



Natural Gas Liquids Fundamentals

November 2023

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Antero Resources Corporation is denoted as “AR” in the presentation and Antero Midstream Corporation is denoted as “AM”, which are their respective New York Stock Exchange ticker symbols.



U.S. NGL Outlook

2023

-  **Rig Count Reductions will Moderate Supply**
 - NGL basins were among the first to see meaningful rig drops
-  **China PDH Buildout Continues**
 - 150 MBbl/d PDH demand capacity added in 2023, with 240 MBbl/d expected by the end of 2024
-  **Propane Inventory Levels**
 - 16% above the 5-year average

2024+

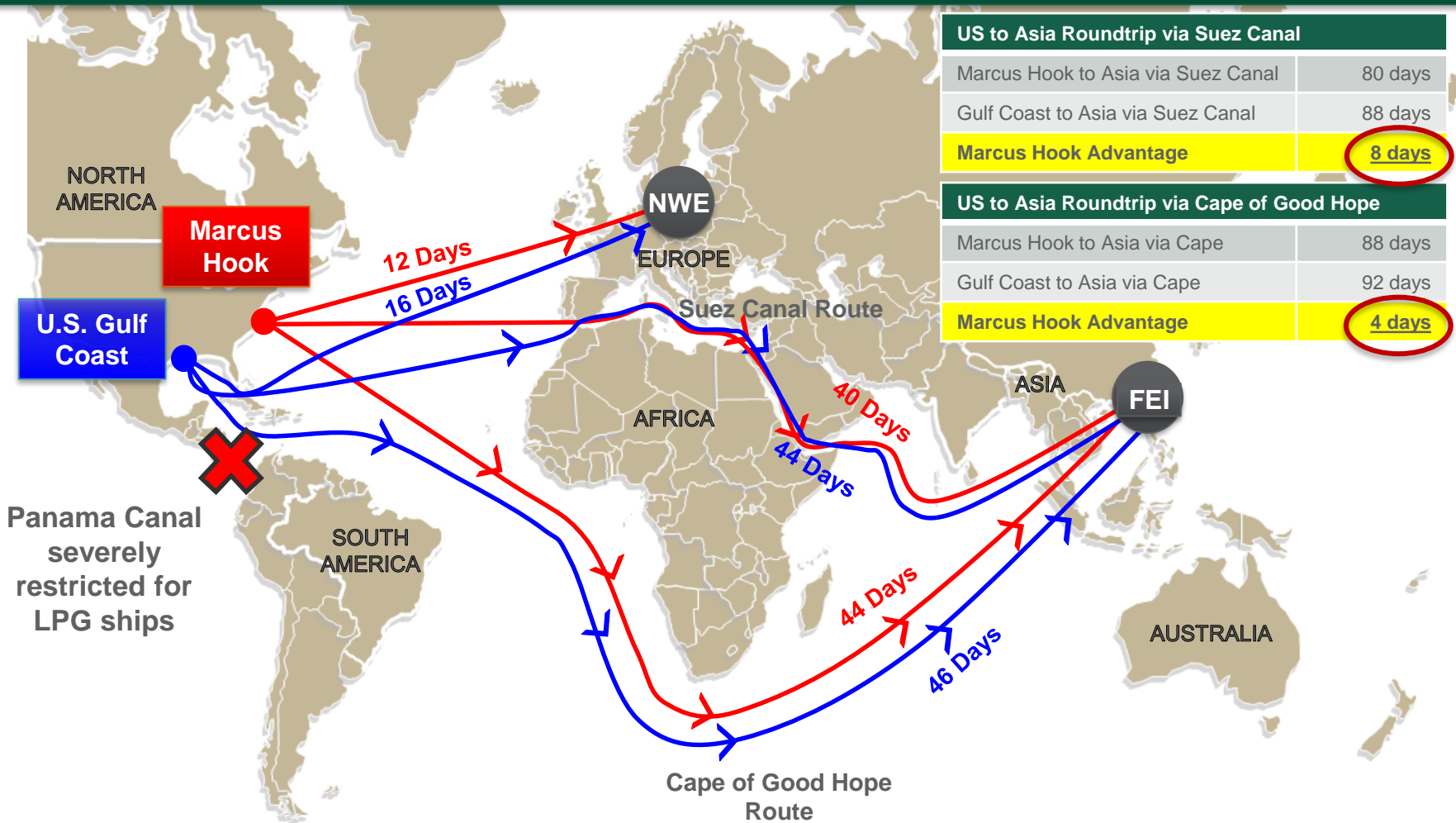
-  **LPG Exports at Record Highs**
 - U.S. exports have grown 20% YOY in 2023, hitting record levels in October
-  **U.S. Supply Increasing to Meet Asian Demand**
 - The U.S. is the incremental supplier of NGLs to meet increasing international demand
-  **Advantaged NGL Producer**
 - Marcus Hook advantaged to both Europe and Asia with Panama Canal restrictions
 - AR sales at Marcus Hook are based on international index pricing (ARA or FEI)

Antero is well-positioned to benefit from increasing global NGL demand as a top U.S. NGL producer and with over 50% of NGL volumes being exported out of Marcus Hook, PA



Marcus Hook export facility is advantaged to both Europe and Asia versus US Gulf Coast with Panama Canal restrictions

LPG Shipping Routes



Antero sells export volumes on a spot basis based on ARA and FEI pricing

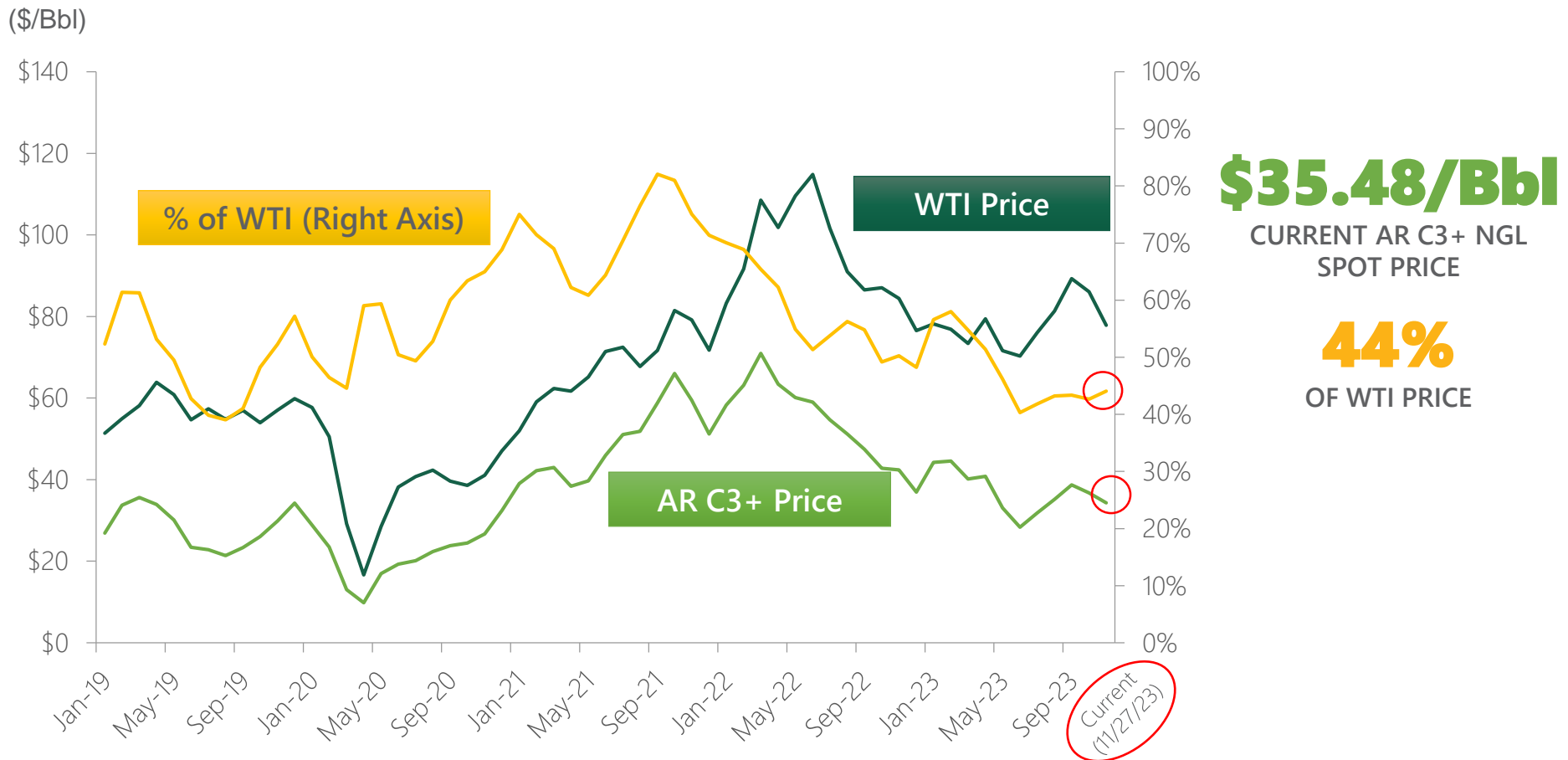
Antero Advantages

- **AR exports the majority of its propane and butane production out of Marcus Hook, Pennsylvania**
- **Marcus Hook has a transportation advantage of 4-8 days to Asia versus US Gulf Coast without Panama Canal**
 - **This results in \$0.03-\$0.05 per gallon lower shipping costs ⁽¹⁾**
- **Gulf Coast export capacity constraints expected to keep international arbs wide, a benefit to Northeast exporters, like Antero**
- **AR sales at Marcus Hook are based on international index pricing (ARA or FEI)**

NGL Price Trend

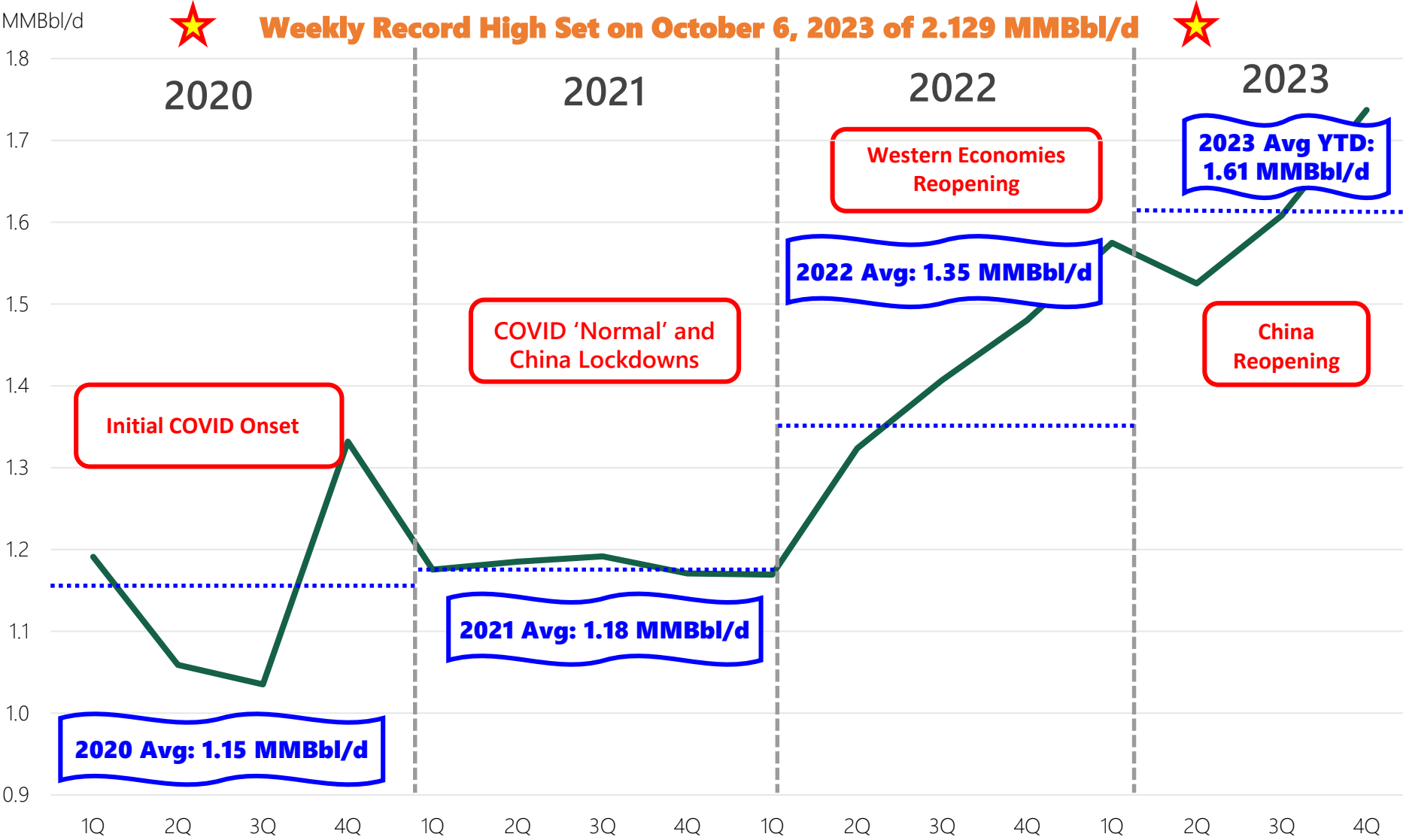
Despite strong exports, C3+ pricing as a percentage of WTI is near historical lows

AR Monthly Realized C3+ NGL Price

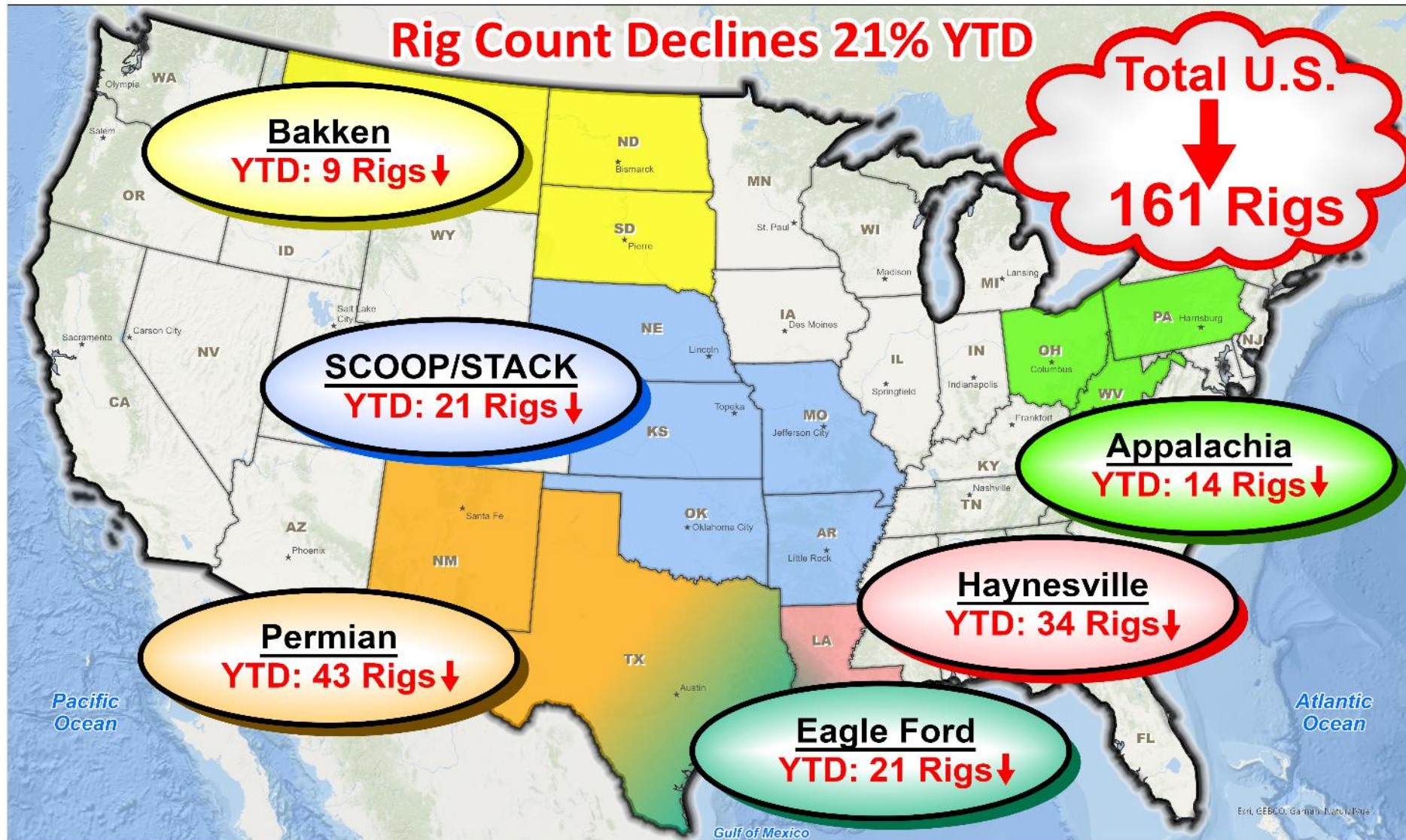


U.S. Exports of Propane Hit Record Highs in 2023

U.S. Exports of Propane/Propylene, Quarterly Average (MMBbl/d)

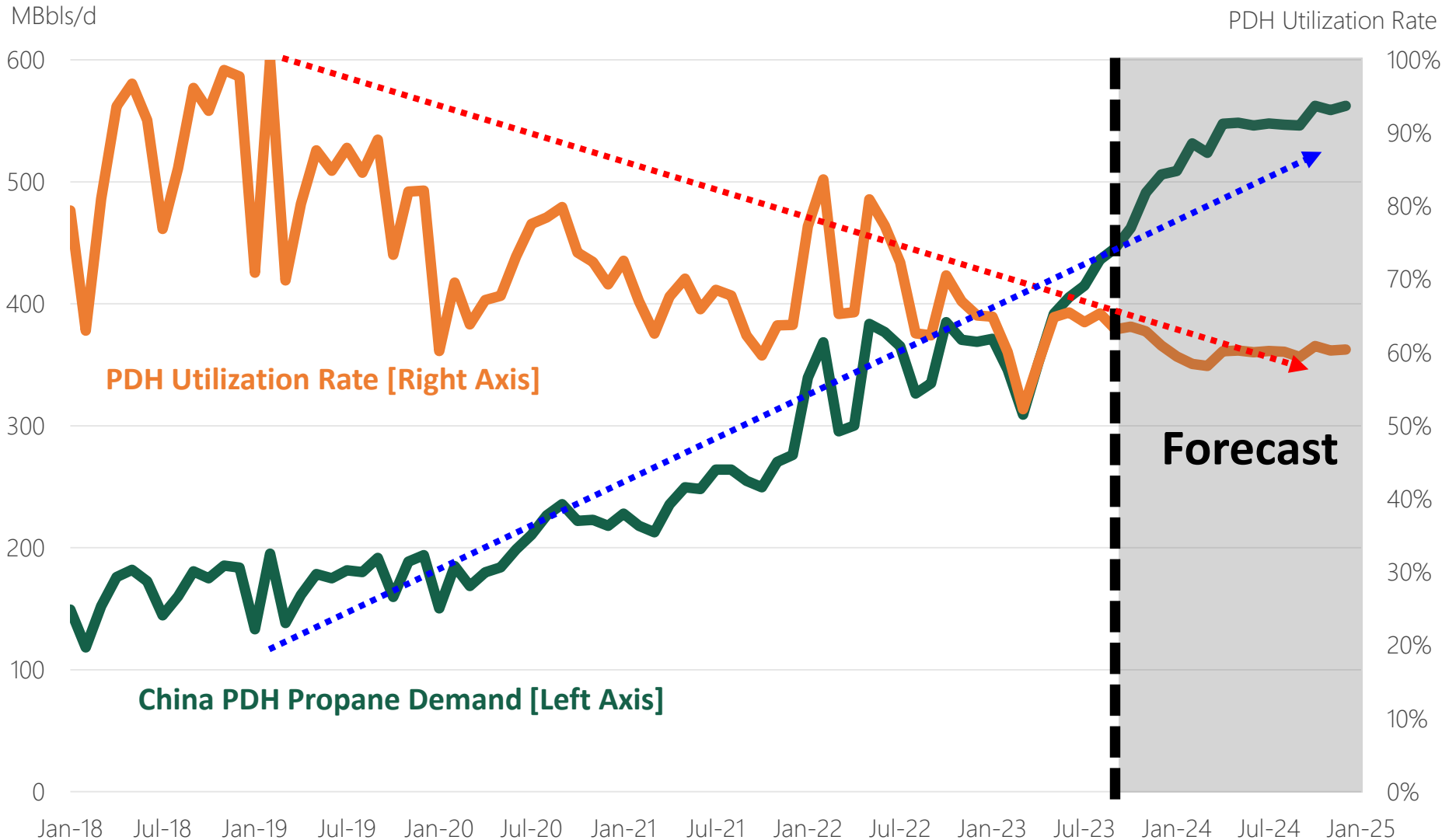


Rig Count Declines Have Accelerated in Key Producing Basins



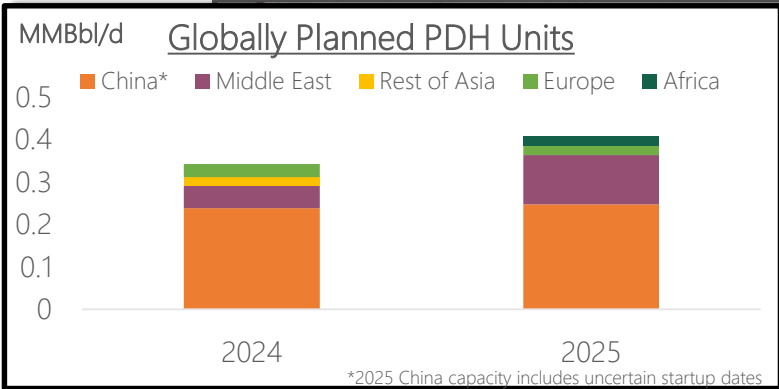
China PDH Propane Demand and PDH Utilization

Although China PDH utilization may flatten out, outright China PDH propane demand is expected to increase 55% from 2022 to 2024 from new PDH capacity additions



China PDH Buildout Continues

China added 150 MBbl/d of new China PDH demand capacity in 2023, Another ~250 MBbl/d of new PDH demand capacity is expected by the end of 2025



China's Planned 2024 PDH Units

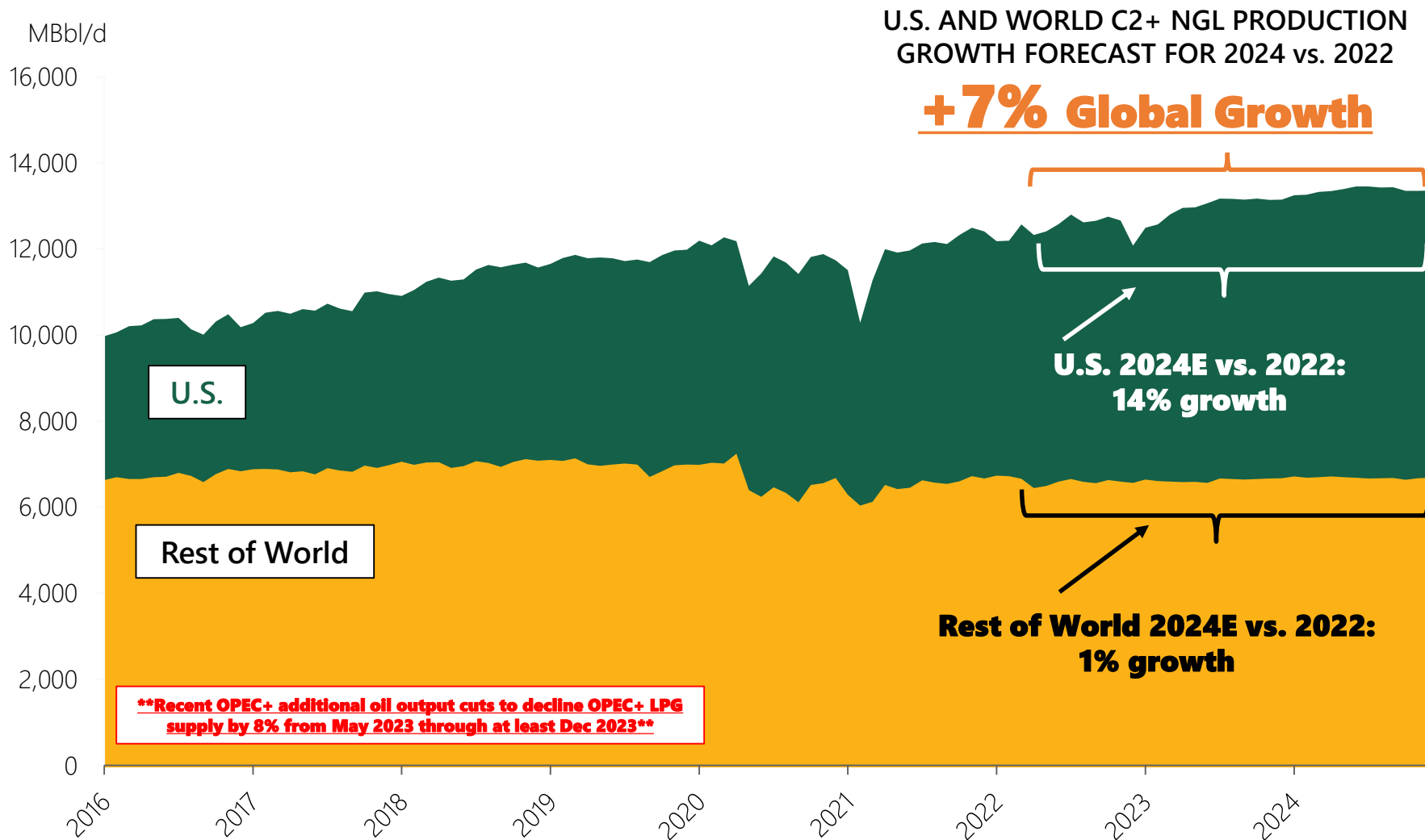


In Service PDH Unit – Guangdong Province



The U.S. is the Prominent Incremental LPG Supplier

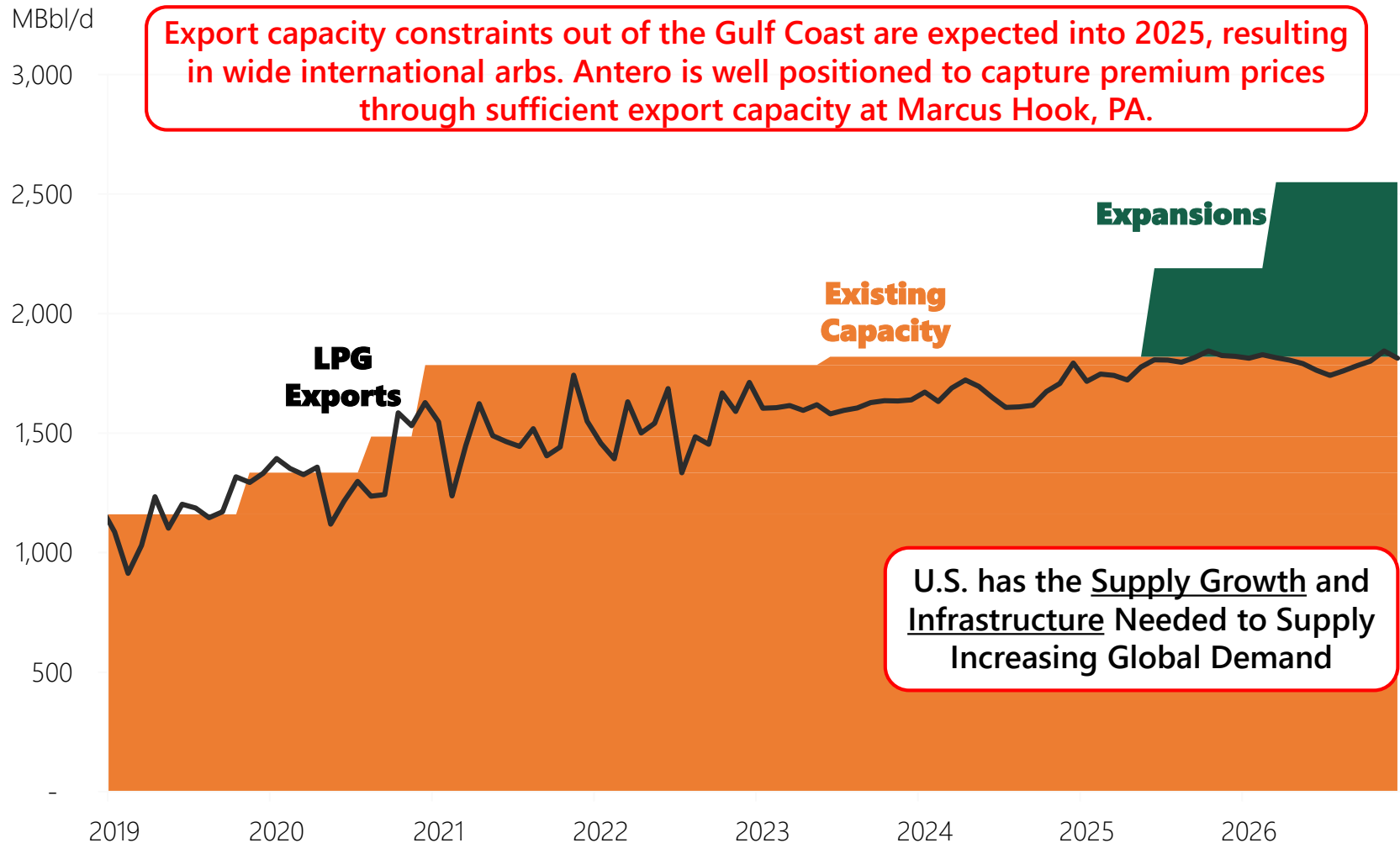
The U.S. is the incremental supplier and exporter of NGLs for growing global demand
World C2+ NGL Production



U.S. Export Capacity – Northeast Export Advantage

Antero export capacity not tied to near-term USGC capacity limitations

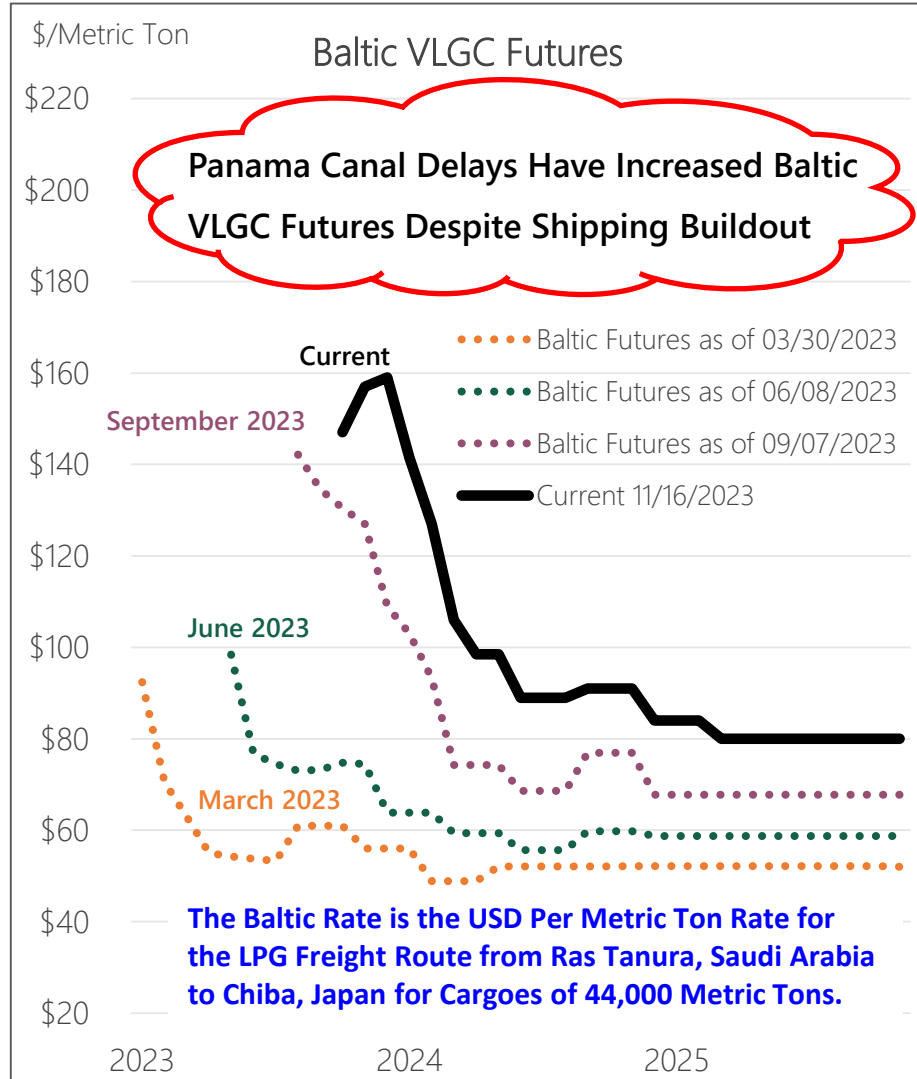
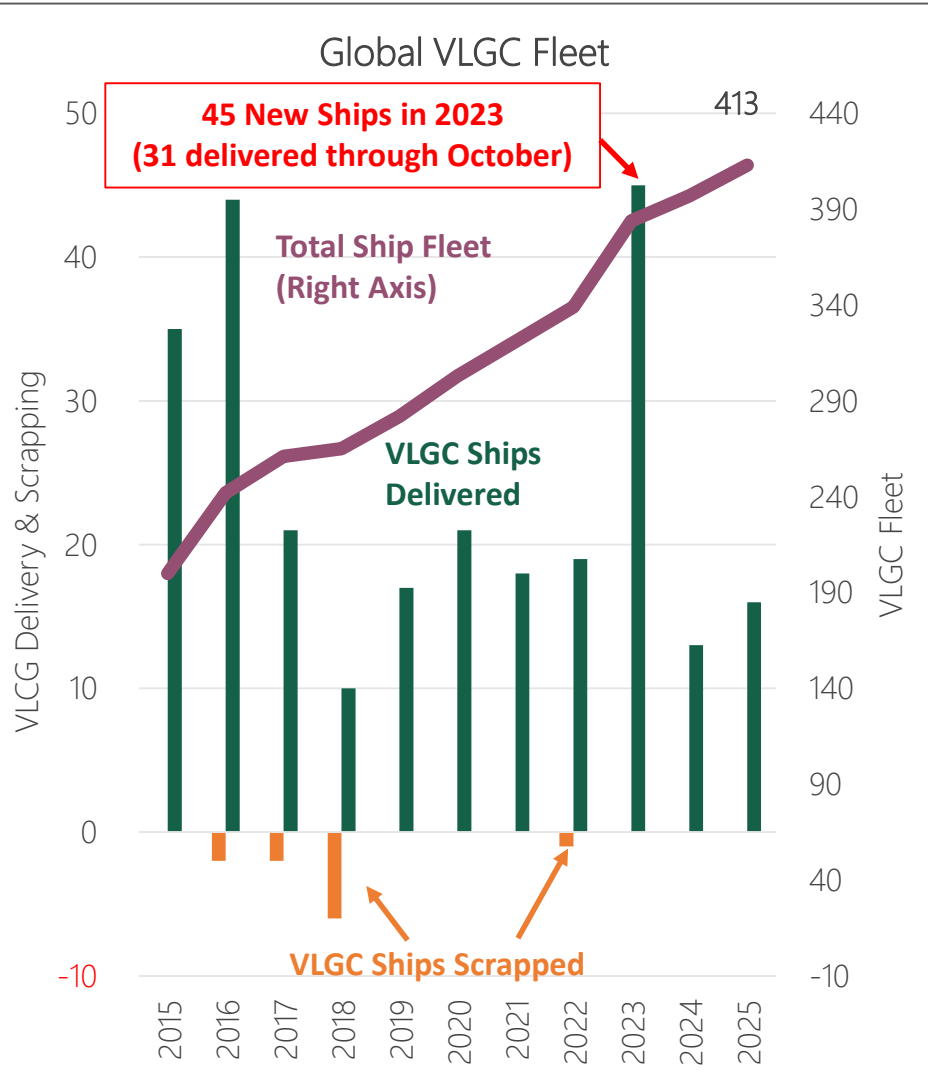
U.S. Gulf Coast LPG Export Capacity Expected to be Constrained in 2024



"VLGC" Shipping Buildout Faces Panama Canal Delays

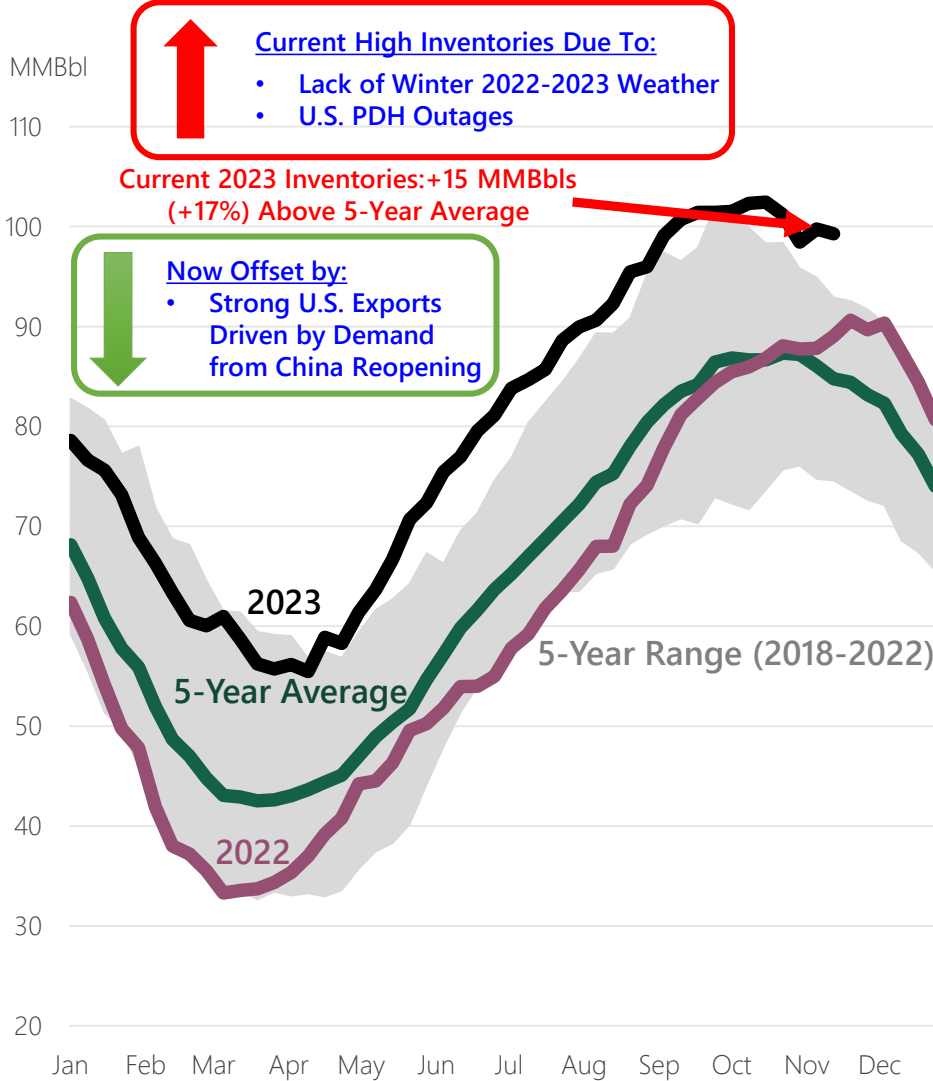
-Very Large Gas Carriers ("VLGC") transport LPG (propane and butane)

Ship additions in 2024 and 2025 have increased as shipowners order more newbuilds

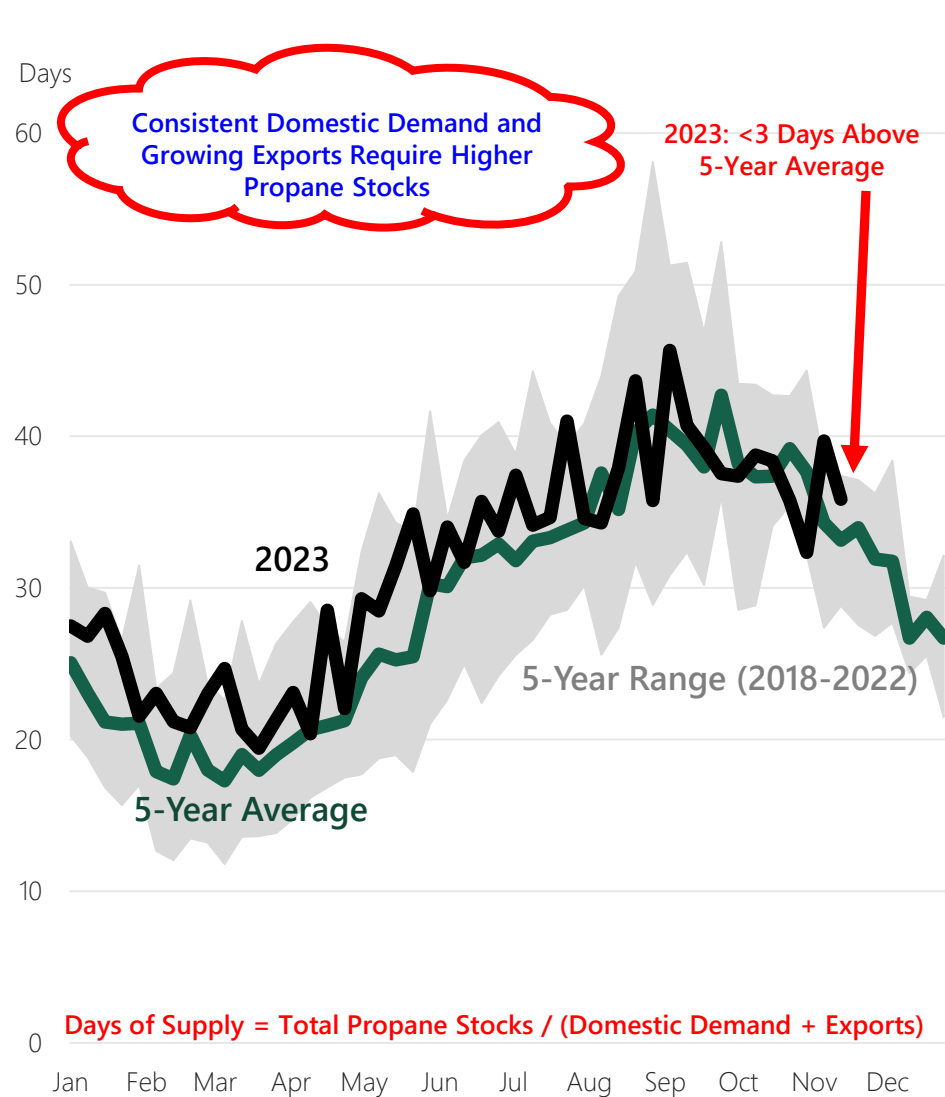


U.S. Propane Stocks and Propane Days of Supply

Propane Inventories Above 5-Year Historical Range driven by lack of winter weather in 2022-2023



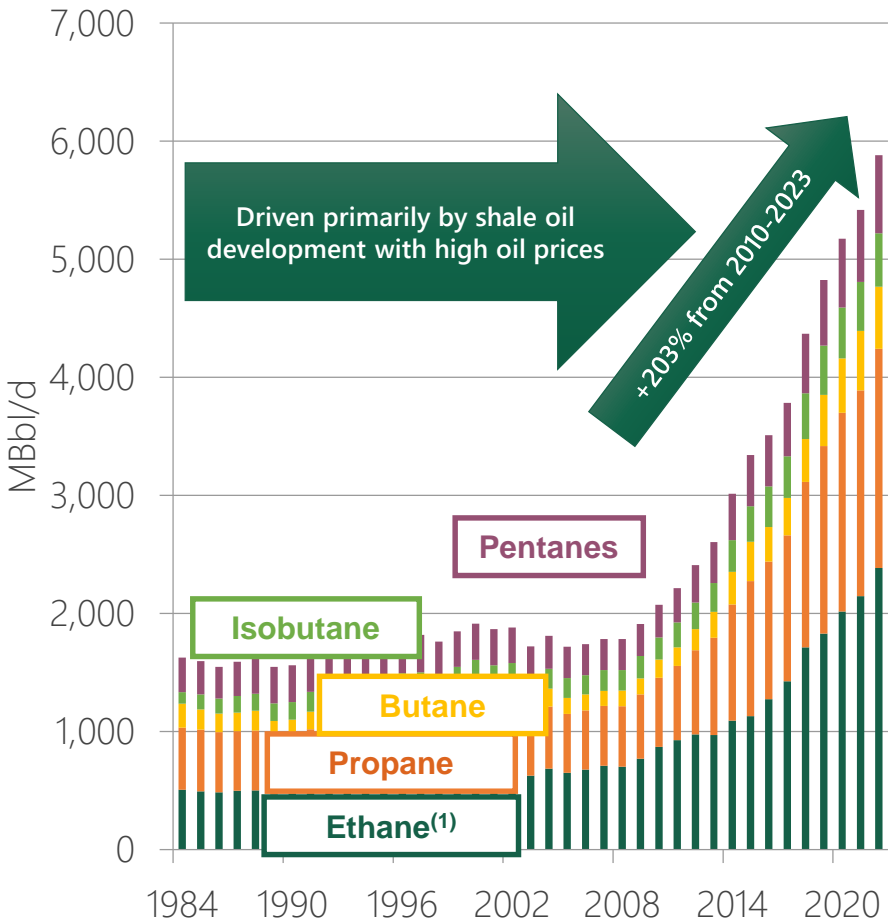
Despite High Absolute Propane Stocks, Days of Supply Overall Remains Within 5-Year Range



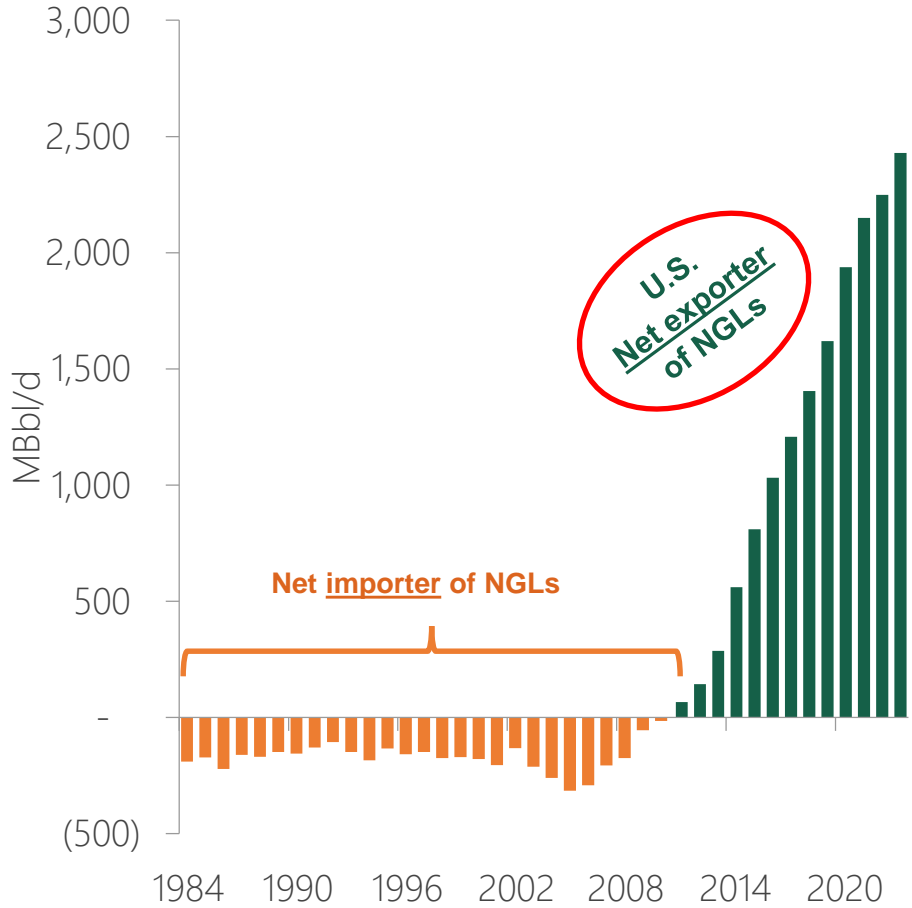
The Impact of the U.S. Shale Revolution

The Shale Revolution dramatically changed the NGL landscape, turning the U.S. into a net exporter after decades of importing NGL products

U.S. NGL Production



U.S. NGL Exports / (Imports)

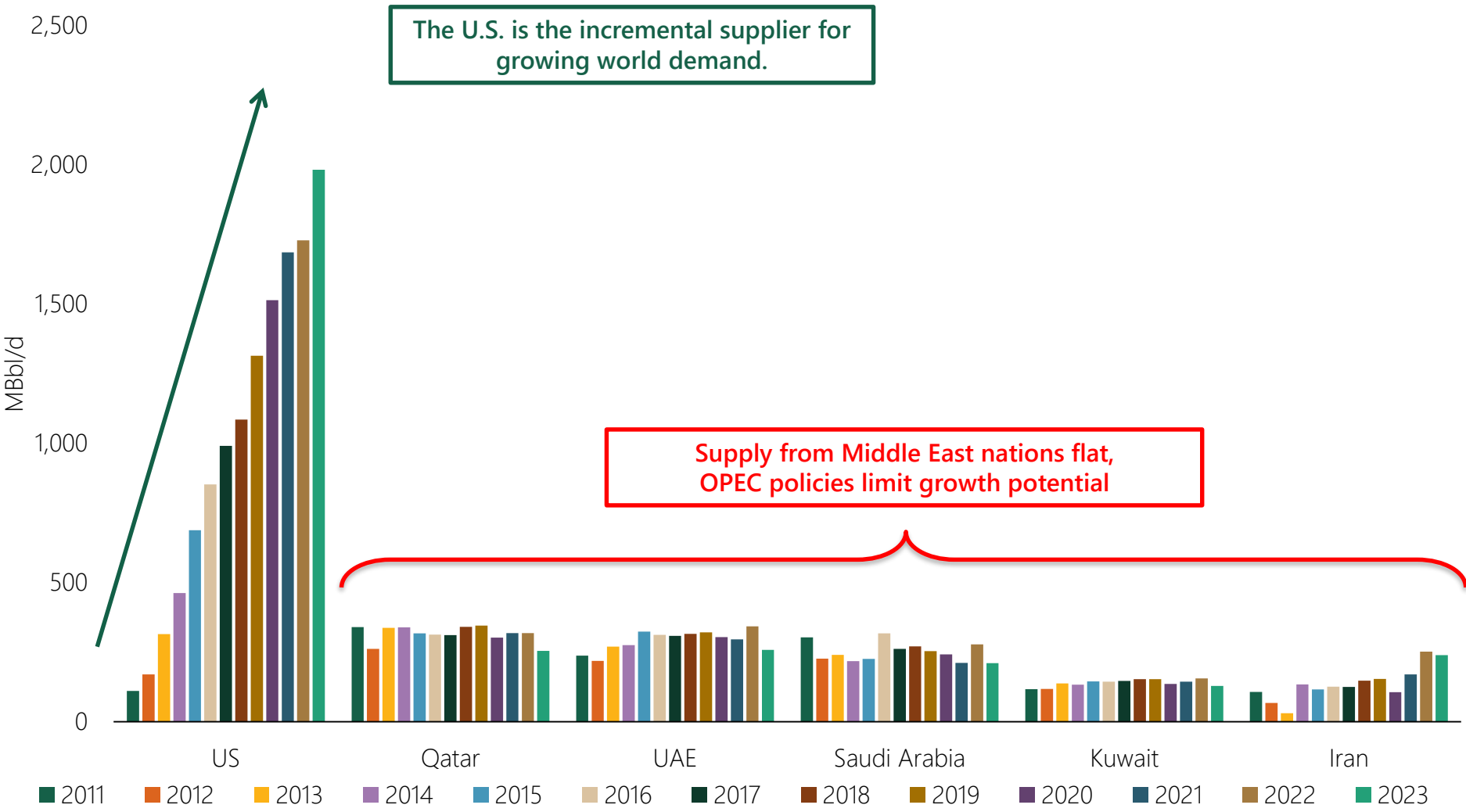


LPG Exports: U.S. versus Middle East

Recently announced OPEC+ cuts could limit OPEC LPG production and exports even further

The U.S. is the incremental supplier for growing world demand.

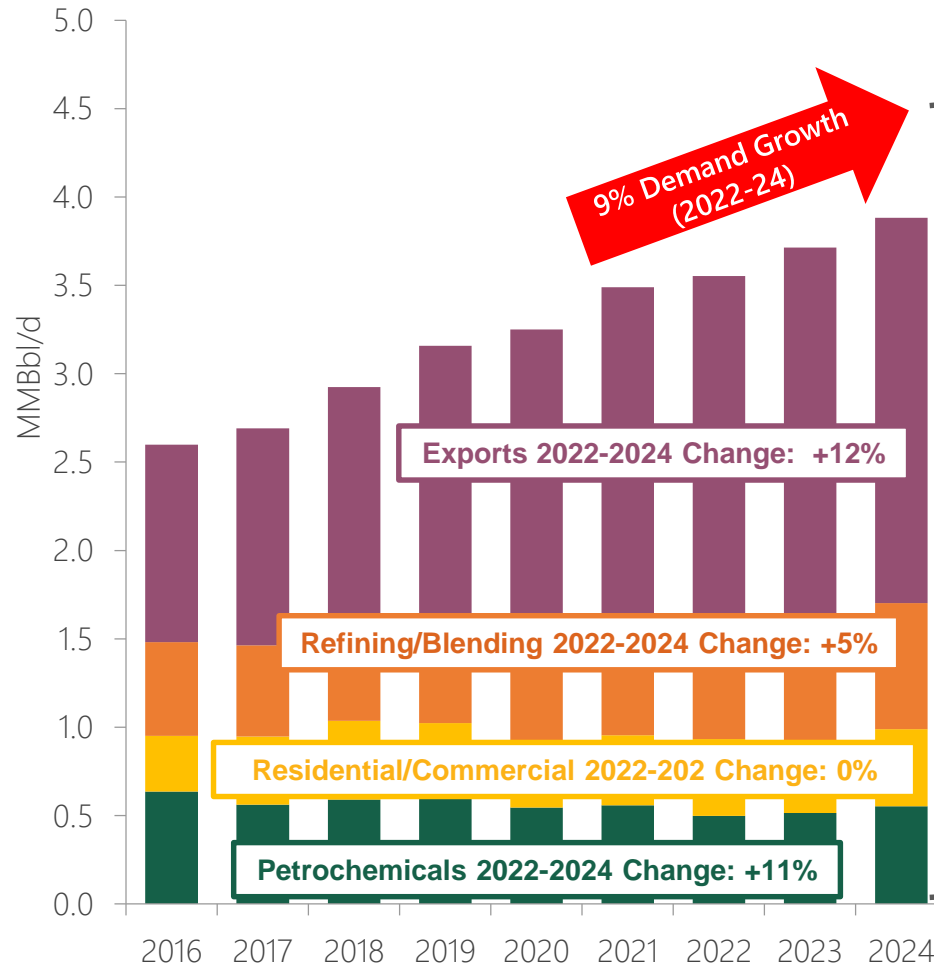
Supply from Middle East nations flat, OPEC policies limit growth potential



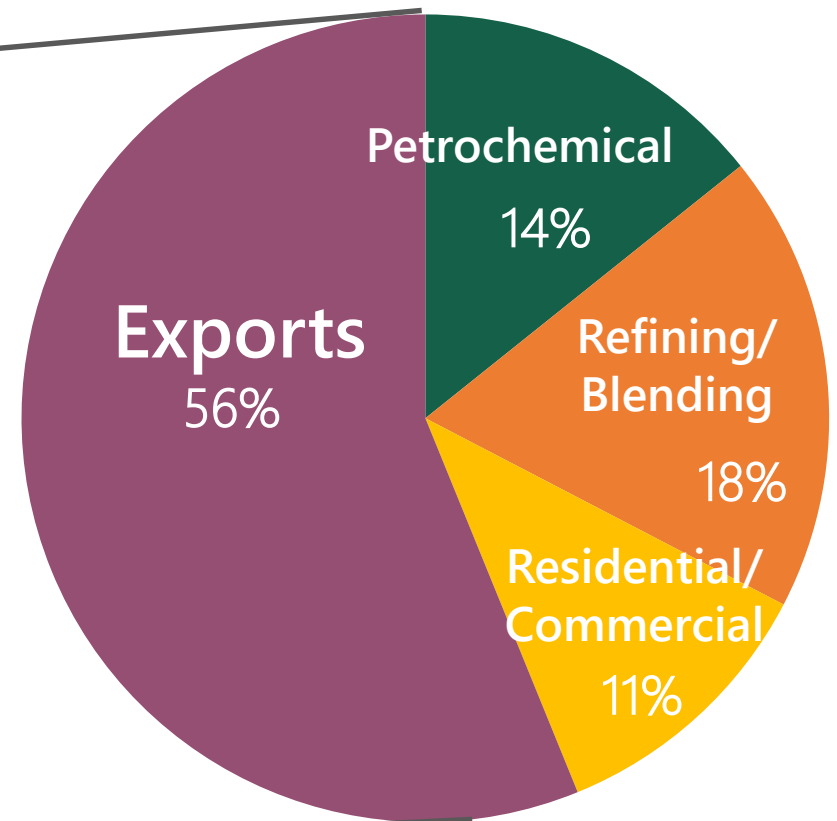
US NGL Demand

US NGL demand growth driven primarily by exports of LPG (propane/butane)

U.S. C3+ Demand by Sector



Estimated U.S. C3+ Demand – 2024

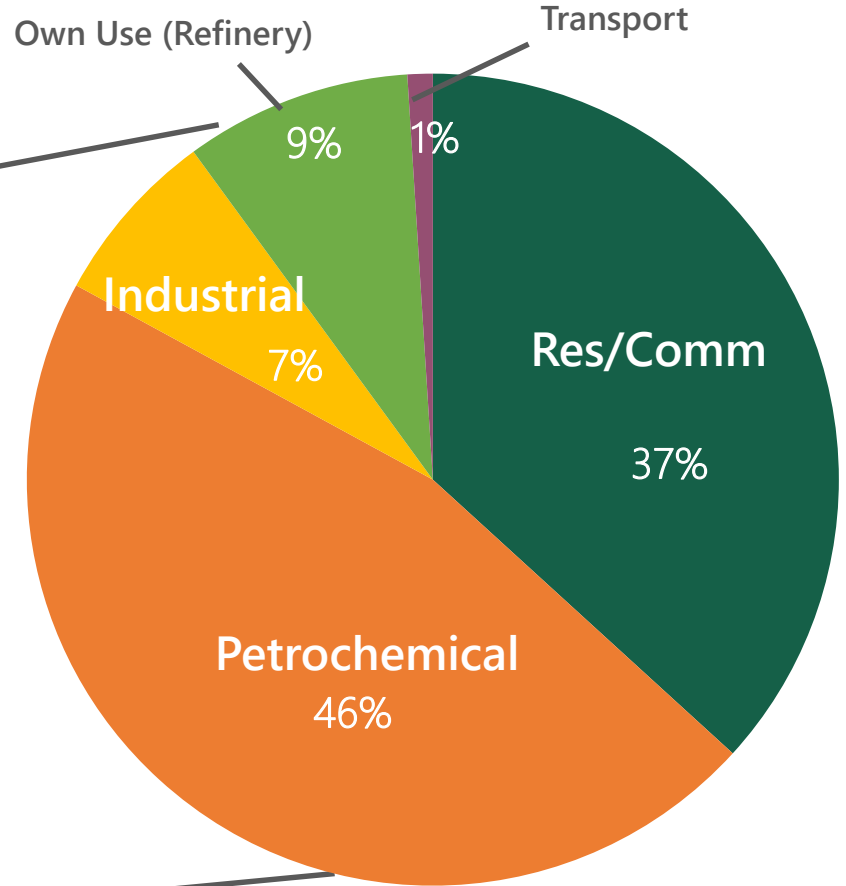
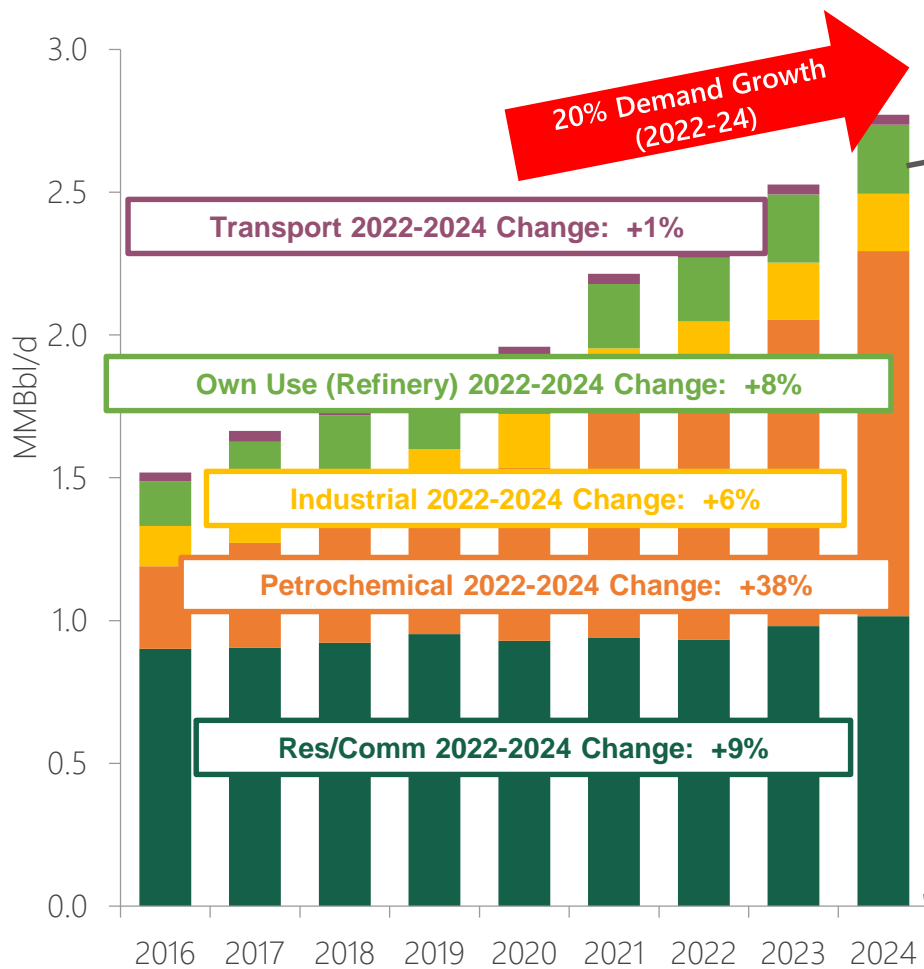


China LPG Demand

China's LPG demand growth driven by the petrochemical industry, fueled by PDH and steam cracker buildout

China LPG Demand by Sector (MMBbl/d)

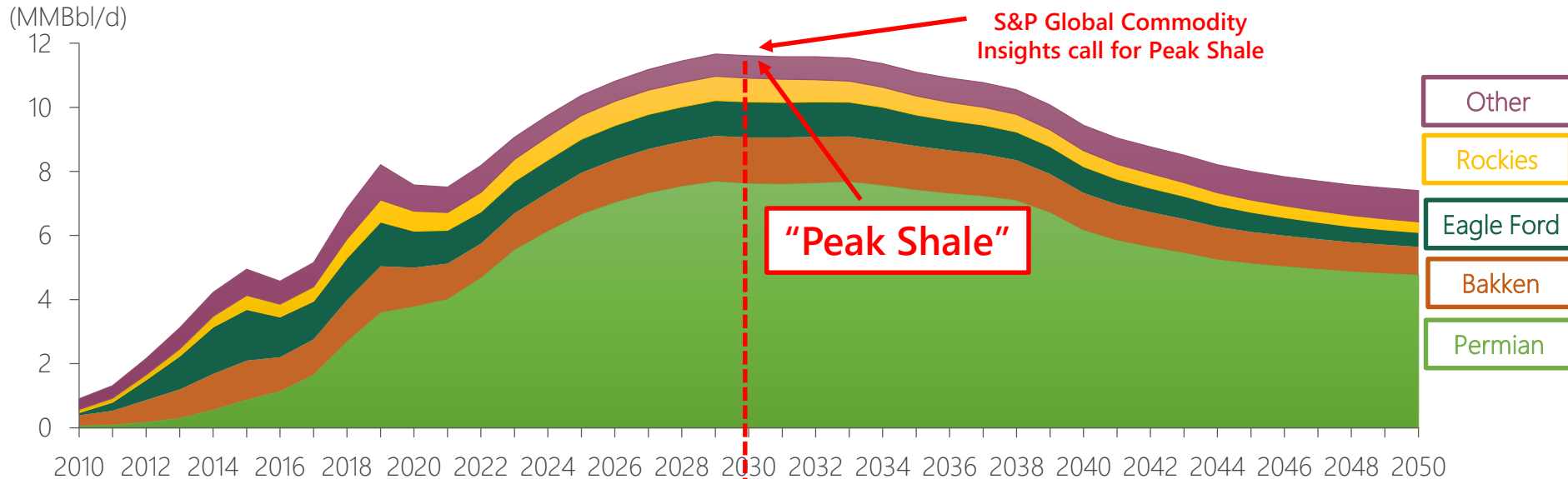
Forecast China LPG Demand – 2024



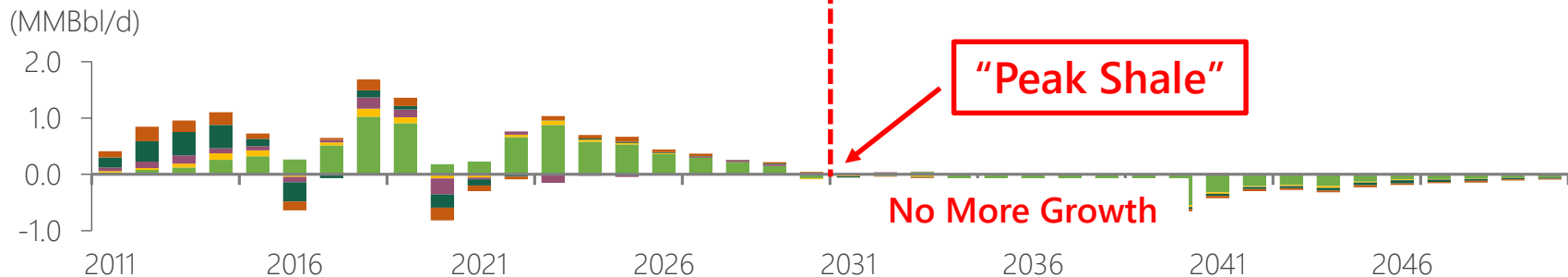
U.S. NGL Supply Growth Expected to Peak by 2030

U.S. shale crude and condensate growth is expected to decline after 2030

US Shale Crude and Condensate Production Forecast to 2050



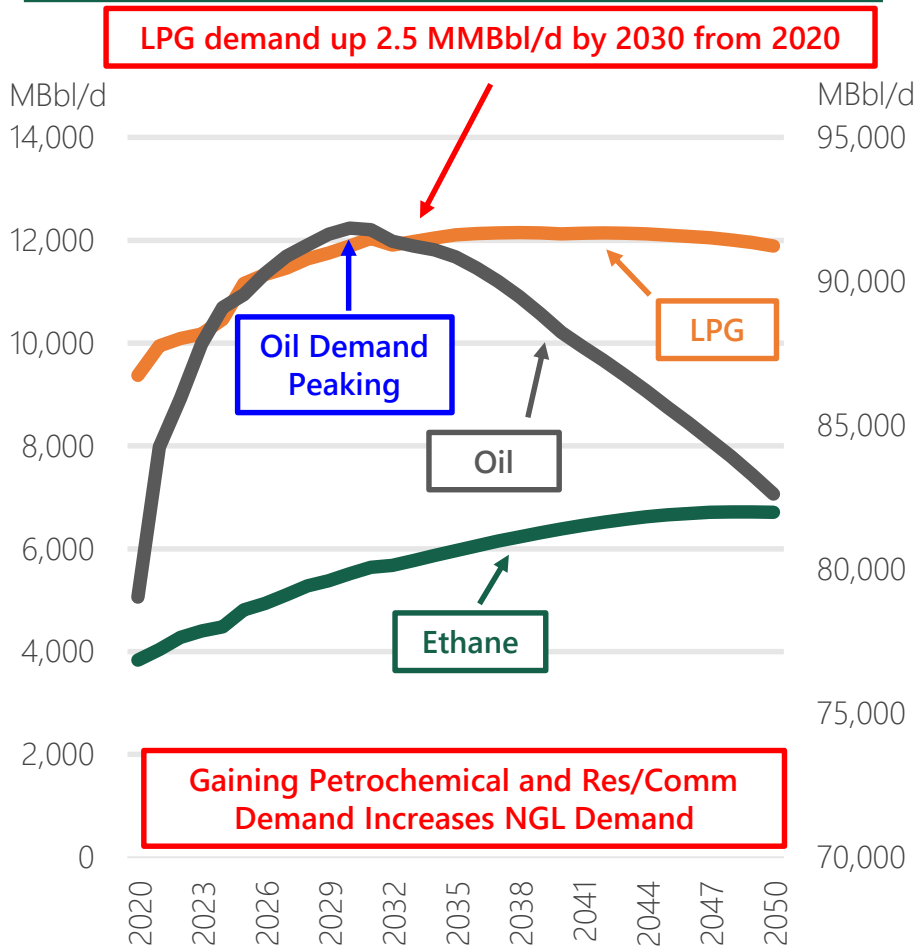
Year on Year Growth by Basin



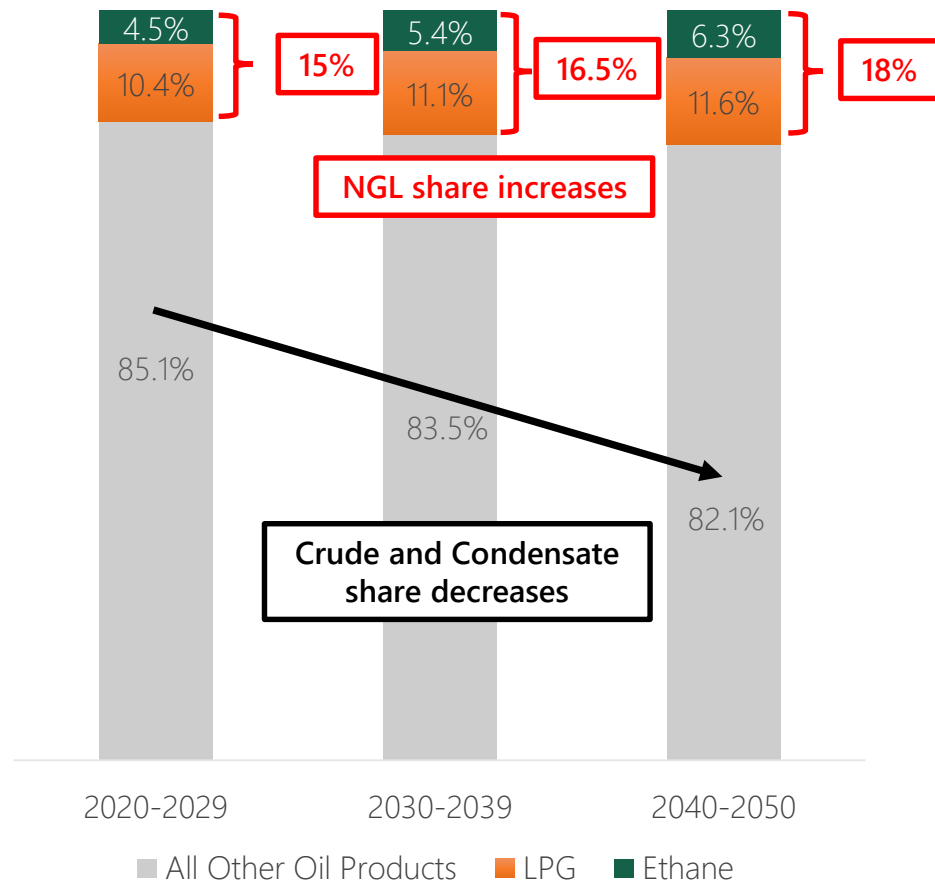
NGL Demand Growth Expected Through 2050

Demand for NGLs will continue to grow to meet the needs of the energy transition and growth in global petrochemical demand

Change in Demand by Liquids Product



Change in Market Share

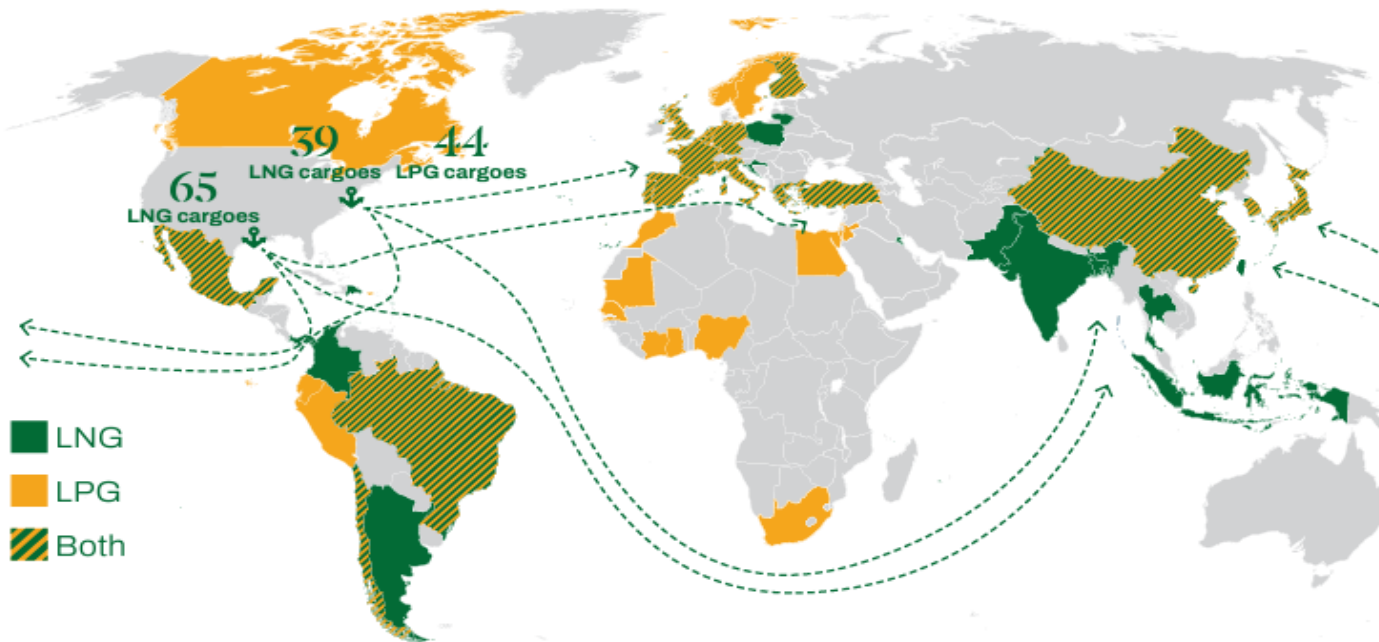


ESG Benefits of Growing Global NGL and LNG Demand

As the sixth largest U.S. natural gas producer and the fourth largest U.S. NGL producer, Antero Resources is supplying a portion of the energy needed to improve the health, safety and livelihood for people living in energy poverty.



Antero Resources 2022 LNG and LPG Cargo Destinations



104 LNG CARGOES
 In 2022, Antero Resources was responsible for the equivalent of 104 cargoes of LNG being sent to international markets.

Approximately 25% of LNG volumes that were exported went to developing countries.

4.4 LPG CARGOES
 In 2022, 24 million barrels of Antero Resources' LPG volumes were shipped to international markets.

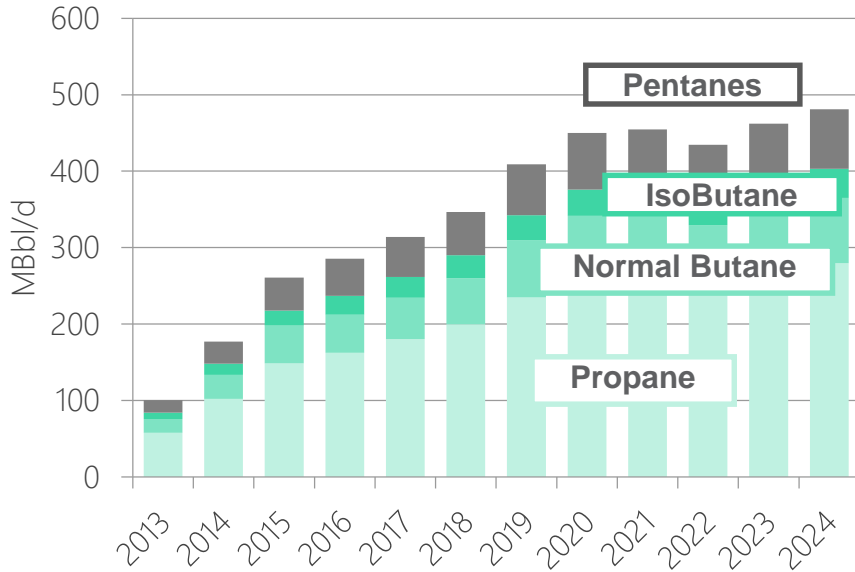
Export destinations pulled from EIA PADD 1 (LNG and LPG) and EIA PADD 3 (LNG) data



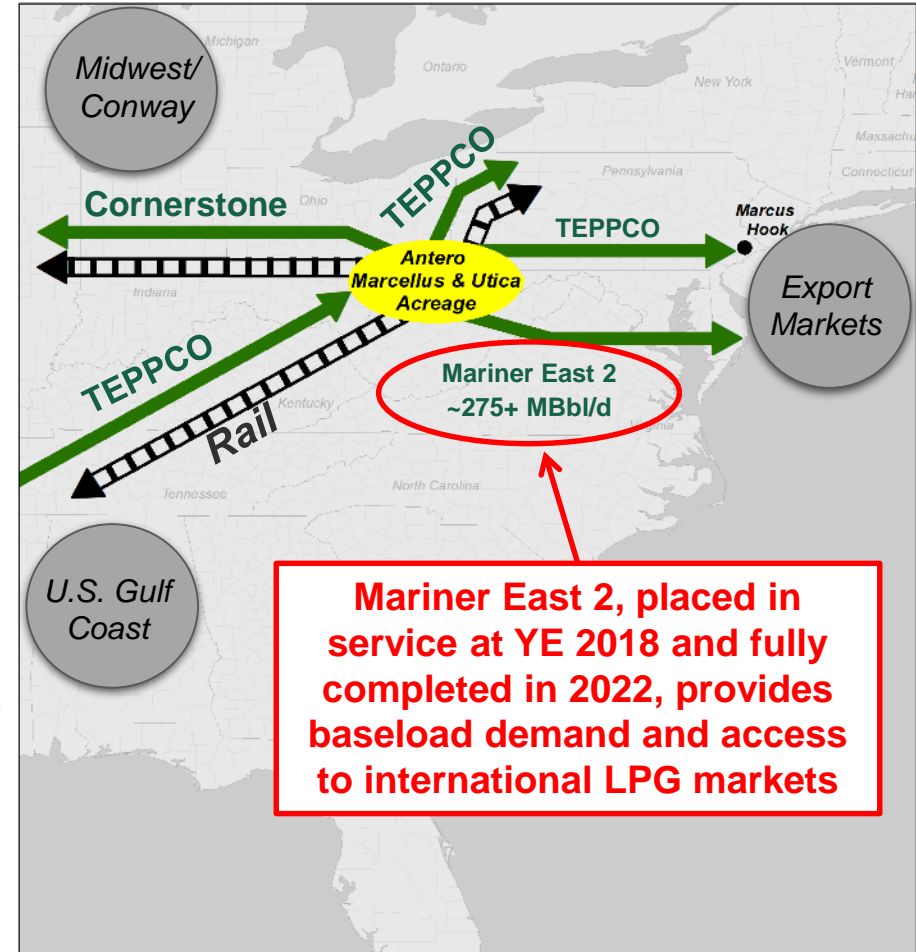
C3+ NGLs: Northeast Market Dynamics and Supply

Antero's C3+ blended differential to Mont Belvieu has improved with Mariner East 2 export takeaway and ability to access international markets

Northeast C3+ NGL Supply



Northeast C3+ NGL Takeaway



~200 MBbl/d of Northeast C3+ demand vs.

~450 MBbl/d of Northeast supply in 2021

- Resulted in **44%** of production consumed locally
- Remainder moved primarily by rail and exported

Differentials to Mont Belvieu tightened in 2019 with Mariner East 2 coming online



Ethane: Northeast Market Dynamics & Supply

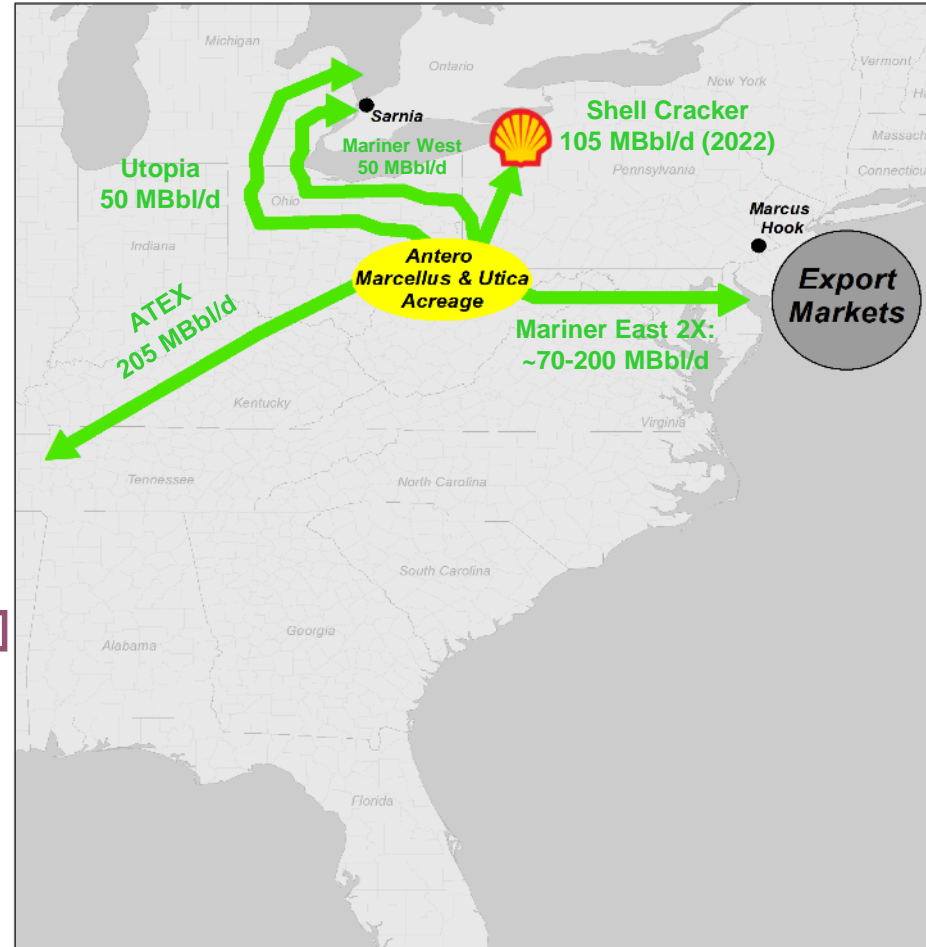
Antero's ethane has a natural gas value pricing floor; pricing improvements from additional petrochemical and takeaway demand is all "Upside"

~140 MBbl/d of ethane current rejected in Northeast (~25% of potentially recoverable ethane)

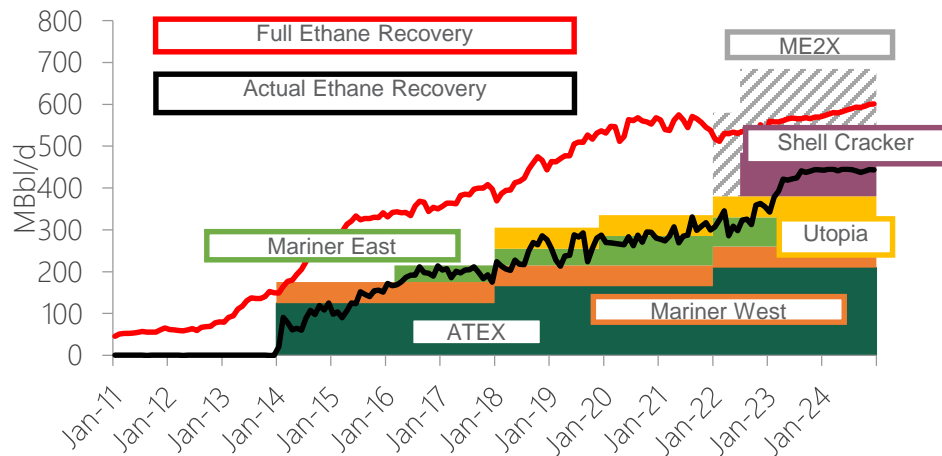
Antero is an anchor supplier to Shell's cracker which began operations in 2022

Antero ethane firm sales contracts ~50% gas-linked and ~50% Mont Belvieu-linked

Northeast Ethane Takeaway and Capacities



Northeast Ethane Supply (MBbl/d)

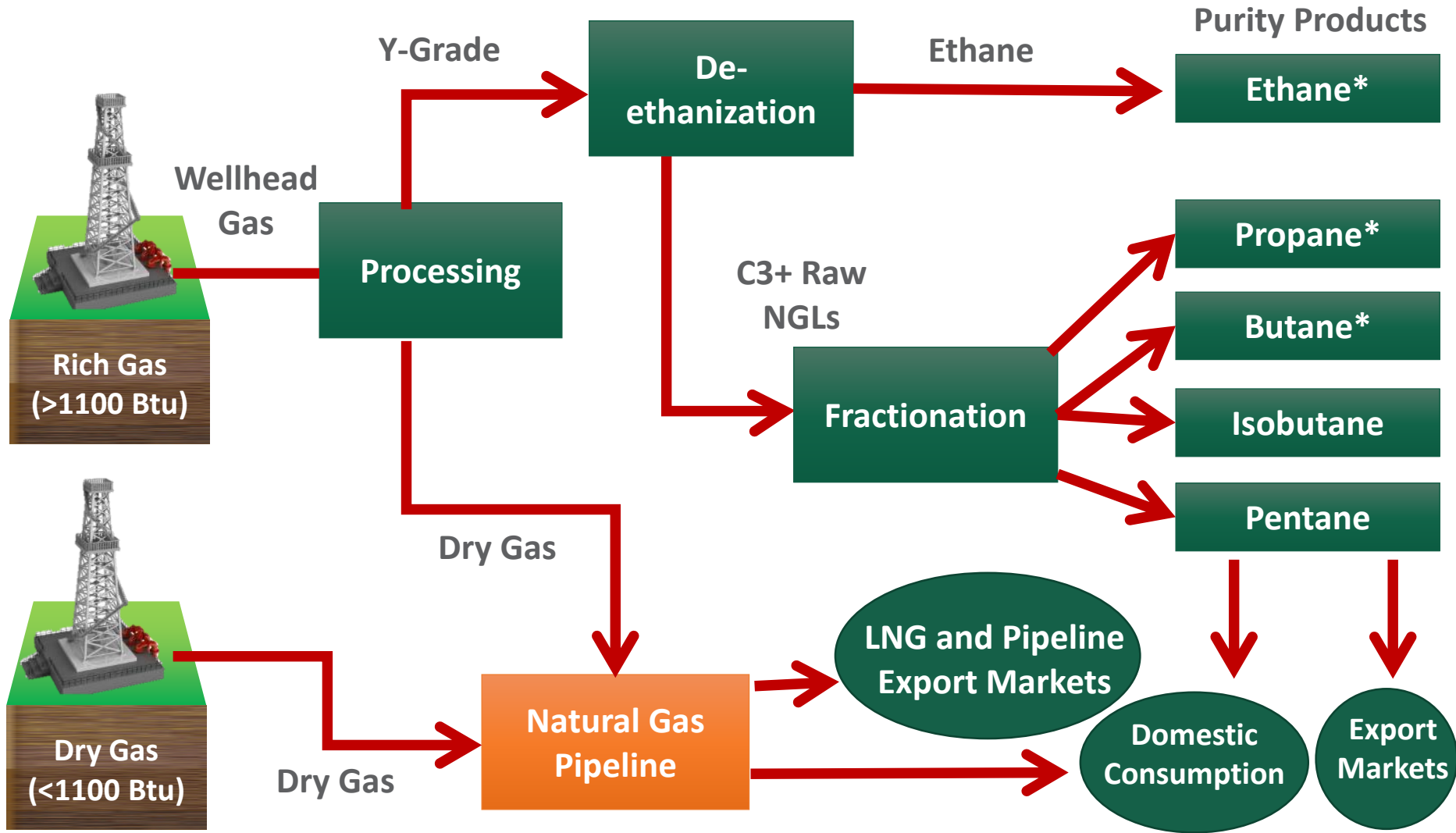




APPENDIX

Natural Gas Liquids Primer

Natural Gas Liquids “NGLs” are contained in the rich natural gas stream, but after processing, condense into liquid form for storage, shipping and consumption



Natural Gas Liquids Primer

NGLs play an essential role in the domestic and international industrial, residential, commercial and transportation industries

Gas Linked Pricing **Crude Linked Pricing**

	Methane	Ethane	Propane	Butane	Iso-Butane	Pentane
	Natural Gas	C2	C3	C4	IC4	C5
Primary Sectors	All	Chemical Industrial	Industrial Residential Commercial, Chemical	Industrial Transportation	Industrial	Transportation
Primary Uses	Power	Ethylene Production (For plastics)	Heating, Crop drying, Commercial, Propylene	Winter Gasoline Blending	Alkylate feed to produce gasoline	Gasoline blend and diluent



Appendix and Supporting Information

This material is intended for benchmark pricing estimates only and does not reflect Antero actual contracted prices

Key Terms and Definitions:

- ARA** – “Amsterdam-Rotterdam-Antwerp.” ARA is a port and refining area in the Belgian-Dutch region of Europe.
- CIF** - “Cost, Insurance, Freight.” CIF means that the seller delivers the goods on board the vessel or procures the goods already so delivered. Note that the CIF ARA LPG prices represent a delivered cargo into Europe.
- FEI** – “Far East Index.” The Argus Far East Index is the average of the Argus Japan CFR propane quotation and the Argus South China CFR propane quotation. Note that the FEI LPG prices represent a delivered cargo into Asia.
- CFR** - “Cost and Freight.” CFR means that the seller delivers the goods on board the vessel or procures the goods already so delivered.
- Baltic LPG Index** - The Baltic LPG Index is a shipping cost estimate based on a voyage from Ras Tanura, Saudi Arabia to Chiba, Japan round trip, laden (full) on the outbound journey and ballast (empty) on the return trip, carrying a fully refrigerated cargo of 44,000 MT (+/- 5%) propane, butane, or a mixture. The index is published by the Baltic Exchange.

Intercontinental Exchange (ICE) provides the benchmark pricing information used in this presentation. For more information, visit <https://www.theice.com/energy/natural-gas-liquids>

	ICE Definition	
ANTERO LABEL	HUB	PRODUCT
ARA C3	CIF ARA	Propane Argus Futures
ARA C4	CIF ARA	Butane Argus Futures
FEI C3	Far East	Propane Argus Futures
FEI C4	Far East	Butane Argus Futures
MB C3	MT.B-ENT	Propane OPIS Futures
MB C4	MT.B-ENT	Normal Butane OPIS Futures

Relevant Conversions:

- Propane = 521 gallons per metric ton
- Butane = 453 gallons per metric ton

Antero Internal Shipping Estimates are derived by Antero using several sources, including Baltic LPG Index Futures and broker estimates.

- Rates are adjusted based on travel time from Marcus Hook, PA to Northwest Europe (Amsterdam-Rotterdam-Antwerp Region) and Marcus Hook, PA to Asia (Chiba, Japan).
- Antero’s actual shipping rates may differ from these estimates.

