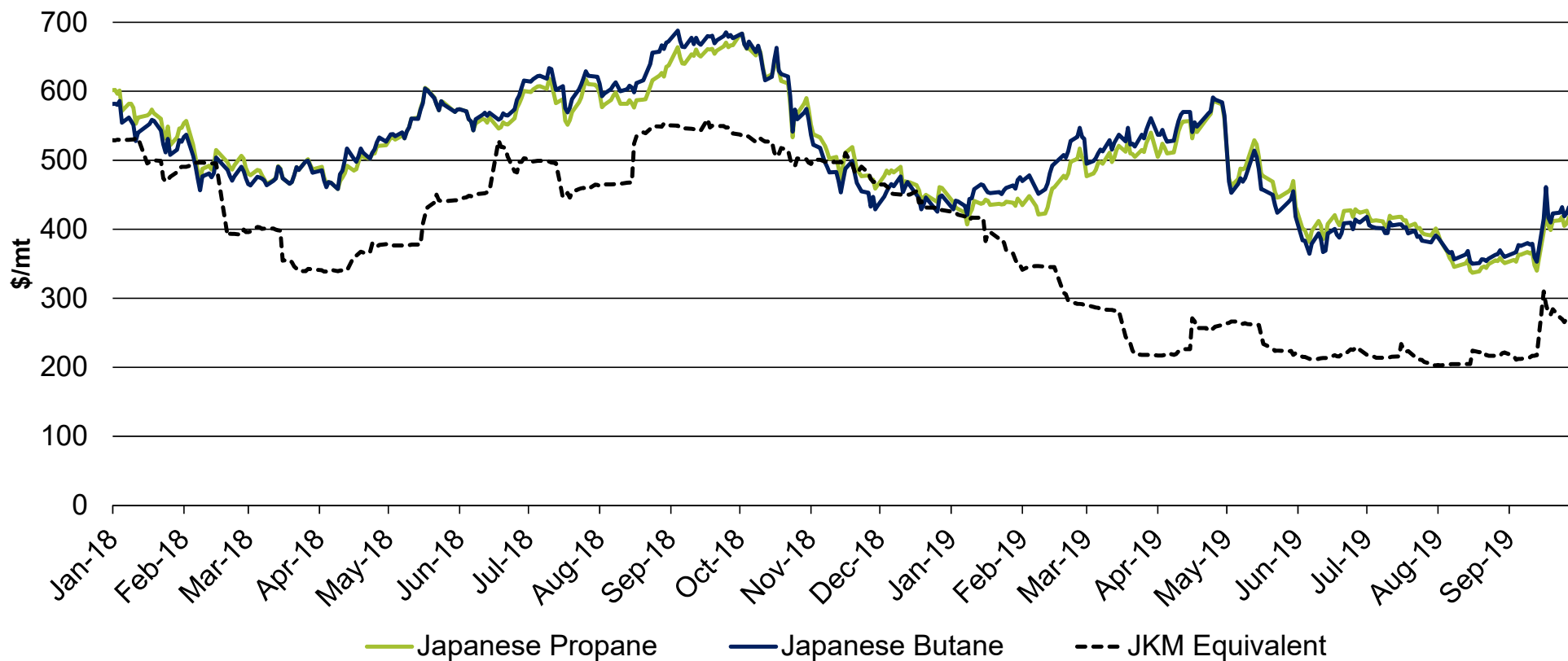
Winter Expected To Offer Short Term Uplift – Longer Term Pricing Outlook More Optimistic Beyond 2021 – Until The Next Wave Of Liquefaction In 2024



Global Oversupply Increasingly Apparent – That Netback Can Only Be Recognized To Those Who Can Find The Offtake



Asian LPG and LNG price comparison – As Excess LPG Competes Into ResCom, JKM Price Equivalent Becomes Potential Price Floor



— Japanese Propane — Japanese Butane - - - JKM Equivalent

Key Takeaways

- US crude growth, driven by the Permian, leads global supply growth through 2023 – With it comes low cost Nat Gas.
- Risks to US production forecast now highest in NE Wet (NGL) window as producers struggle under weight of high transport costs and negative NGL netbacks. Falling crude prices and surging NGL production has pressured liquids markets.
- US Nat Gas production continues to grow, however at a much slower rate , while demand, driven by exports accelerate.
- Global LNG markets remain long in mid term pressuring prices – abundant US NG, driven by Permian crude, double US LNG exports in 2020 vs 2019.
- Offtake infrastructure for all BTUs globally needs to grow much more rapidly to absorb the supply push driven by US supply.
- In a long energy market, BTU on BTU competition continues to pressure all pricing. High US crude prices, relative to associated NGLs and NG, do not allow for “normal” price signal to trigger production response in a timely manner.
- Mid term Henry Hub price forecast sits under \$3.00 as US supply needs to find a home in global , long markets.

Thank You

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Innovative market **insights**

Driven by analytics, powered by fundamentals