



# Natural Gas Liquids Fundamentals

September 2024

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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

## 2024+

### Propane Inventory Levels

- Storage inventories are 4% below the year ago level

### LPG Exports at Record Highs

- U.S. exports grew 22% in 2023 and are up over 170,000 Bbl/d year-to-date 2024 compared to the same period last year

### Export Premium vs. Mont Belvieu at Record Levels

- Tight export capacity and increasing international demand drives export prices to nearly than \$0.30 per gallon above Mont Belvieu

### Shipping Rates Normalize

- LPG shipping rates return to historical levels as Panama Canal delays are alleviated and new VLGC ships are delivered

### China PDH Buildout Continues

- China Driving Global Capacity Additions of 220 MBbl/d in 2024 and 250 MBbl/d in 2025

### U.S. Supply Growth Required to Meet Increasing Demand in Asia

- The U.S. is the incremental global supplier of NGLs to meet increasing international demand



# Antero Resources: Advantaged NGL Producer

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

## Antero Advantages:

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- Antero exports the majority of its propane and butane production out of Marcus Hook, Pennsylvania
- Gulf Coast export capacity constraints expected to keep international arbs wide, a benefit to Northeast exporters, like Antero
- Antero sales at Marcus Hook are driven by international index pricing (ARA or FEI)
- Antero liquids production includes approximately 40,000 Bbls/d that is closely linked to WTI prices

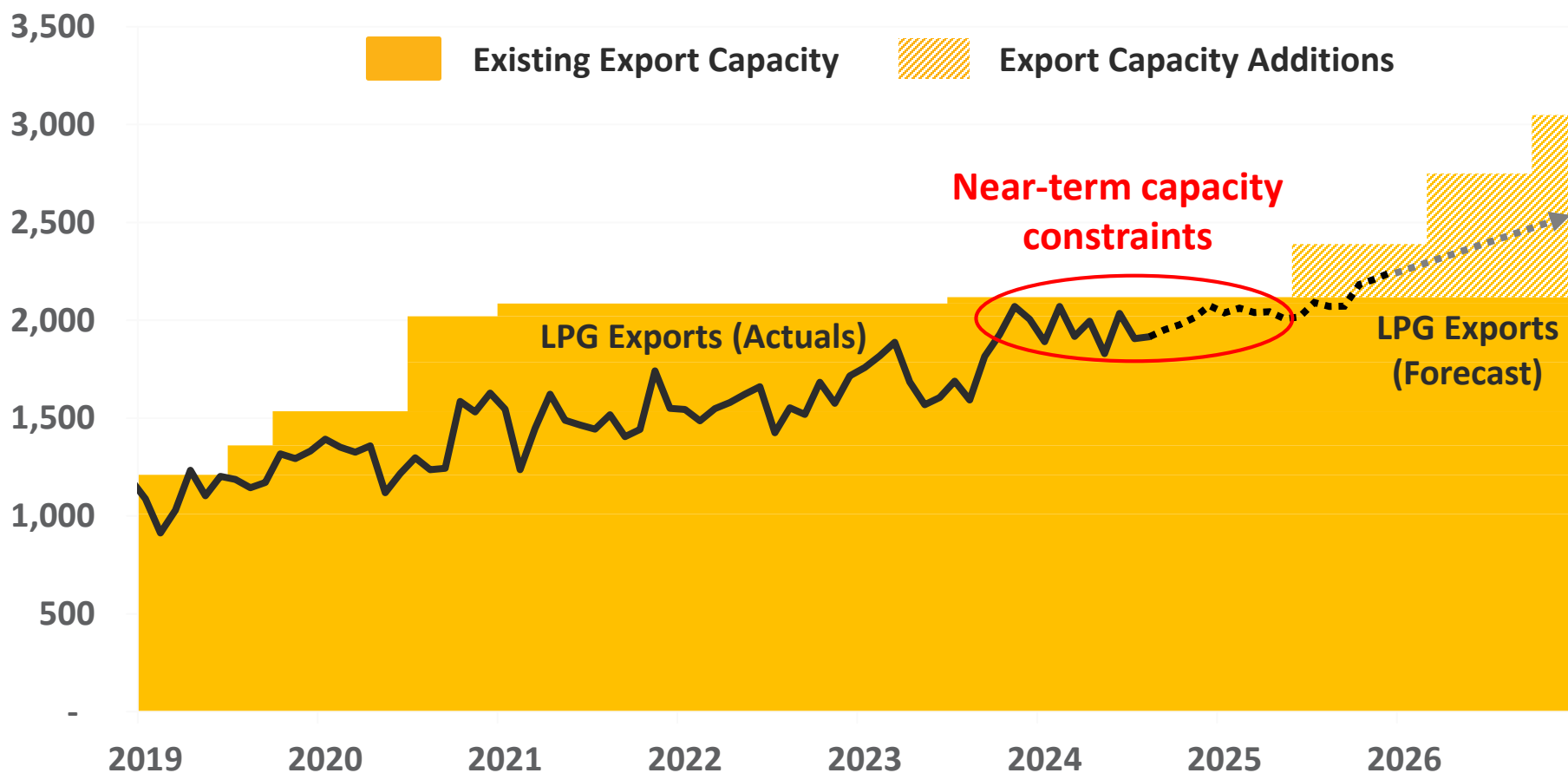


# Antero Holds Northeast LPG Export Advantage

AR's export capacity is not impacted by near-term U.S. Gulf Coast capacity constraints

## U.S. Gulf Coast LPG Export Capacity vs. LPG Exports

(MMBbls/d)



# Improving U.S. LPG Export Fundamentals

## Tight LPG Export Capacity Results in Premium Export Differentials

### Export Premium vs. Mont Belvieu <sup>(1)</sup>

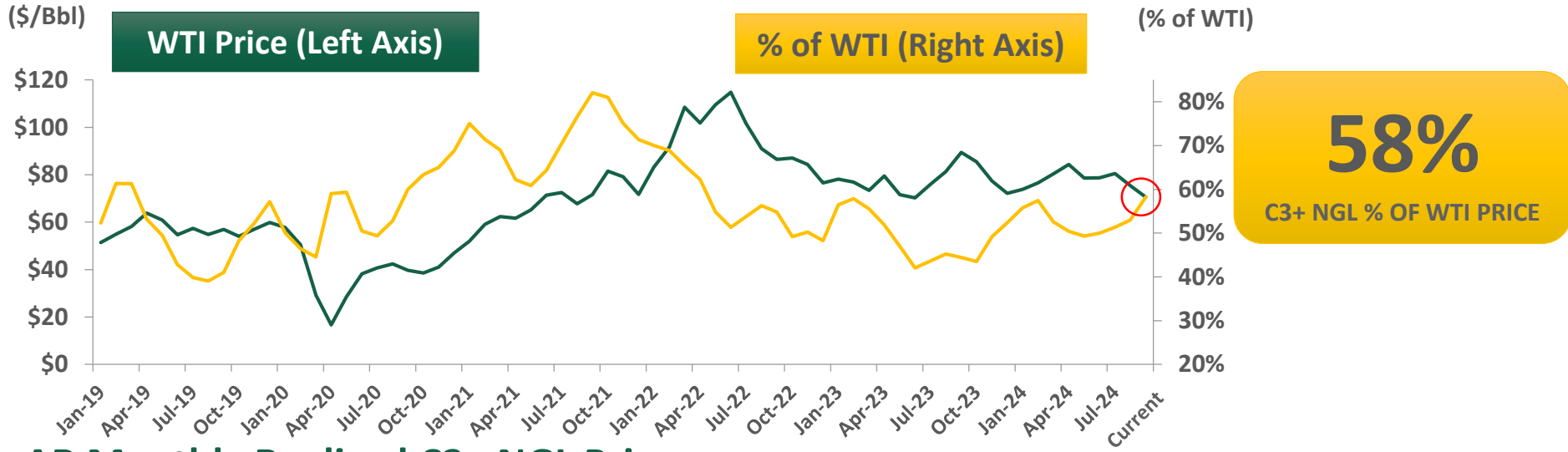
(\$/Gallon)



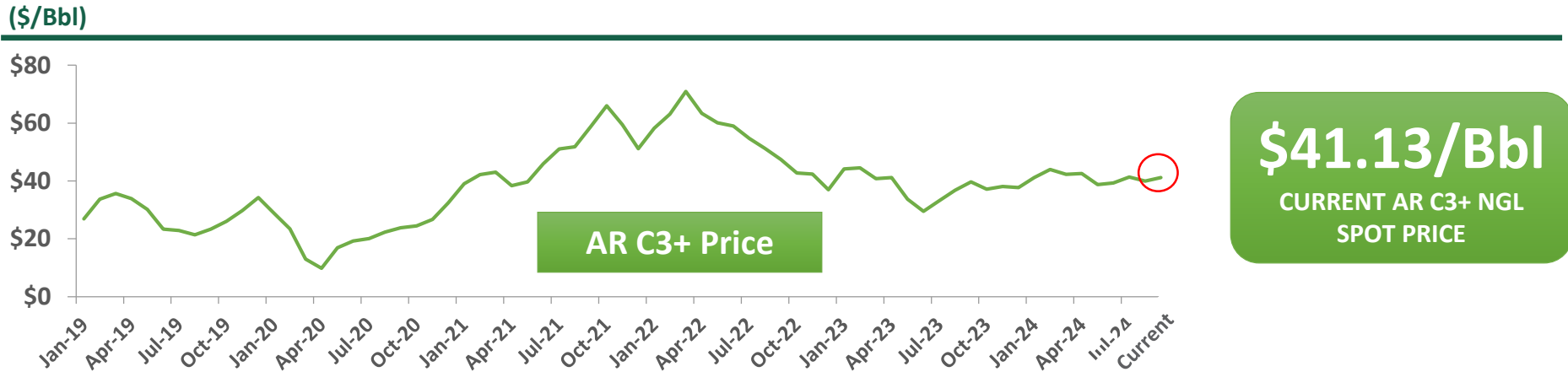
# NGL Price Trend

Driven by strong exports, C3+ pricing as a percentage of WTI is trending back to historical norms

## WTI Oil Price vs. C3+ NGL Price as a % of WTI



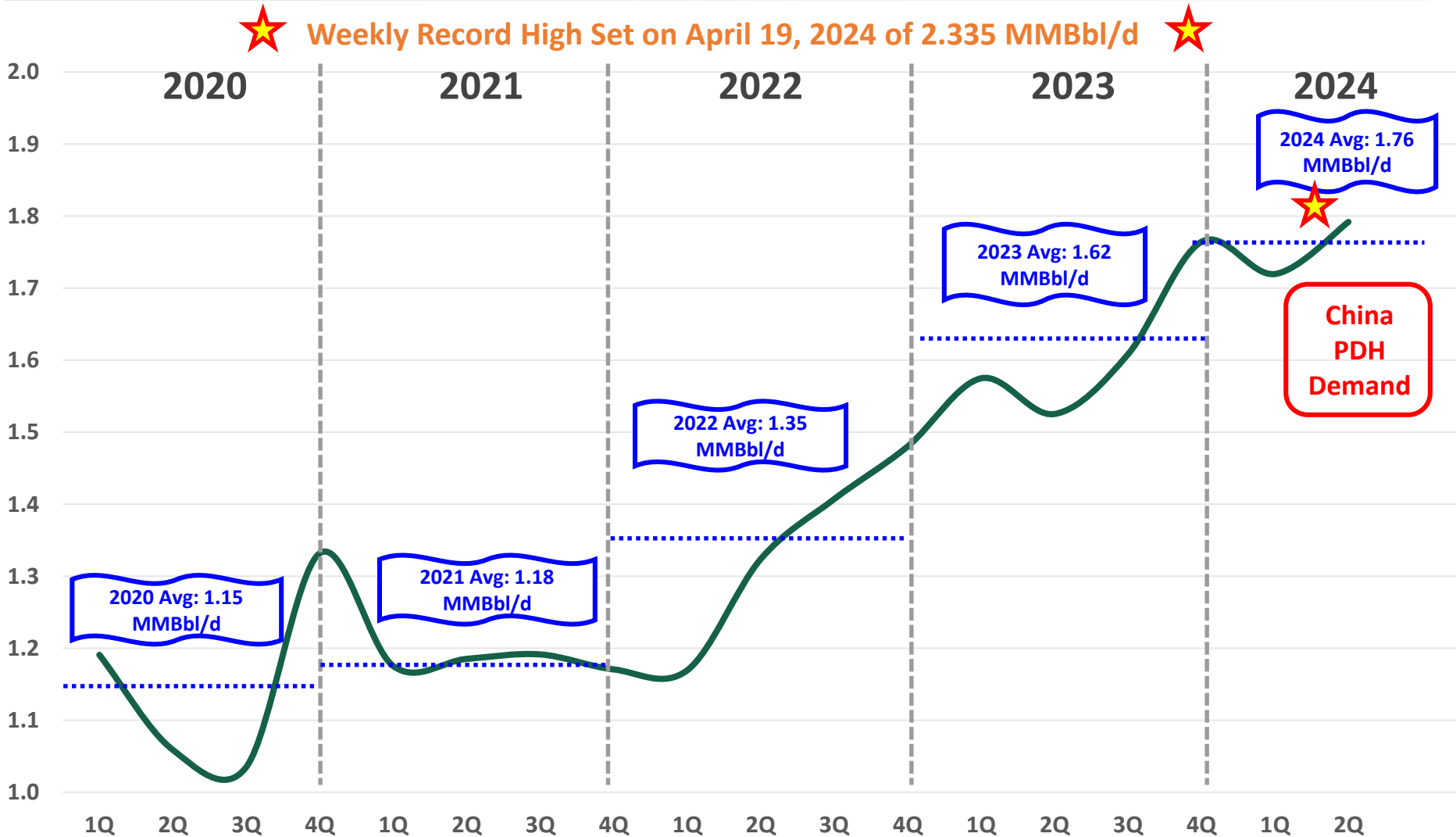
## AR Monthly Realized C3+ NGL Price



# U.S. Exports of Propane Hit Record Highs in 2024

## U.S. Exports of Propane/Propylene, Quarterly Average

(MMBbls/d)

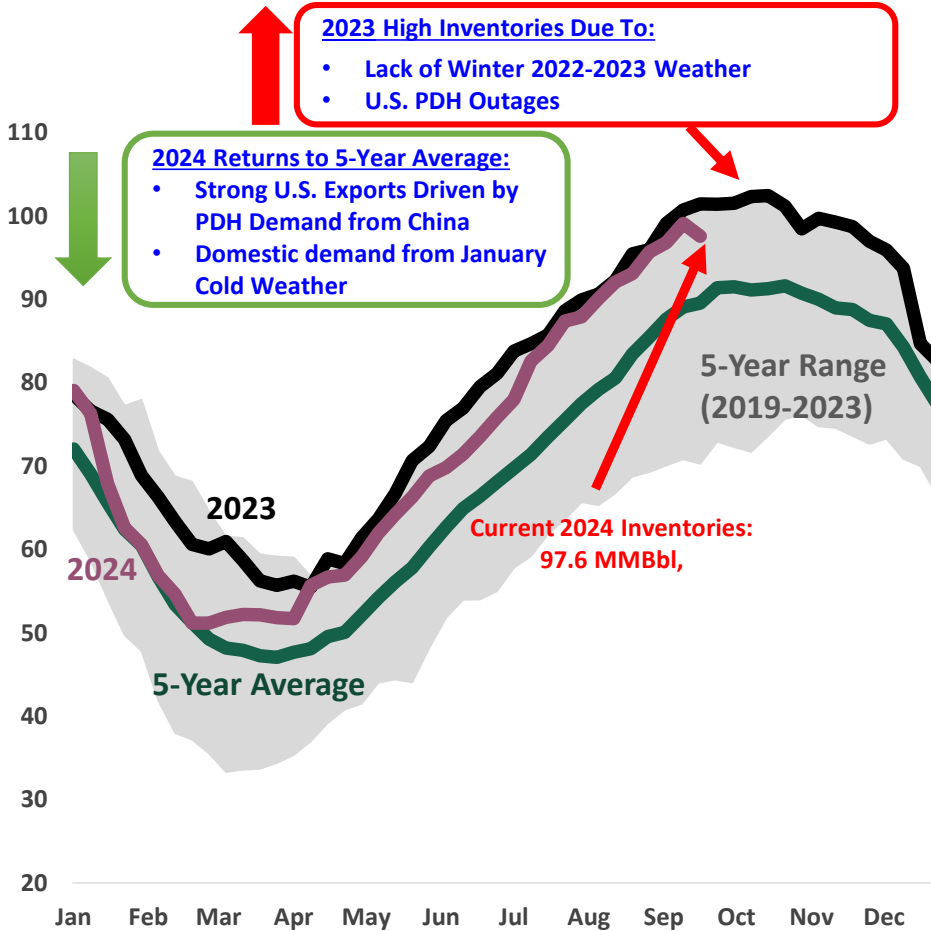




# U.S. Propane Stocks and Propane Days of Supply

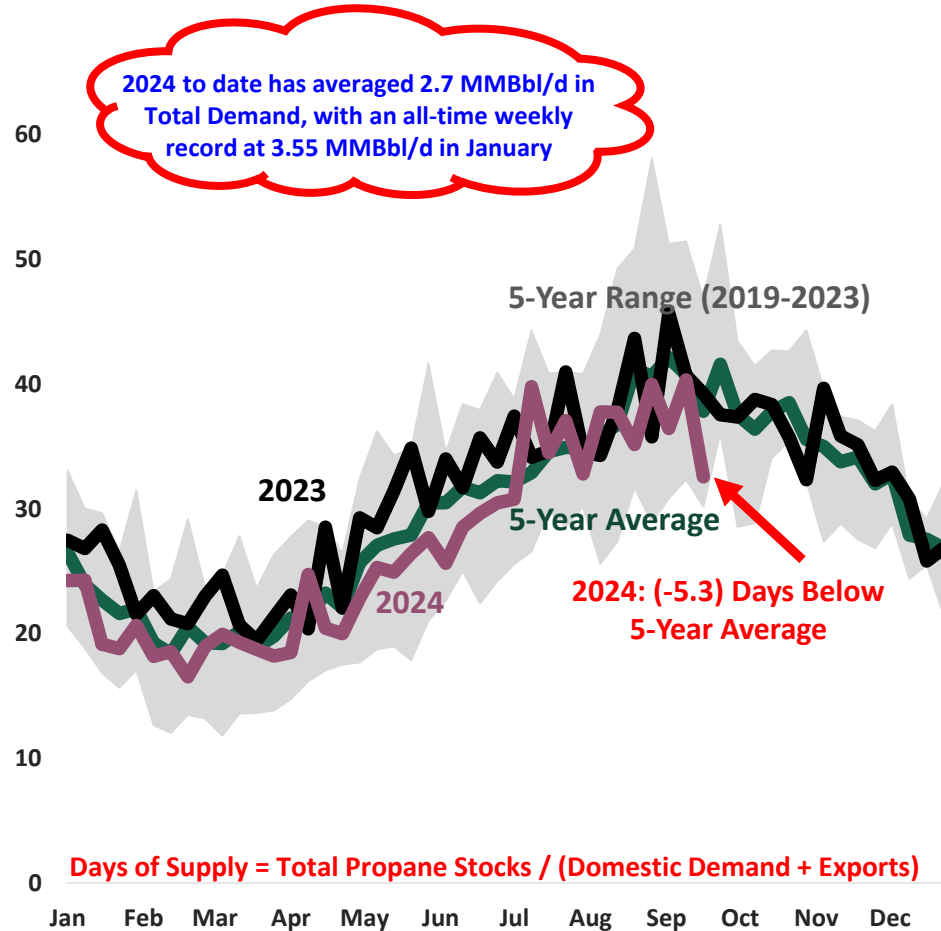
Record Exports Have Helped Reduce Propane Inventories to 4% Below the Year Ago Level

## U.S. Propane Stocks (MMBbls)



Record Total Demand (Domestic Demand + Exports) Drops Days of Supply Below 5-Year Average

## U.S. Propane Days of Supply (Days)

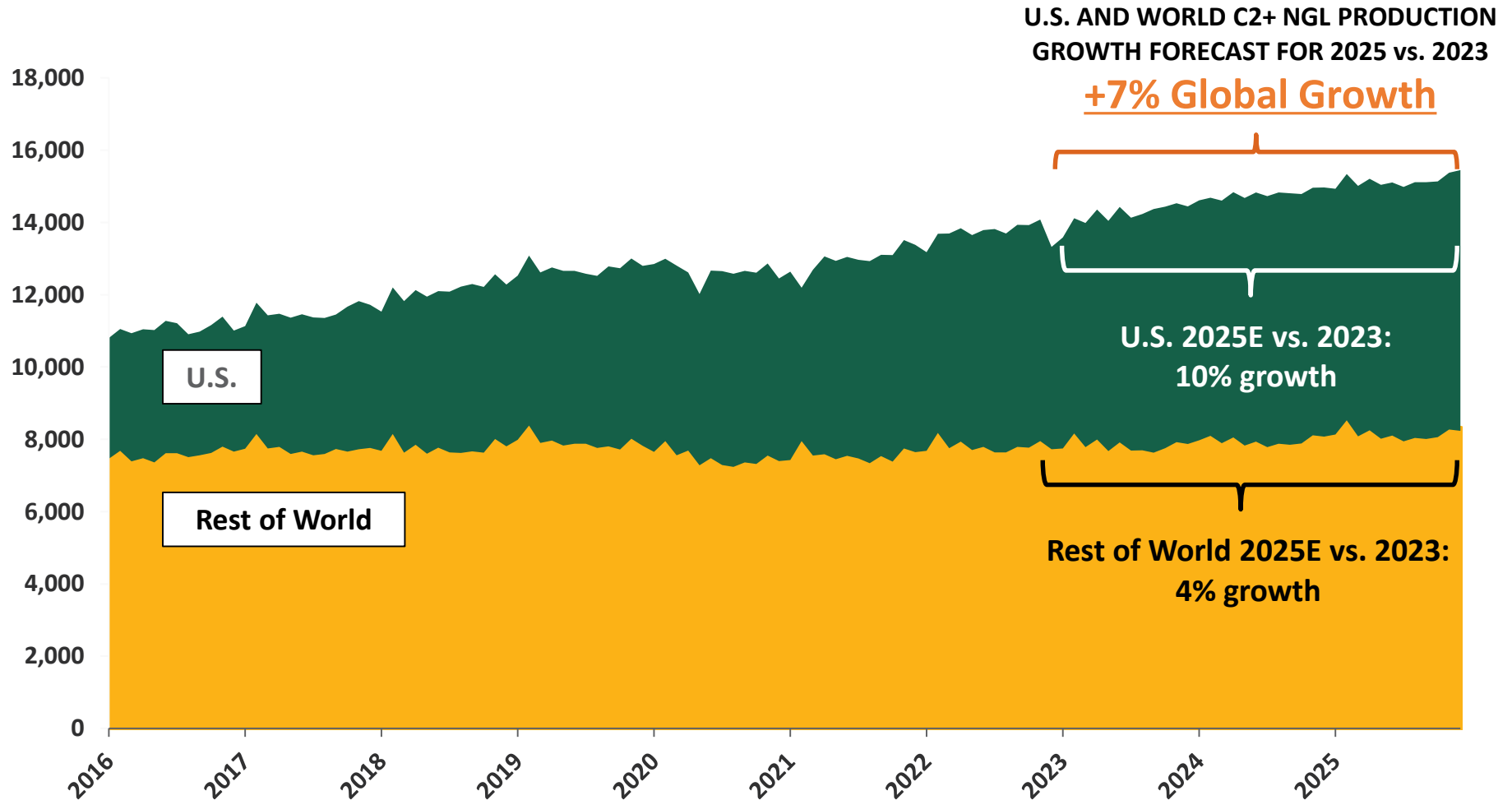


# The U.S. is the Prominent Incremental LPG Supplier

The U.S. is the incremental supplier and exporter of NGLs for growing global demand

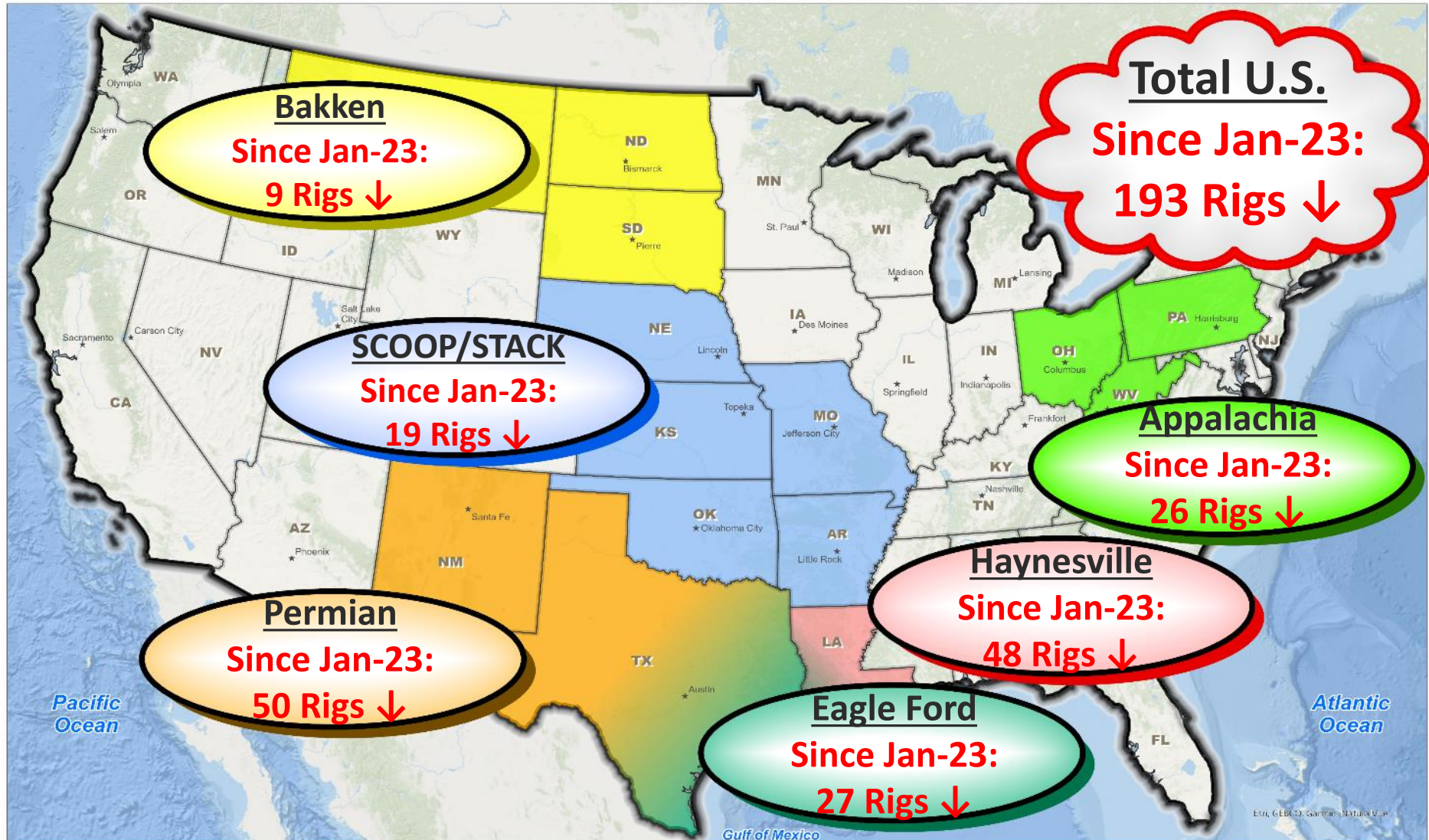
## World C2+ NGL Production

(MBbl/d)



# Rig Count Declines Have Accelerated in Key Producing Basins

## Rig Count Declines 25% Since January 2023



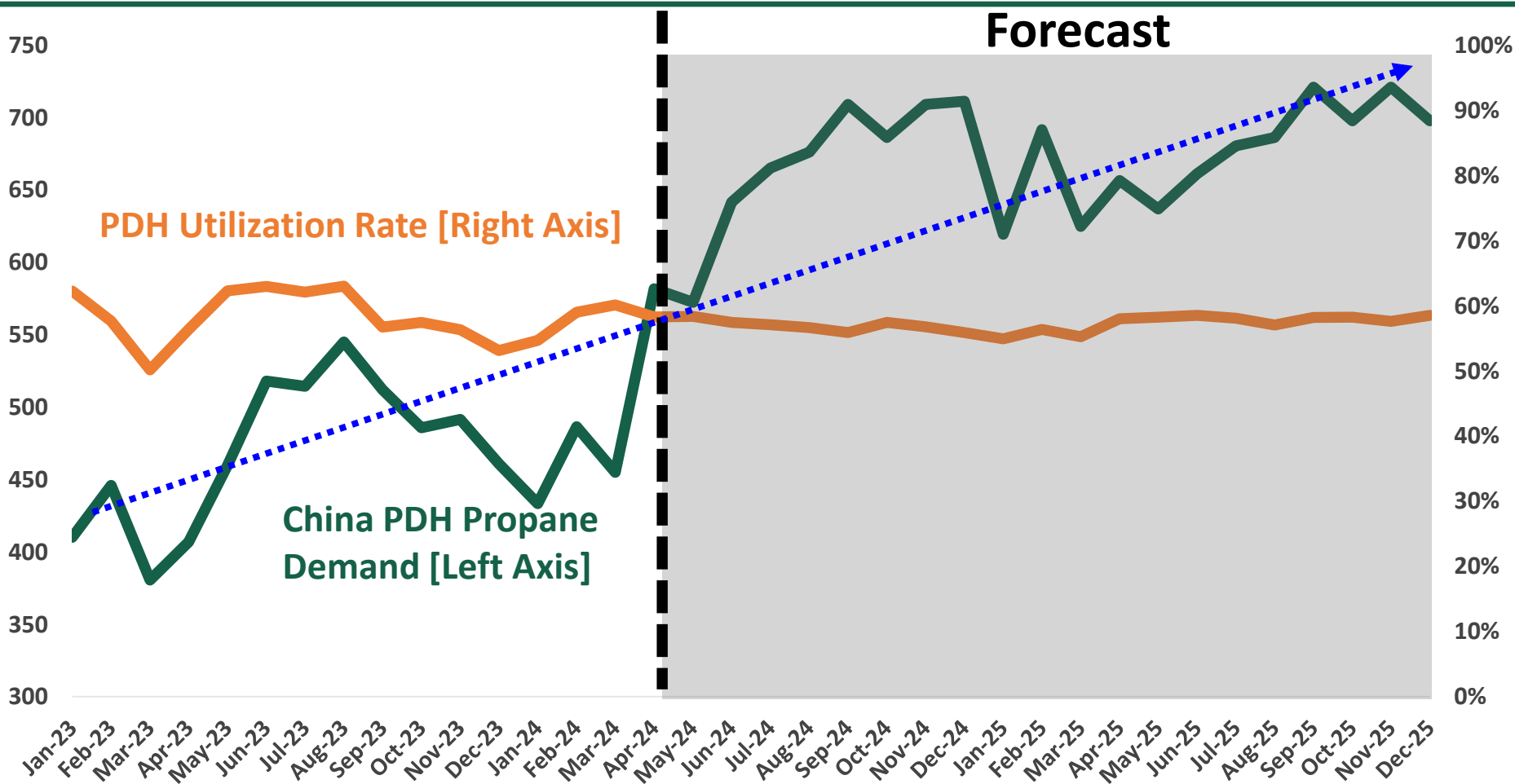
# China PDH Propane Demand and PDH Utilization

While China PDH utilization may flatten out from significant capacity additions, outright China PDH propane demand is expected to nearly double by year end 2025 vs. 2023

## China PDH Propane Demand and PDH Utilization

(Mbb/d)

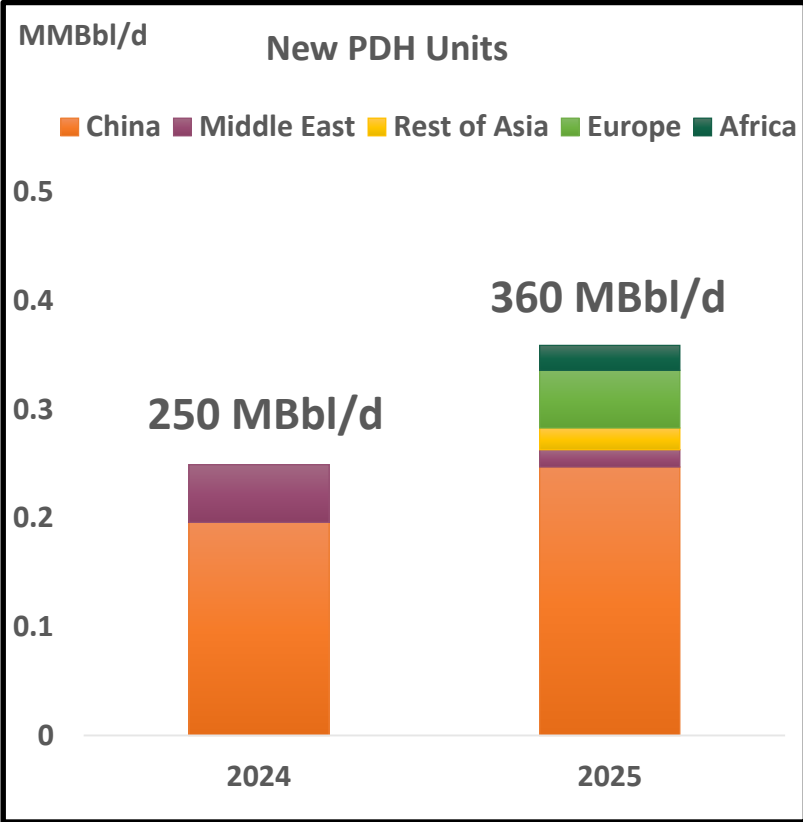
(PDH Utilization Rate)



# Global PDH Buildout Continues

China Is Driving Global PDH Buildout by Adding More Than 400 MBbl/d of Capacity by End of 2025

## China's Planned 2024 PDH Units

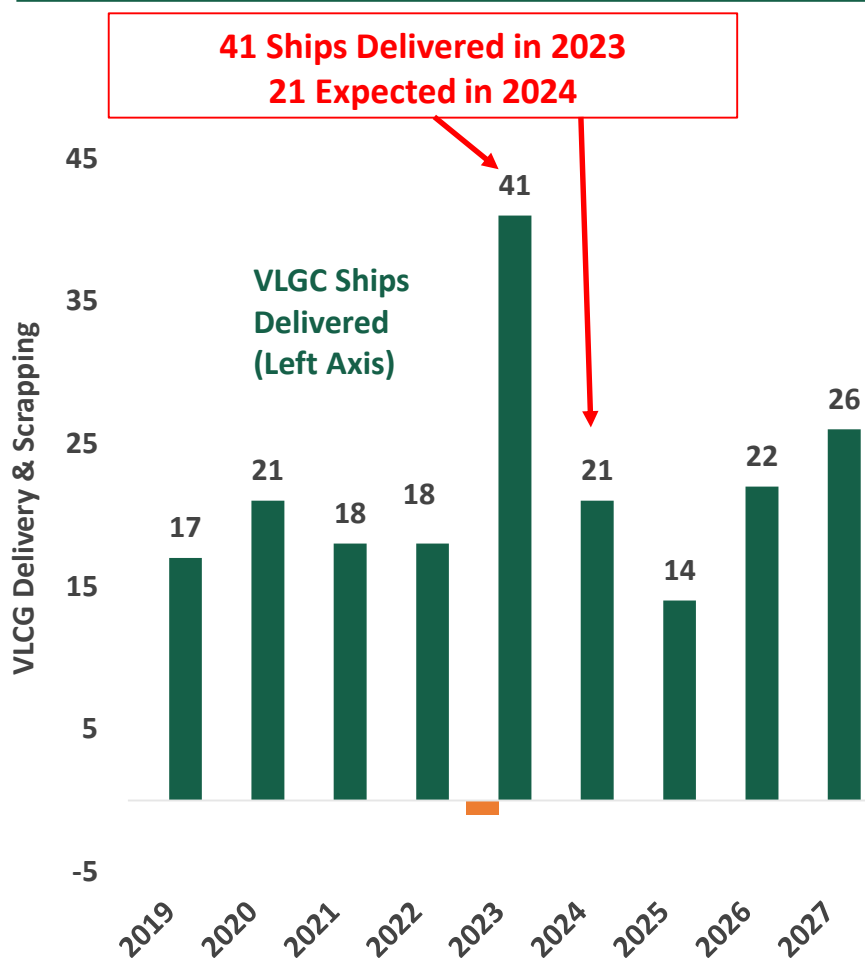


# “VLGC” Shipping Buildout Retreats as Panama Canal Delays Alleviate

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

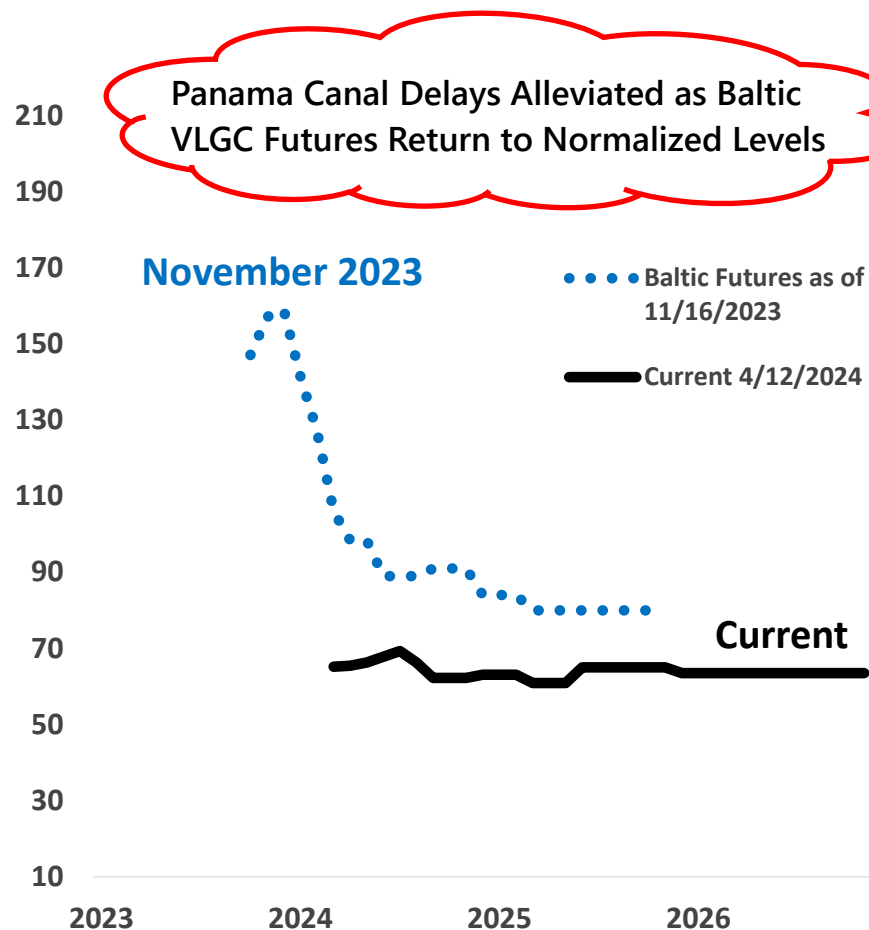
A banner year for ship deliveries in 2023 plus transit improvements at the Panama Canal flattened Baltic VLGC futures rates

## Global VLGC Fleet



## Baltic VLGC Futures

(\$/Metric Ton)

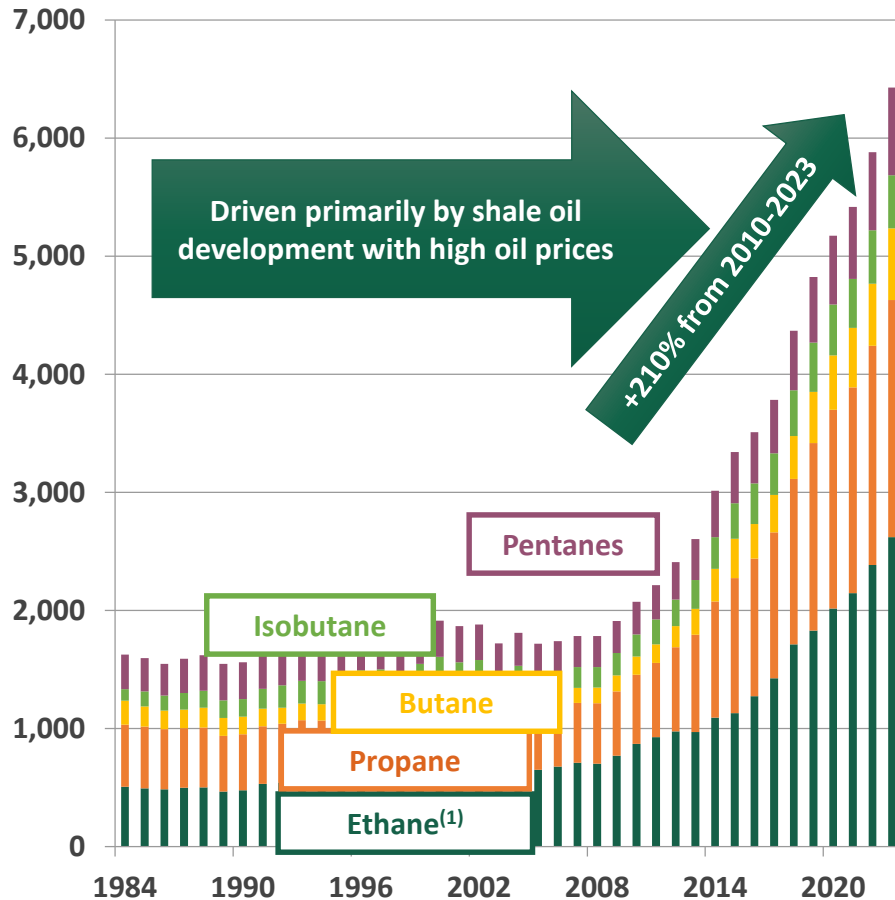


# The Impact of the U.S. Shale Revolution

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

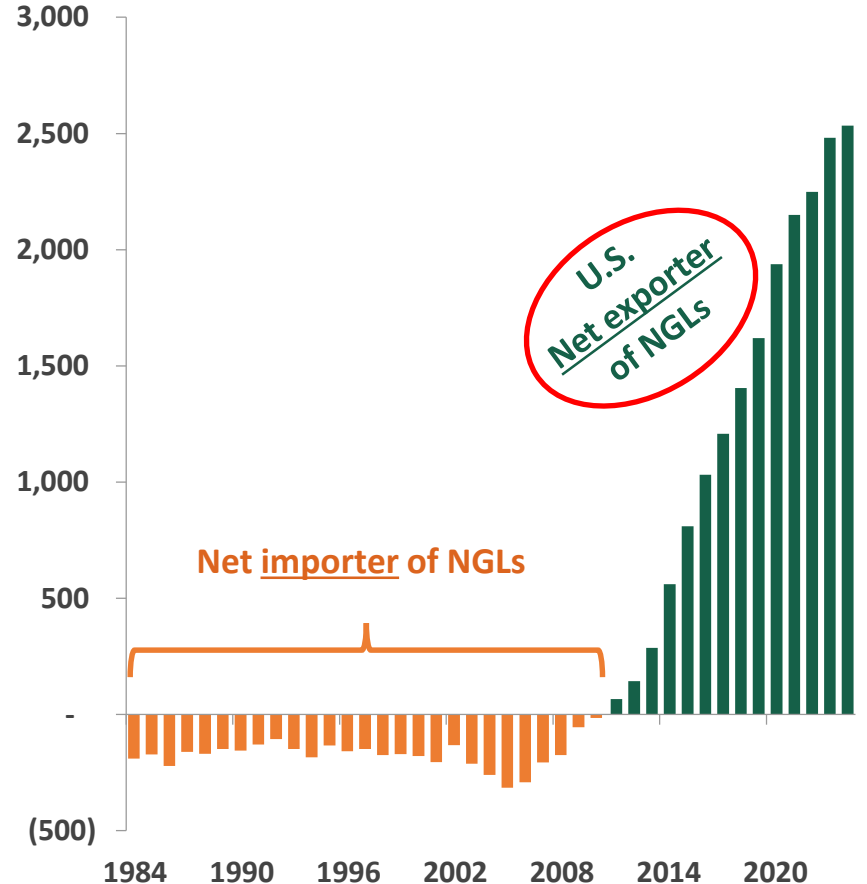
## U.S. NGL Production

(MBbl/d)



## U.S. NGL Exports / (Imports)

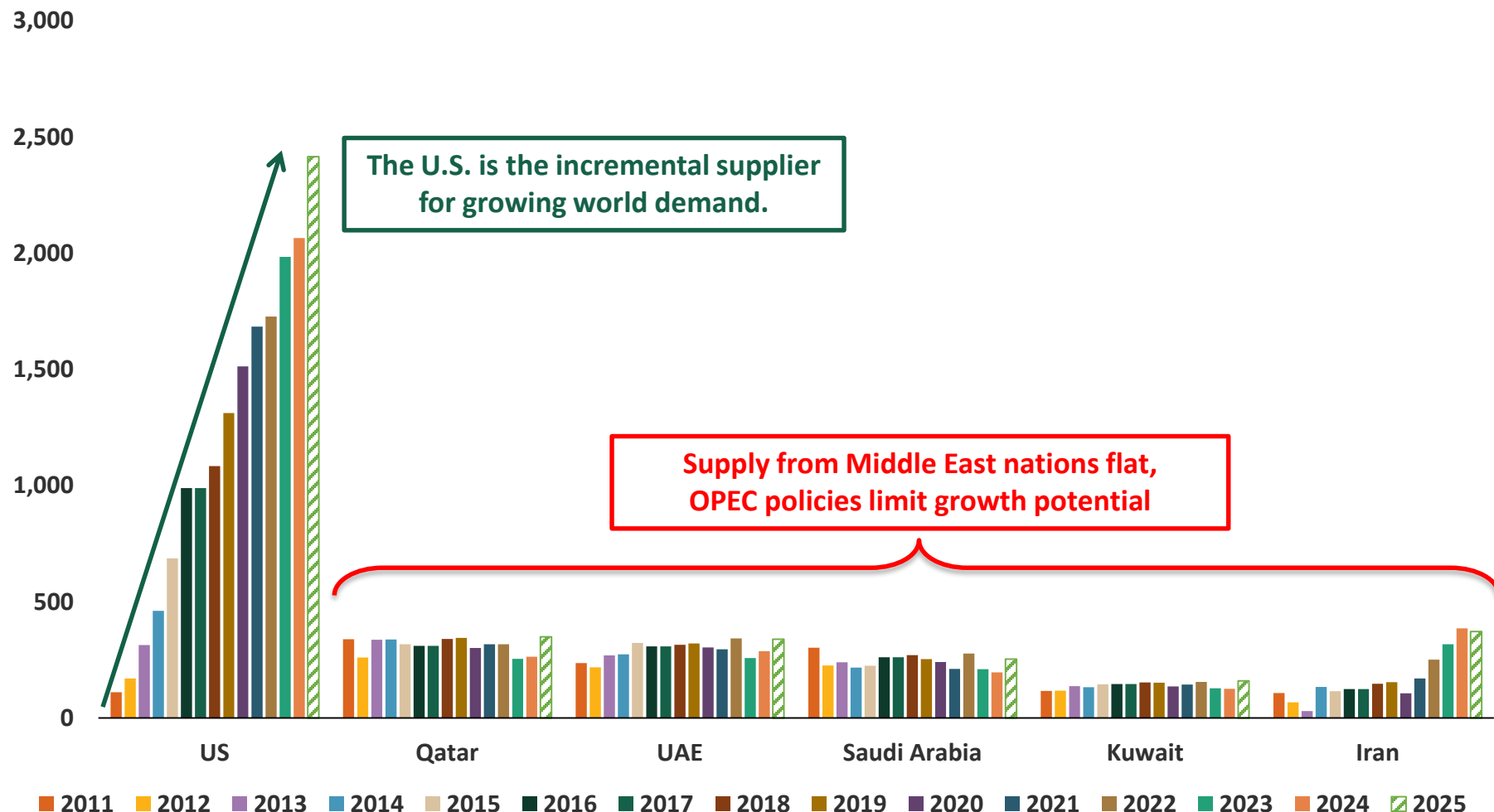
(MBbl/d)



# The U.S. is the Prominent Incremental LPG Supplier

## LPG Exports

(MBbl/d)



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

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



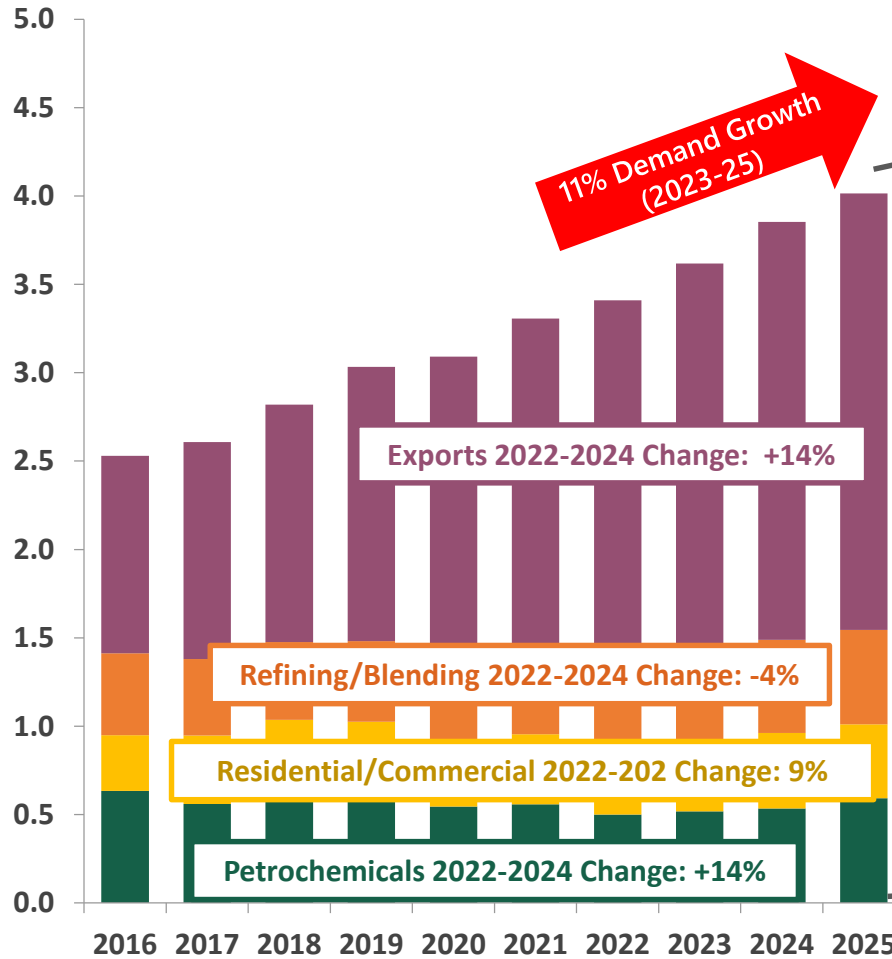


# U.S. NGL Demand

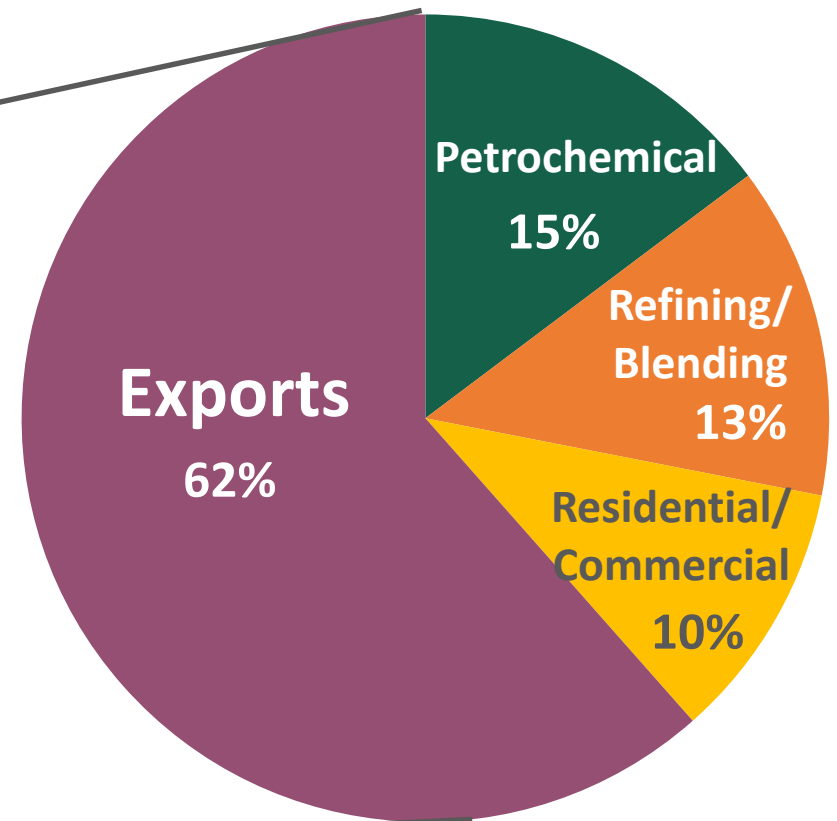
US NGL demand growth driven primarily by exports of LPG (propane/butane)

## U.S. C3+ Demand by Sector

(MMBbl/d)



## Estimated U.S. C3+ Demand – 2025

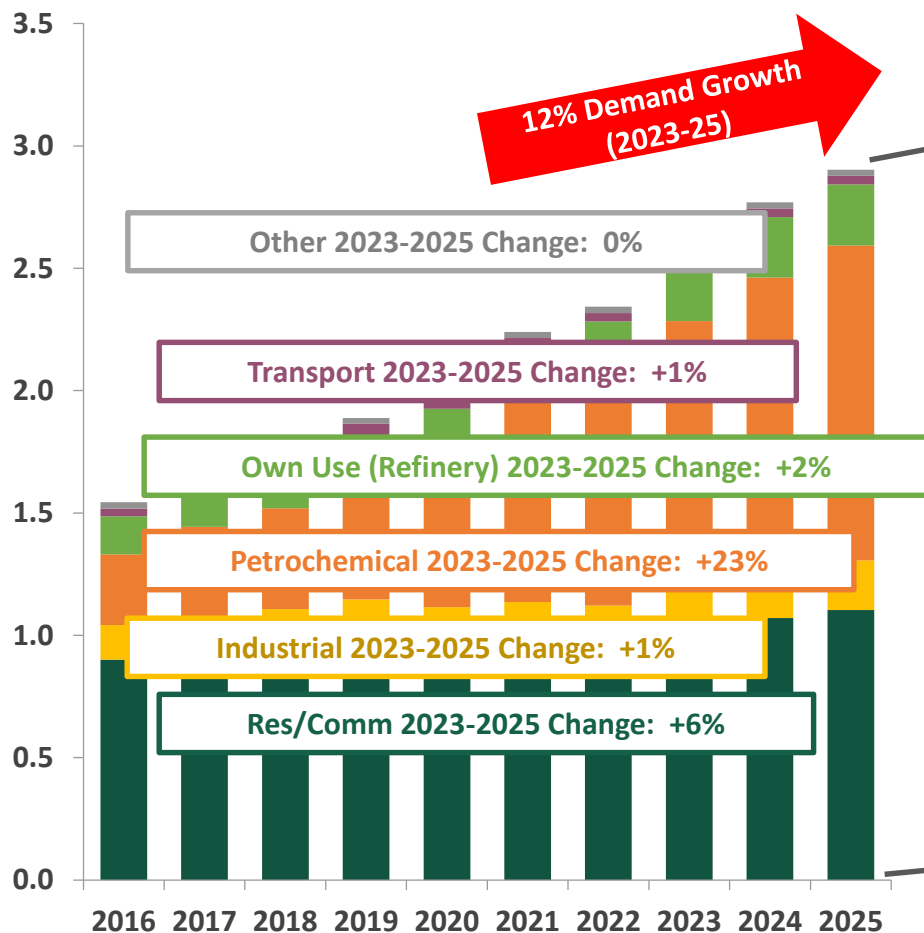


# China LPG Demand

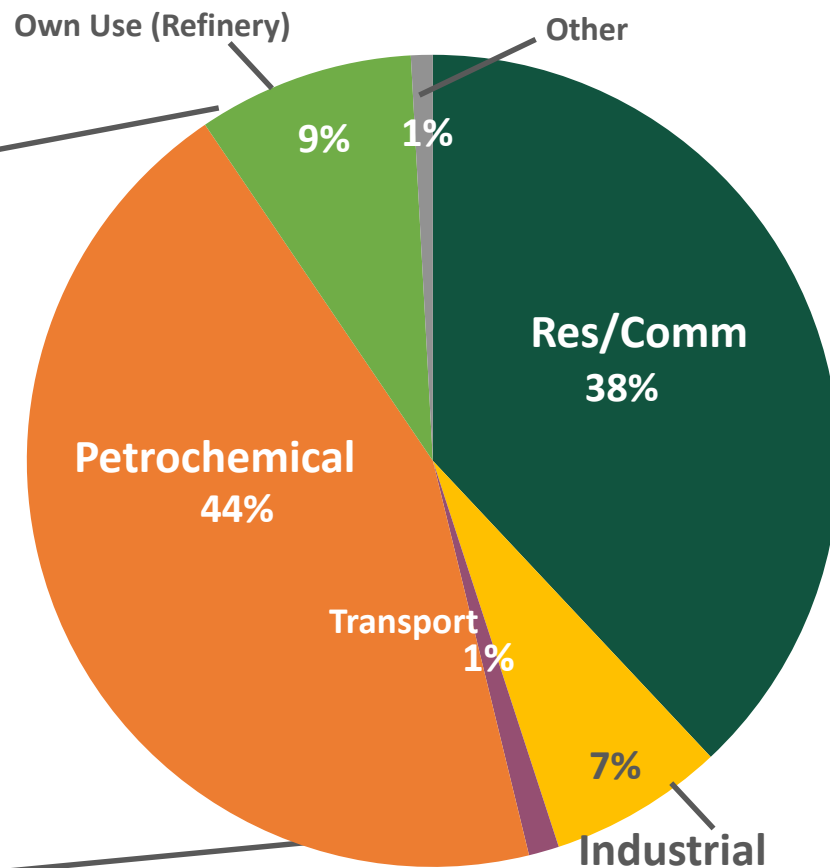
China's LPG demand growth driven by the petrochemical industry, fueled by PDH and steam cracker buildout

## China LPG Demand by Sector

(MMBbl/d)



## Forecast China LPG Demand – 2025

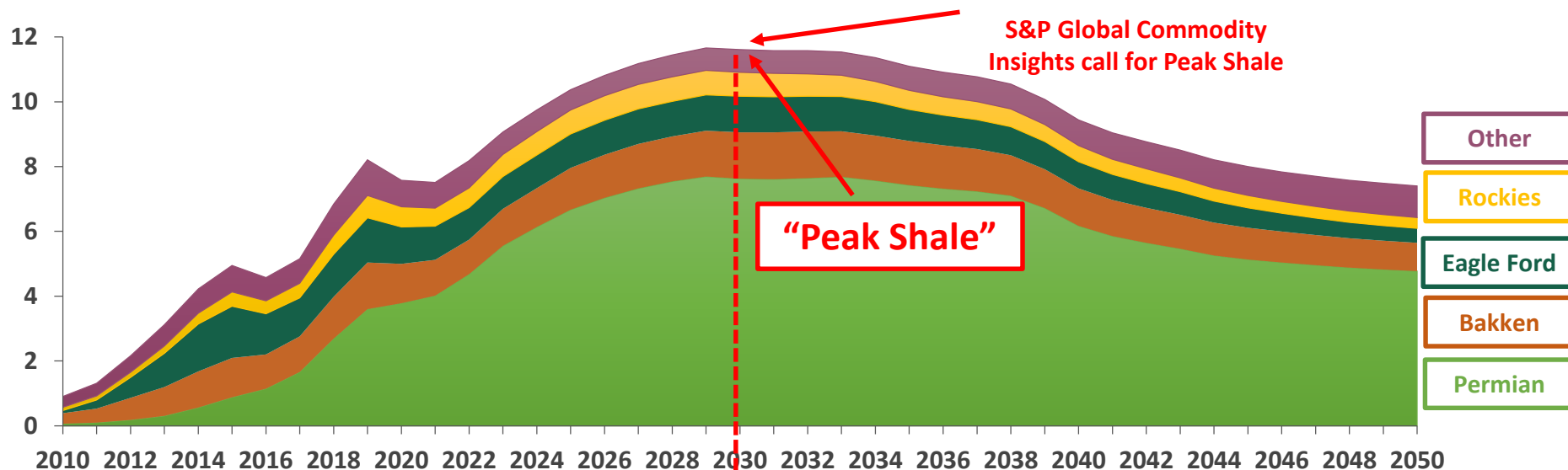


# U.S. NGL Supply Growth Expected to Peak by 2030

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

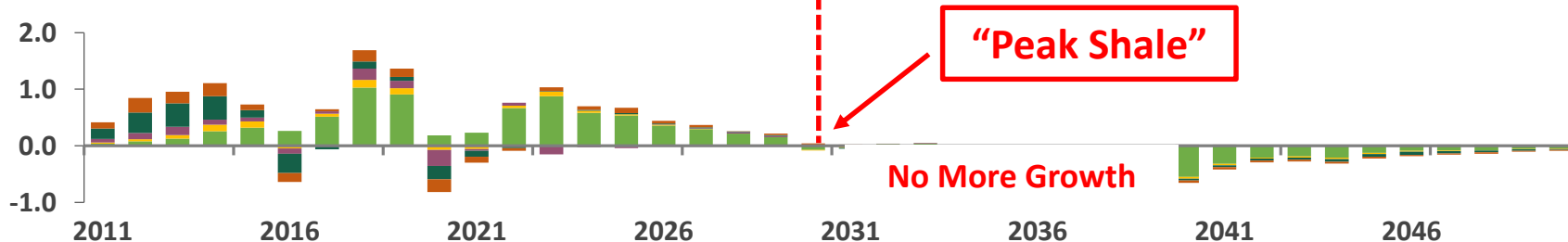
## U.S. Shale Crude and Condensate Production Forecast to 2050

(MMBbl/d)



## Year on Year Growth by Basin

(MMBbl/d)

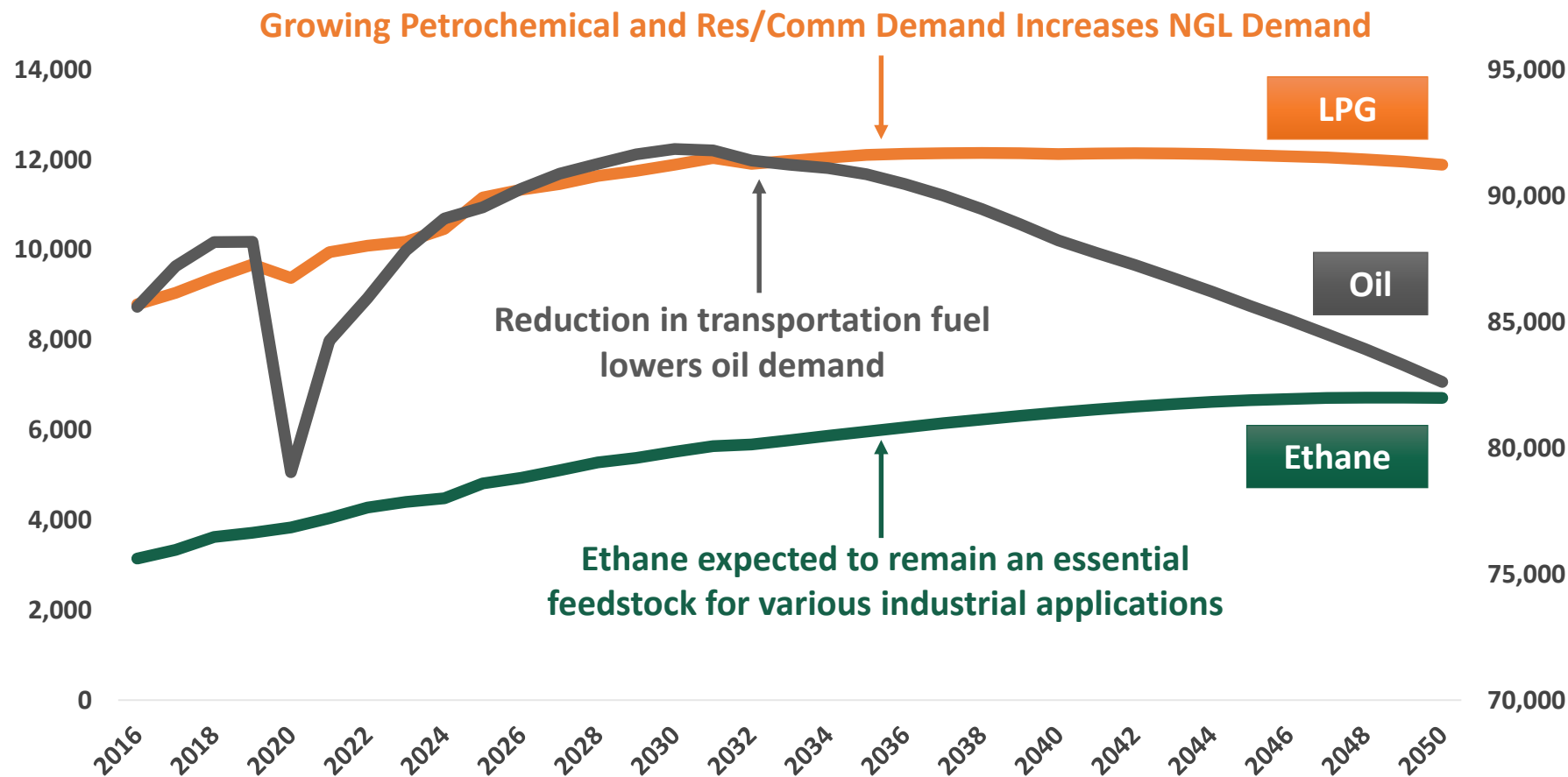


# NGLs Remain Essential for Decades

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

## Change in Demand by Liquids Product

(MMBbl/d)

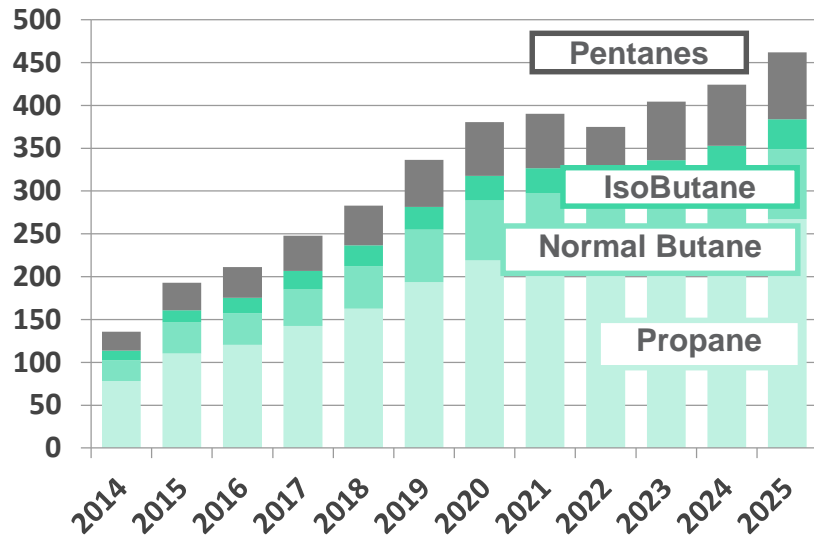


# C3+ NGLs: Northeast Market Dynamics and Supply

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

(MBbl/d)



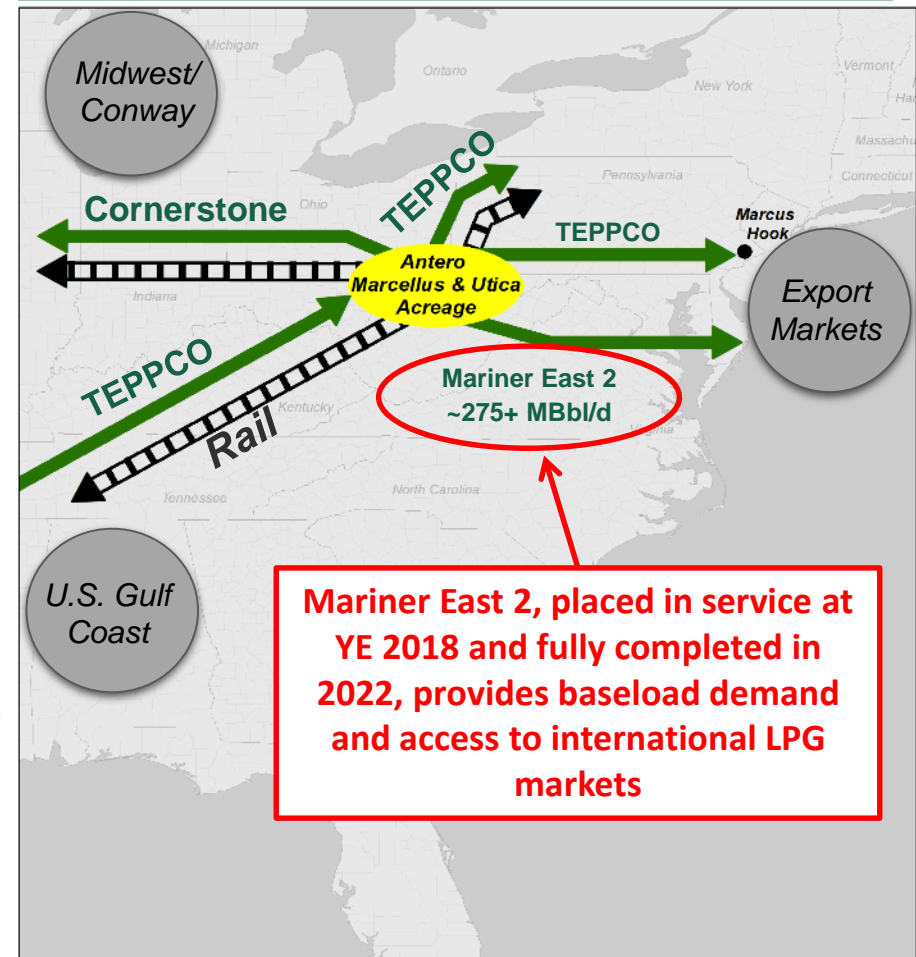
~264 MBbl/d of Northeast C3+ demand vs.

~404 MBbl/d of Northeast supply in 2023

- Resulted in **65%** of production consumed locally
- Remainder moved primarily by rail and exported

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

## Northeast C3+ NGL Takeaway



Mariner East 2, placed in service at YE 2018 and fully completed in 2022, provides baseload demand and access to international LPG markets



# 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"

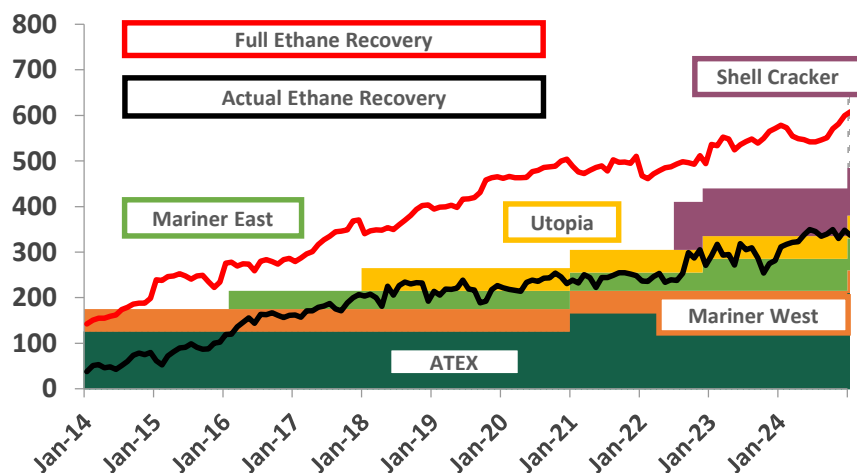
~209 MBbl/d of ethane currently rejected in Northeast (~38% of potentially recoverable ethane)

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

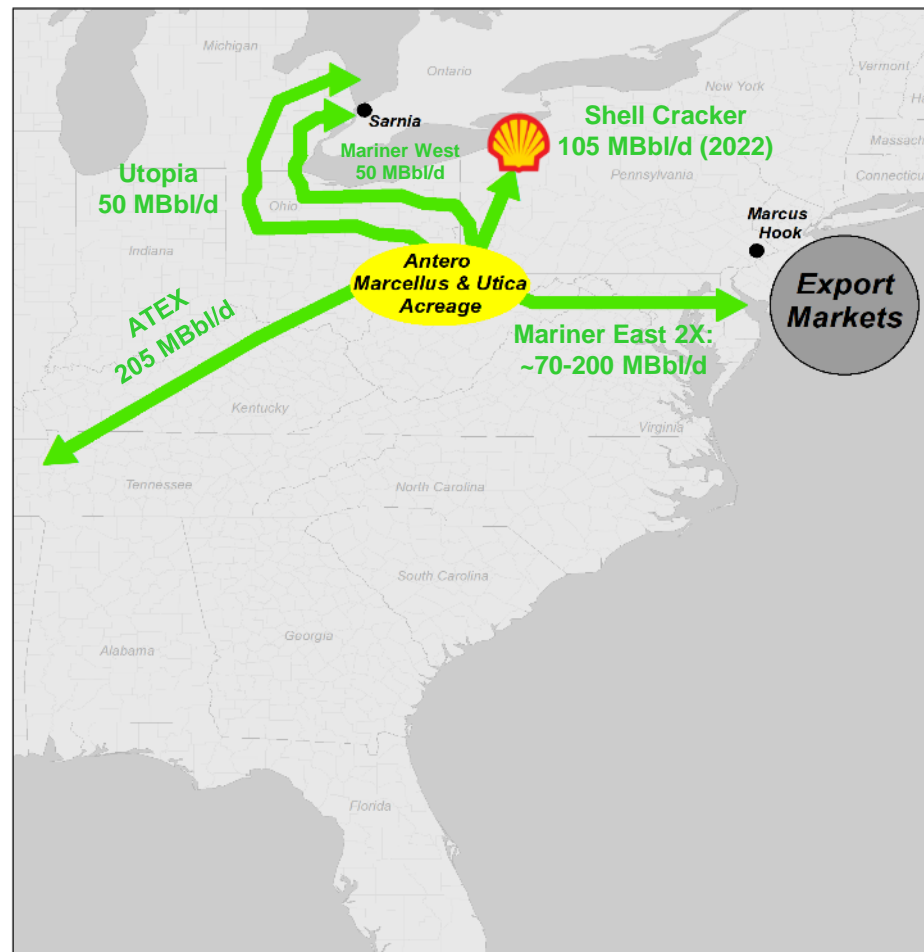
Antero ethane firm sales contracts ~50% gas-linked and ~50% Mont Belvieu-linked

## Northeast Ethane Supply

(MBbl/d)



## Northeast Ethane Takeaway and Capacities



# U.S. LPG is a Transformational Fuel for the World

## INDUSTRIAL / PLASTICS

Durable products, consumer packaging & pharmaceuticals



## RESIDENTIAL

Provides fuel for various applications (heating & cooking)



## VEHICLE FUEL

Preferred blending feedstock for gasoline



## ENERGY POVERTY

1/3<sup>rd</sup> of the earth's population lacks access to fuel for basic human needs



## QUALITY OF LIFE

~700 MM people have gained access to clean cooking through LPG since 2010



NGLs play an essential role in industrial, residential, commercial and transportation industries and can improve the quality of life around the globe





**APPENDIX**

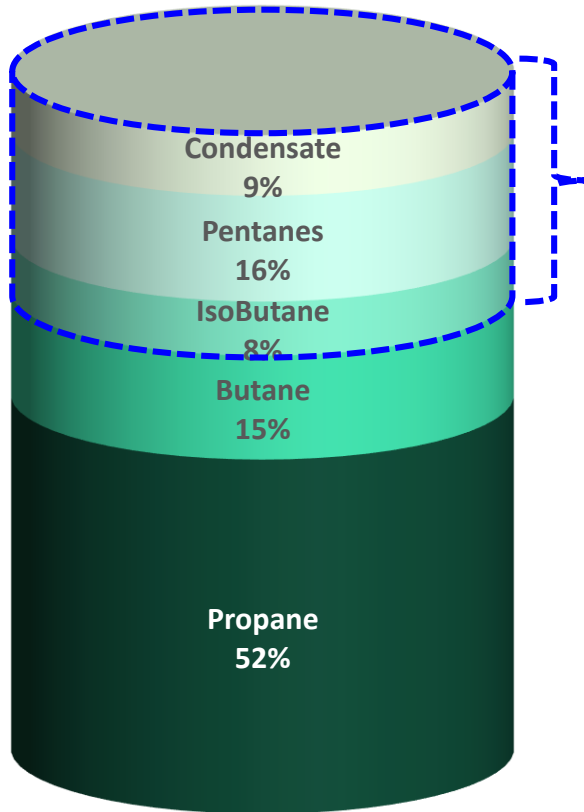


# Strong Oil Price-Linked Exposure

## Antero Liquids Barrel Composition

(2Q 2024 Actuals)

~120,000 Bbls/d



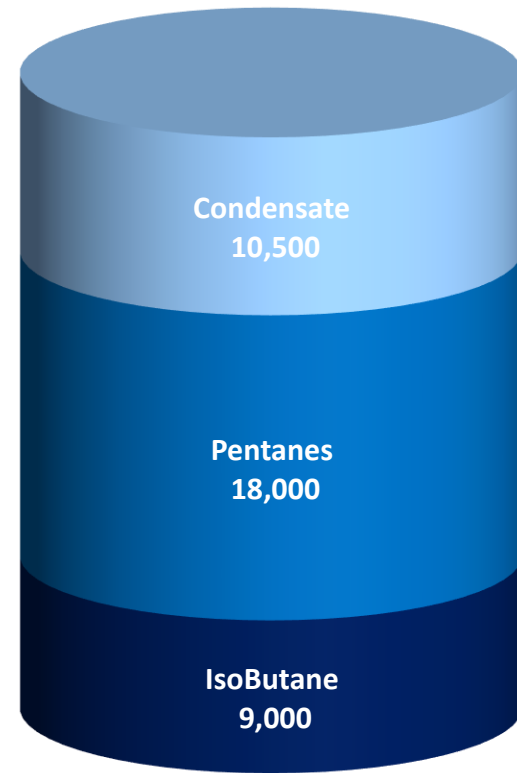
AR's C3+ NGL / Condensate  
Barrel Composition

## Oil Price-Linked Production

(Bbls/d) (2Q 2024 Actuals)

~37,500 Bbls/d tied to  
WTI Linked Prices

Oil Price-Linked

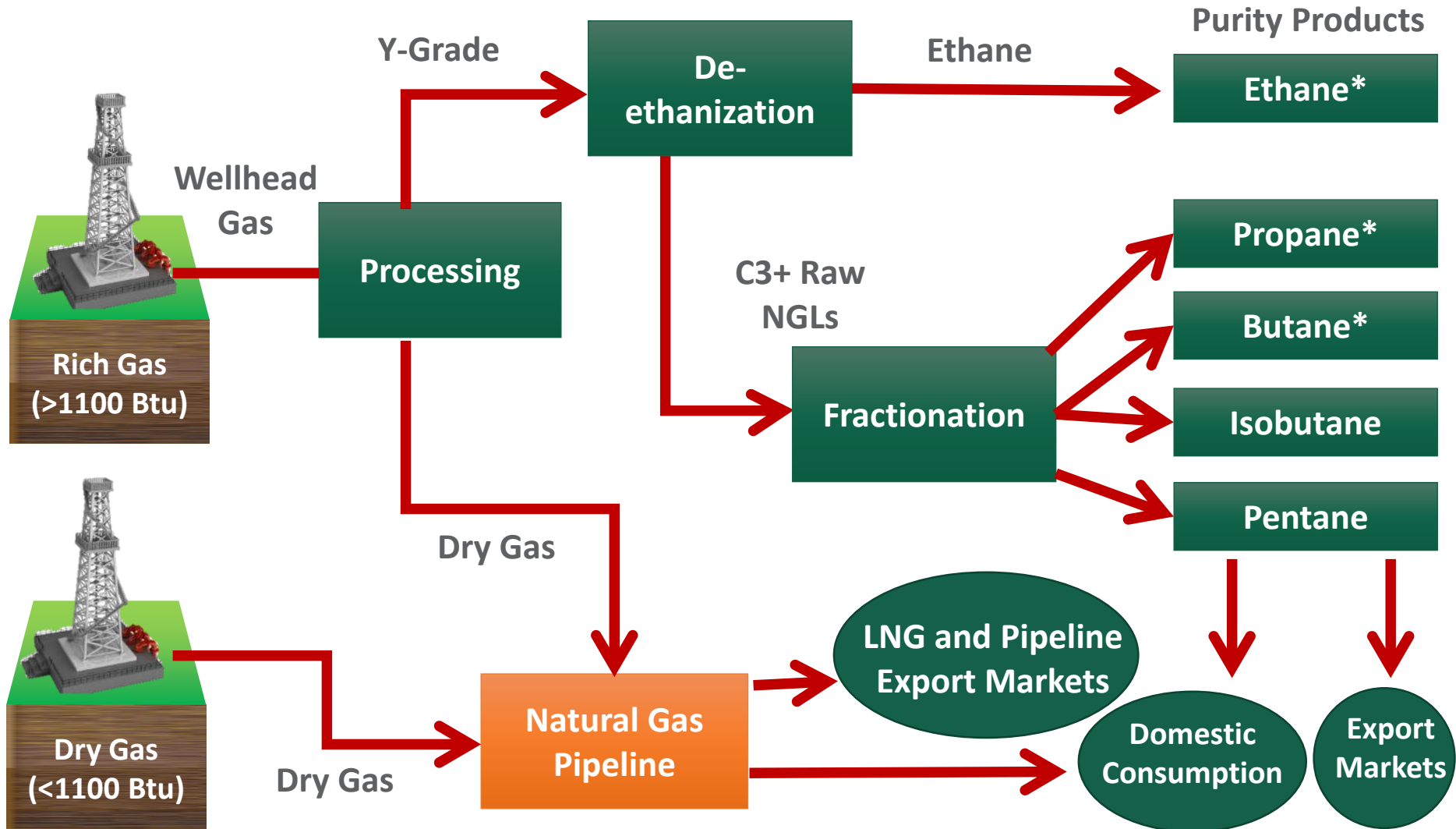


AR 2Q 2024  
Oil Price-Linked Barrels



# 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.

