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# API Industry Outlook

## Second Quarter 2019



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**Chief Economist**

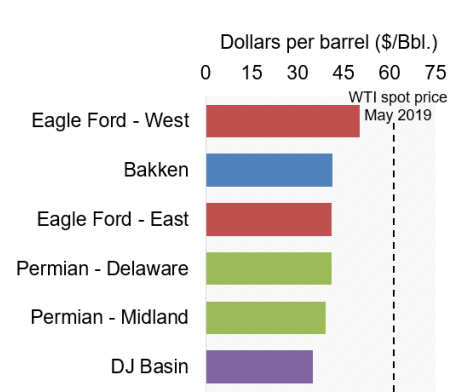
American Petroleum Institute

June 20, 2019

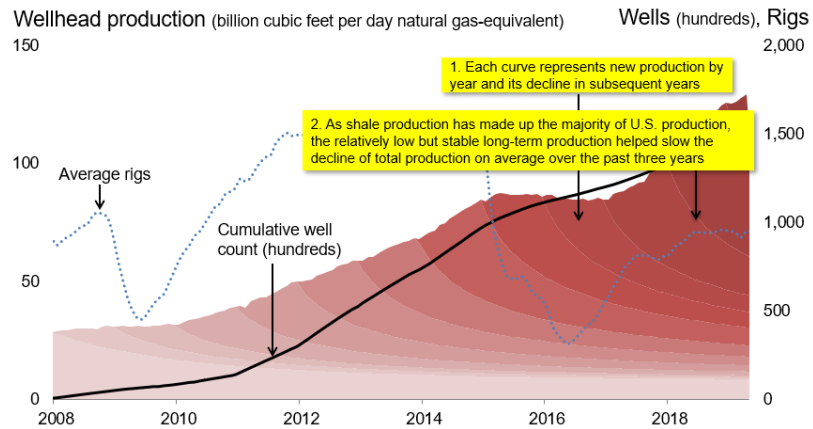
# Top takeaways – Q2 2019

## 1. With strong productivity and a competitive low cost structure, the U.S. is poised for a continuation of record oil, natural gas and NGL production

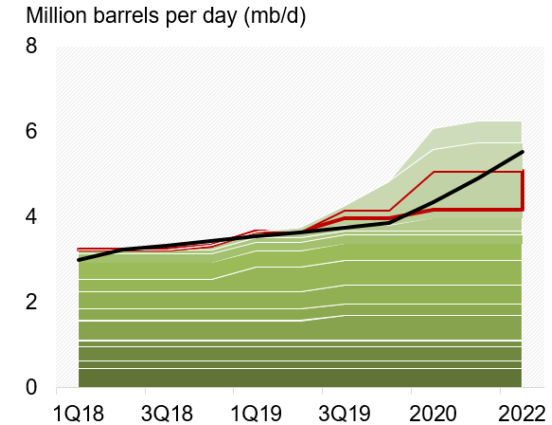
Breakeven prices below recent prices



Strong productivity driving growth



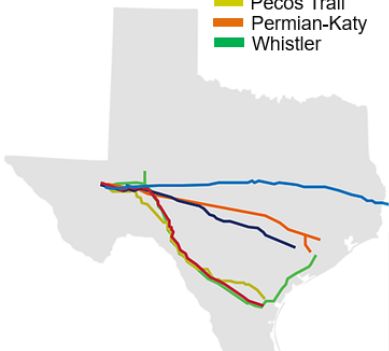
Enabling Permian Basin oil infrastructure



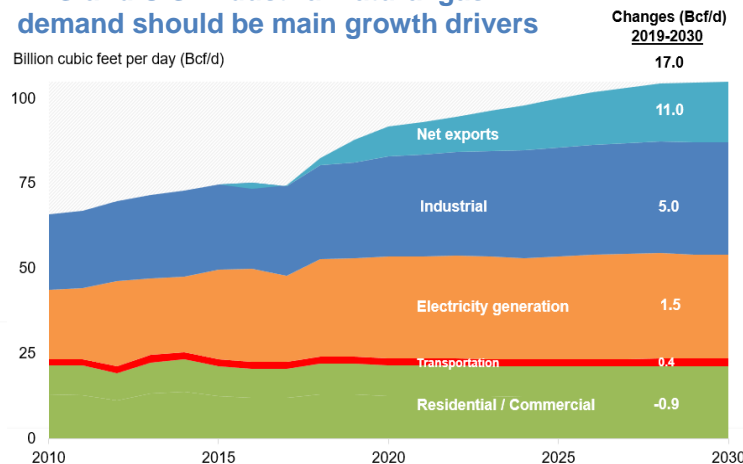
## 2. Critical infrastructure growth is enabling natural gas demand stimulation

New Permian gas pipelines

- Permian Global Access Pipeline
- Gulf Coast Express
- Permian Highway
- Pecos Trail
- Permian-Katy
- Whistler



LNG and U.S. industrial natural gas demand should be main growth drivers



Global LNG prices have decreased







# Global Economy and Oil Markets



# Despite a moderation in global economic growth, solid energy demand has continued



→ Global economy enters 'synchronised slowdown'

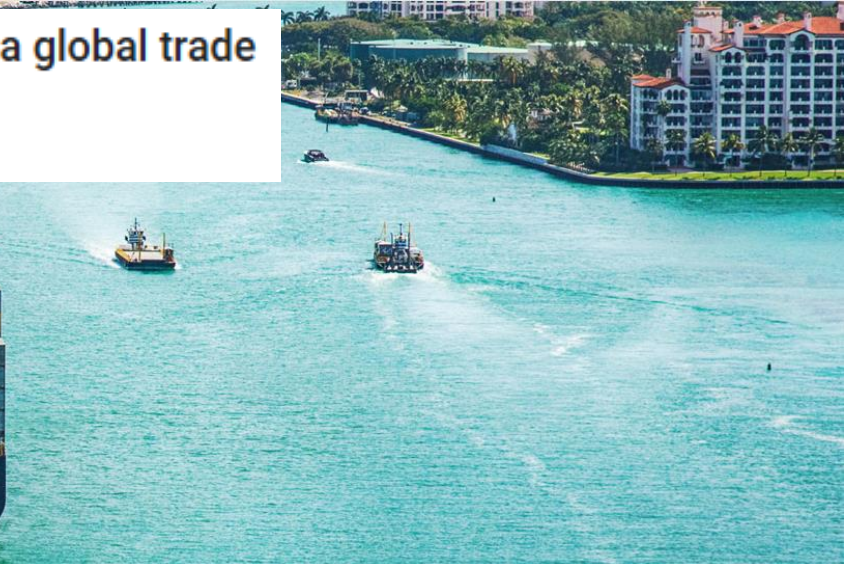
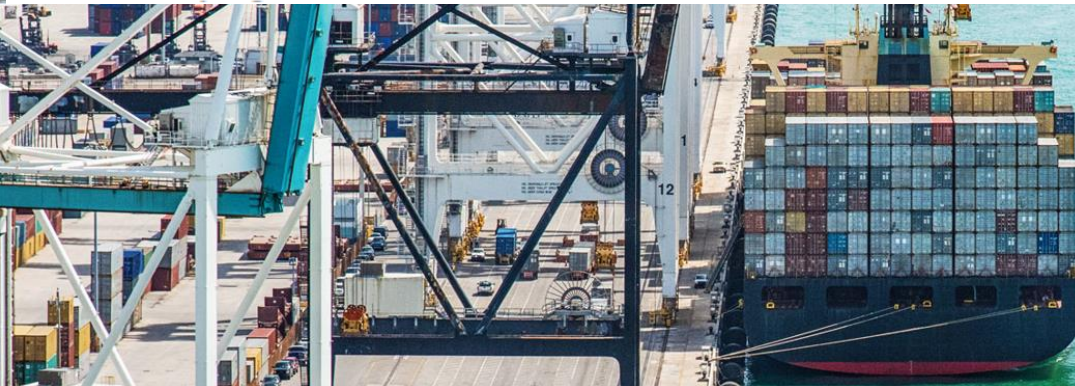
Financial Times

→ Global economy may still defy the pessimists this year

Financial Times

JP Morgan: The US-China tariff battle is just the start of a global trade reordering

CNBC



→ US Shale Is Upending Crude Flows In This Oil Frontier

OilPrice.com

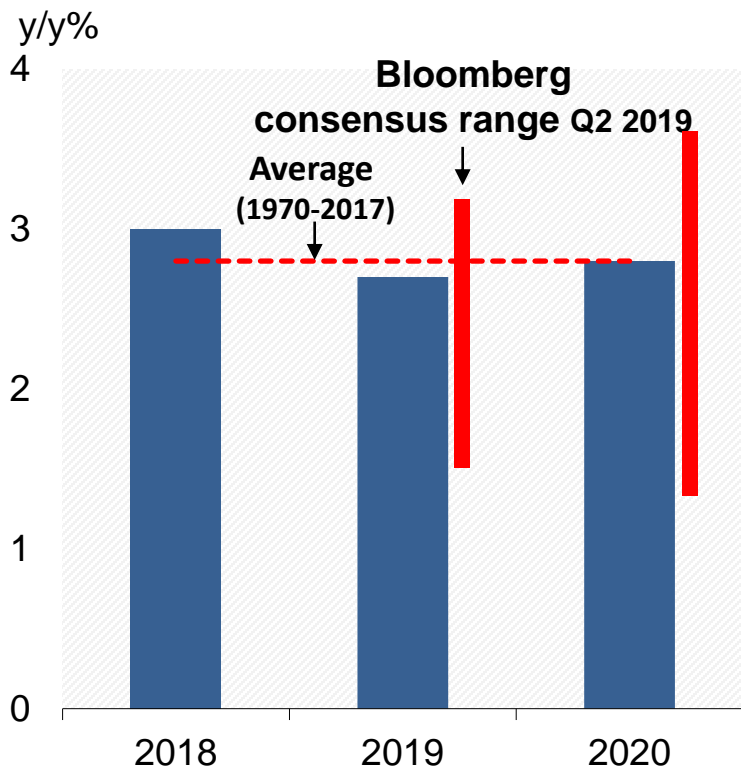


# Although the global economic outlook is expected to slow, oil markets appear to be balanced



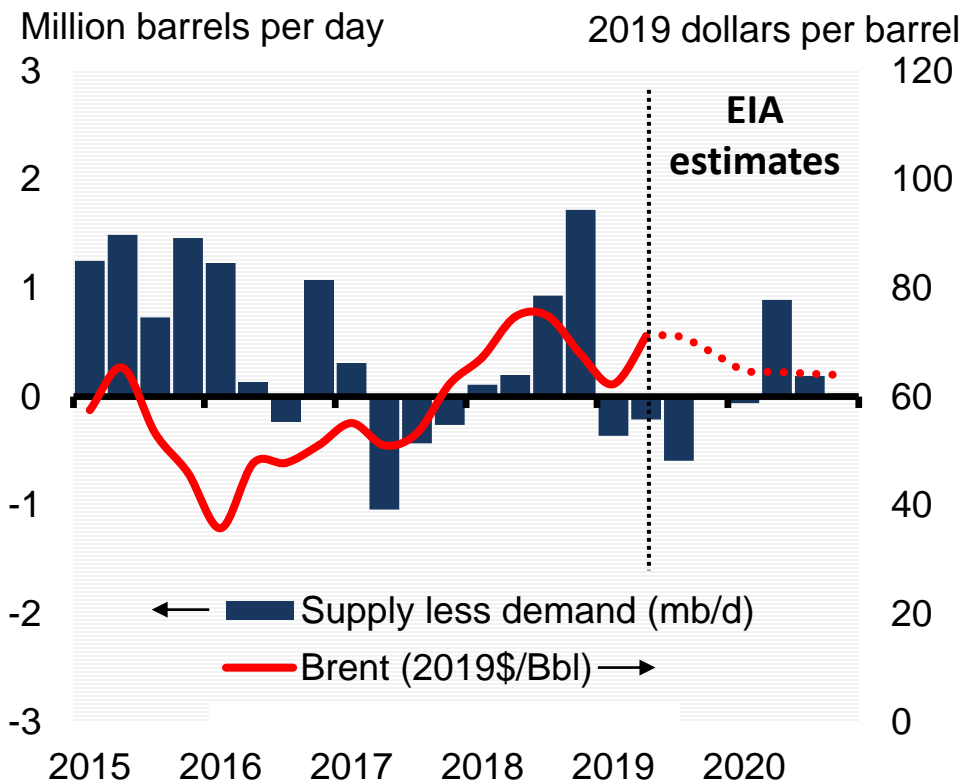
- ▶ The Bloomberg consensus expects global slowing in 2019, followed by a “normal” 2020
- ▶ EIA translates this into a balanced oil market with prices above \$60 per barrel in 2019

## Global real GDP growth



source: Bloomberg

## EIA global supply/demand estimates



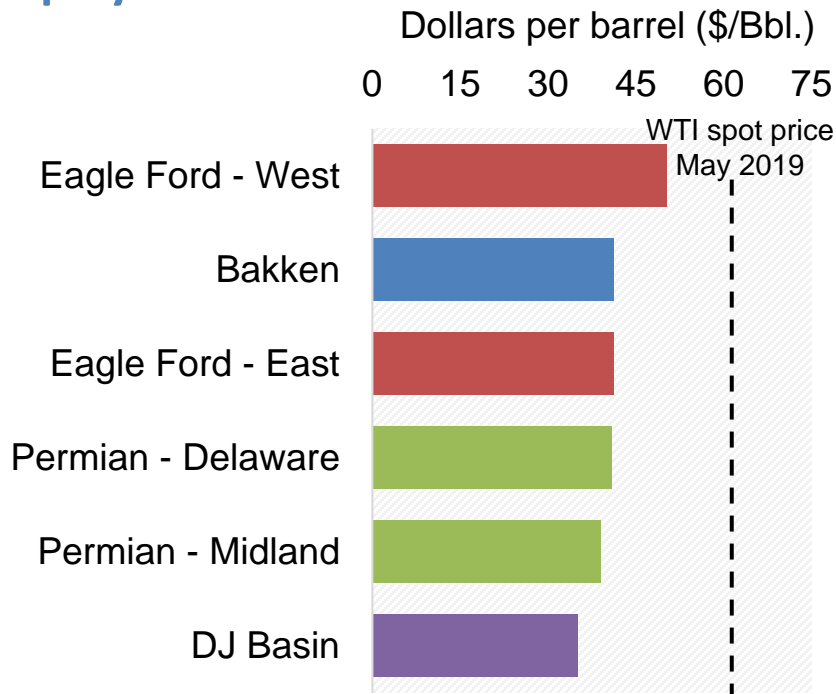
source: EIA

# Cost effectiveness and strong productivity position the U.S. for continued production growth



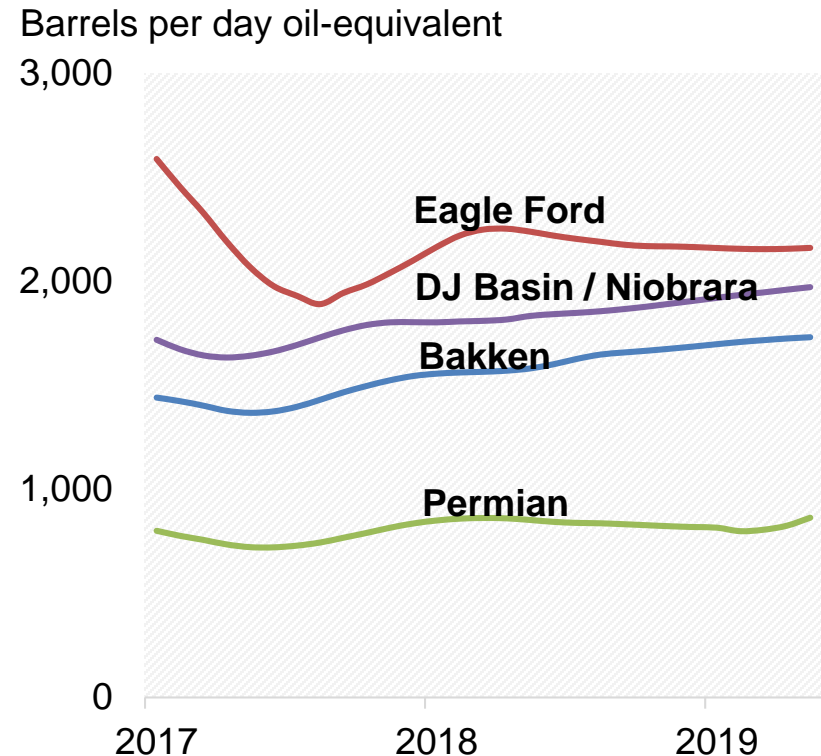
- BTU Analytics estimates breakeven prices among major producing regions range from \$35 per barrel to \$50 per barrel – well below recent WTI prices
- Productivity has continued to improve in the Permian, Bakken and DJ Basin

## Estimated breakeven prices for selected oil plays\*



\*Half cycle breakevens assuming 10% discount factor and play-specific costs  
source: BTU Analytics

## U.S. oil productivity – monthly new well production per rig



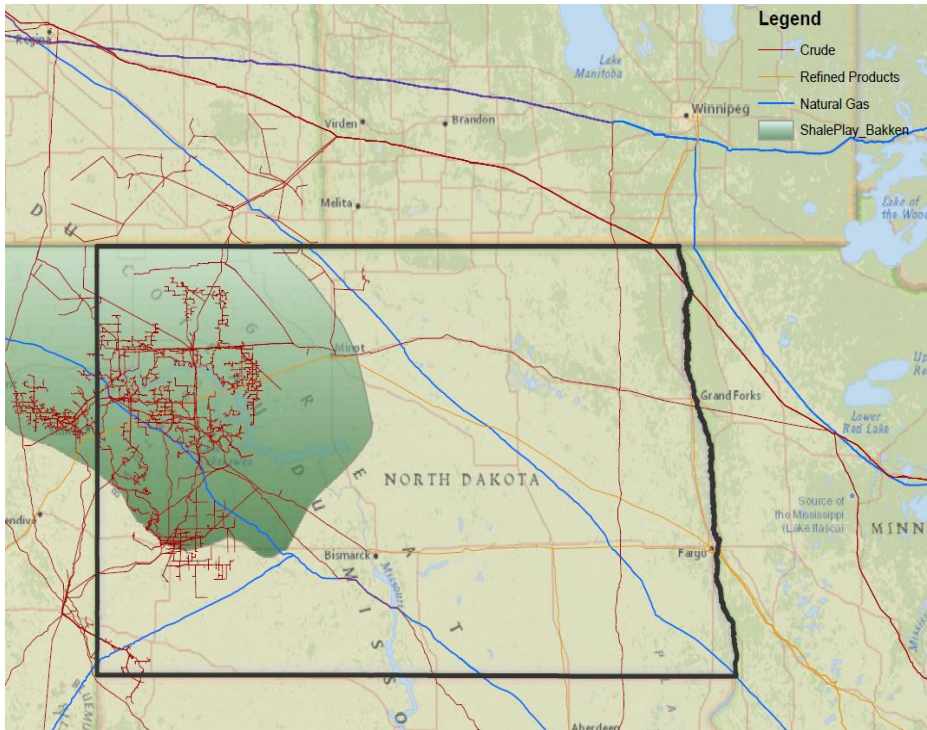
source: EIA Drilling Productivity Report



# Rail has been critical to Bakken formation egress

- 150 kb/d of Bakken crude oil flows by rail through Washington State. New state legislation threatens to curtail the flow to Puget Sound refineries

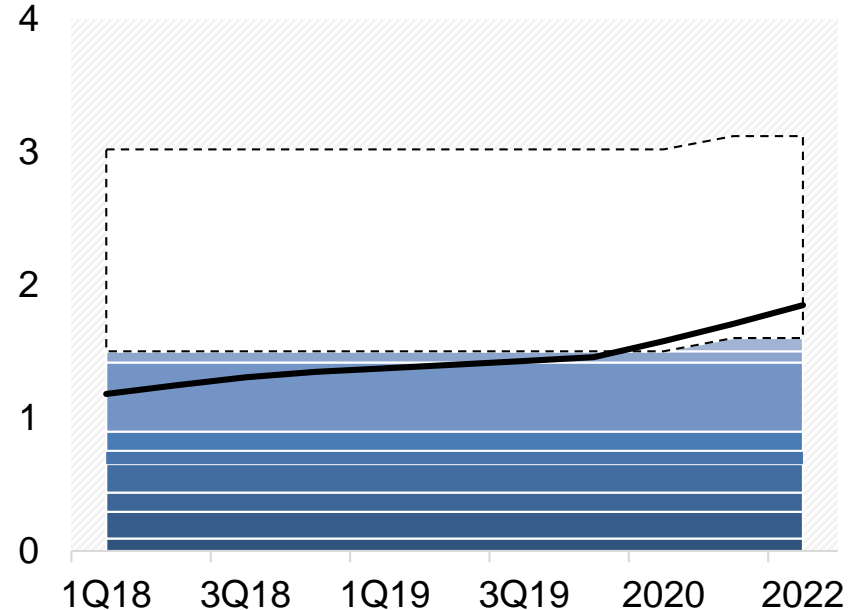
## Bakken Formation pipeline infrastructure



sources: EIA, PennWell, National Geographic, ESRI, Garmin, HERE, UNEP, USGS, WCMC, NASA, ESA and API Team analysis

## Bakken pipeline capacity balance

Million barrels per day (mb/d)



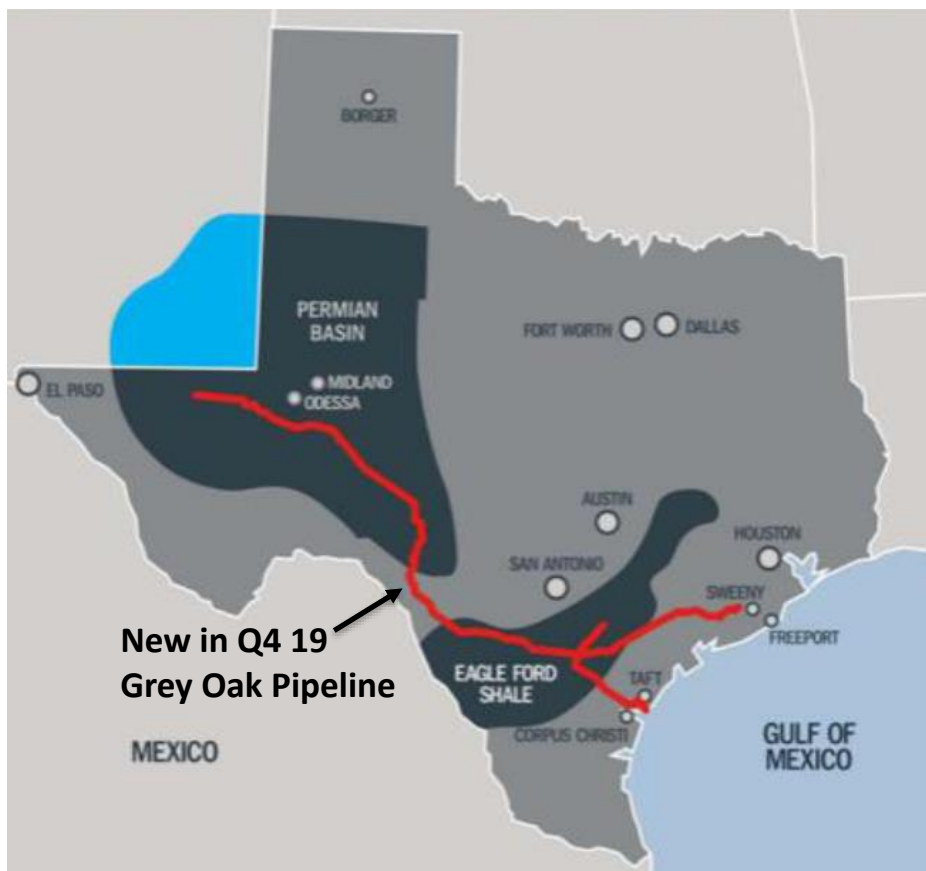
- Refinery capacity
- Enbridge Line 26
- Enbridge Line 83
- ETP Bakken Pipeline
- Keystone XL
- Bakken production
- Butte
- Enbridge Line 81
- Bakken Expansion
- Double H Pipeline
- Rail capacity

sources: EnSys, Bloomberg

# Permian Basin 1.5 mb/d of new pipeline capacity additions are expected by the end of 2019 (Q4 19 vs. Q4 18)

- ▶ The expansions, including the Grey Oak, Cactus II and Seminole Red pipelines, should more than accommodate expected production growth

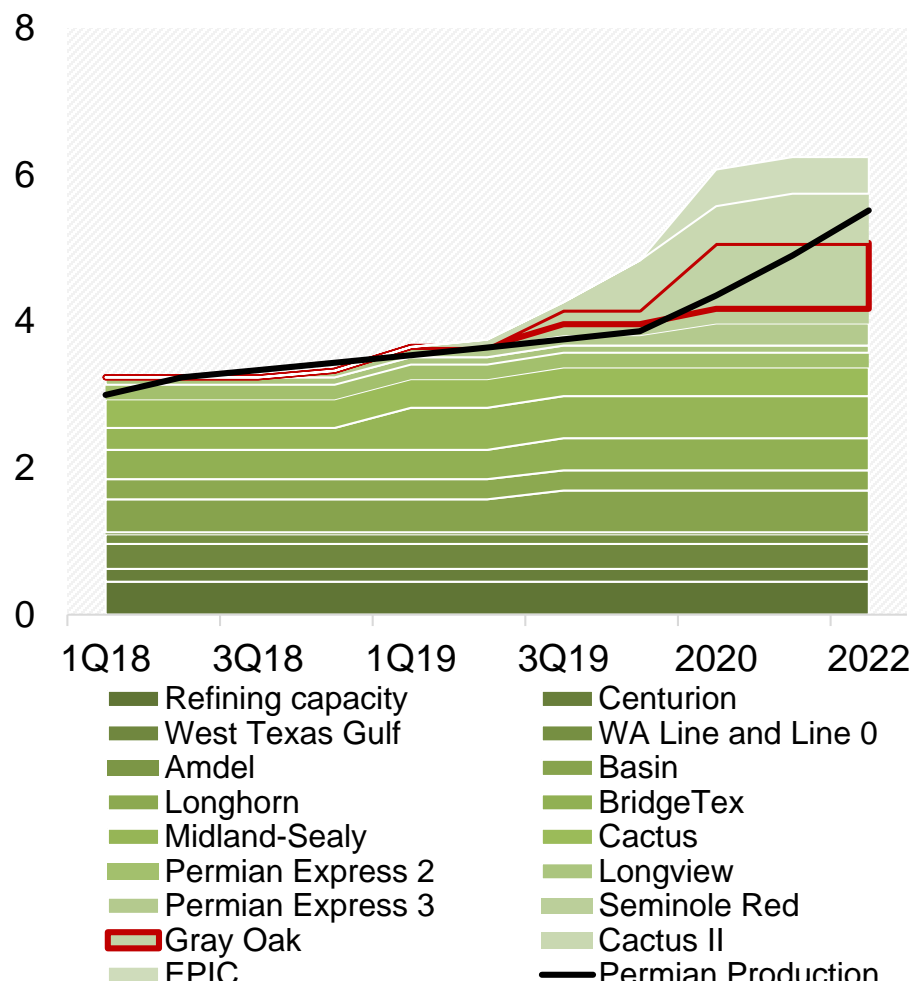
## Permian Basin and the Grey Oak pipeline



source: EnSys

## Permian Basin pipeline capacity balance

Million barrels per day (mb/d)



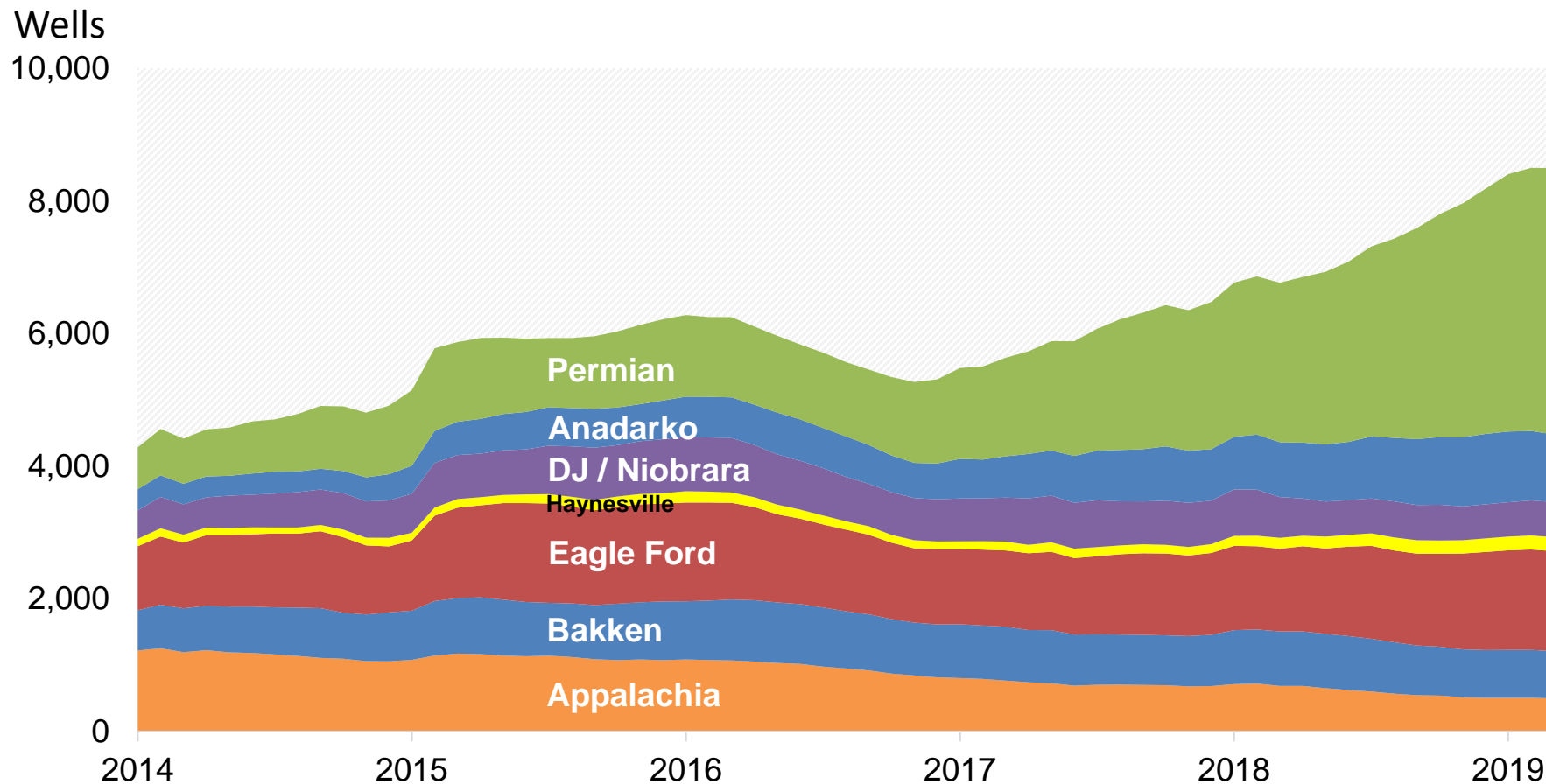


# Pipeline infrastructure constraints in the Permian drove a record 8,500 drilled but uncompleted wells per EIA



- ▶ The nationwide backlog of drilled but uncompleted wells (DUCs) equates to more than 6 months of drilling activity by EIA estimates

## Drilled but uncompleted wells



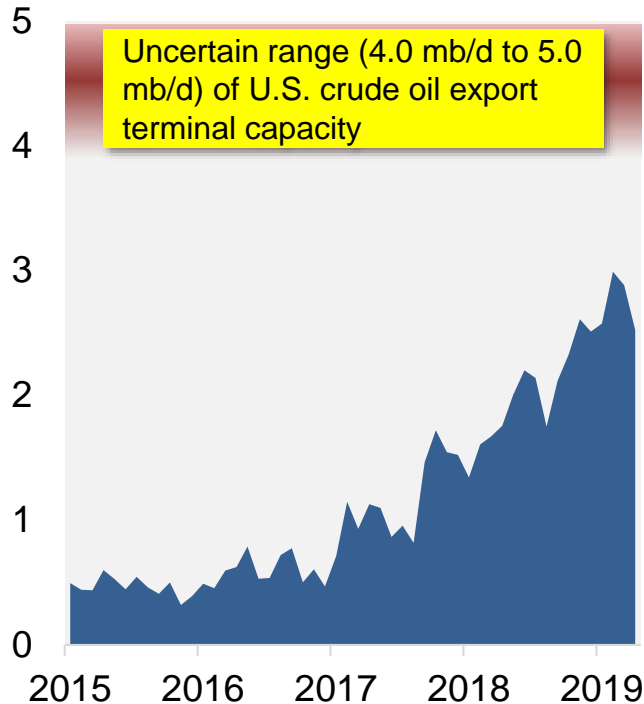
# U.S. crude oil export capacity has been sufficient, but some capacity estimates suggest some urgency to plan forward



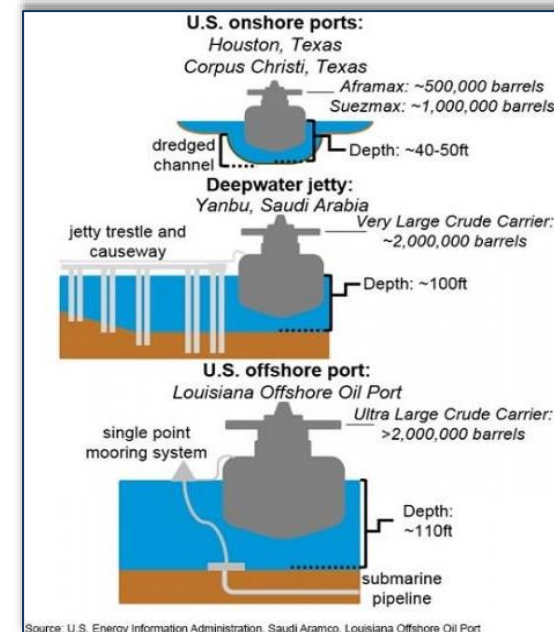
- Estimates of U.S. crude oil export capacity vary between 4.0 mb/d and 5.0 mb/d and depend on local conditions, including weather, ship availability and congestion
- With U.S. energy leadership, crude oil exports exceeded 3.0 mb/d in April and could grow in line with EIA's projections and approach the lower end of the export capacity range this year

## U.S. gross crude oil exports

Million barrels per day (mb/d)



source: API Monthly Statistical Report



Source: U.S. Energy Information Administration, Saudi Aramco, Louisiana Offshore Oil Port

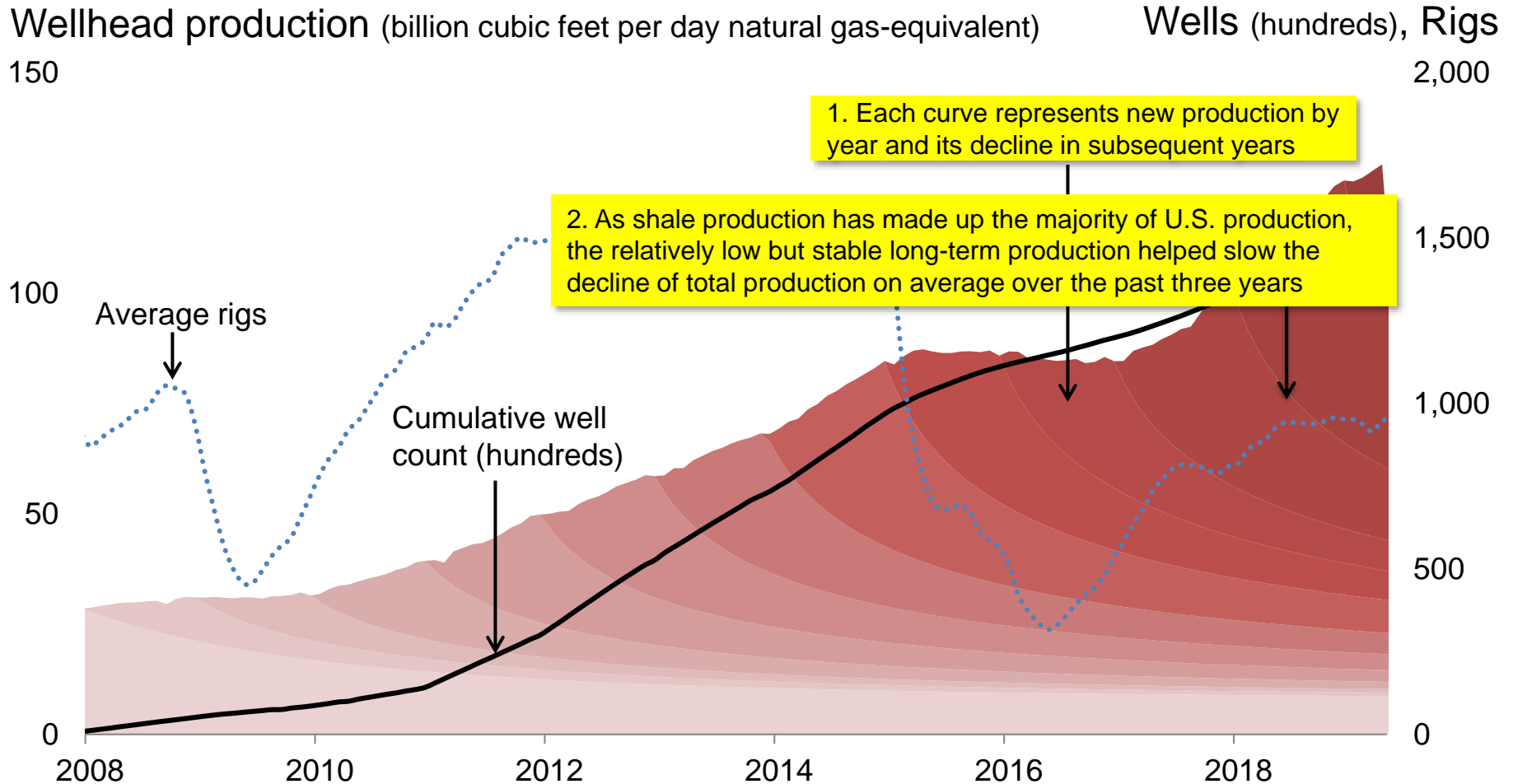


# Strong productivity – greater production with fewer rigs – has fueled the U.S. energy revolution



- Shale production typically shows a rapid decline in early production followed by stable rates for an extended period – building a foundational “brick” of production in the aggregate

## U.S. natural gas and oil production across seven key regions\*



\* Includes the Anadarko, Appalachia, Bakken, Eagle Ford, Haynesville, Niobrara and Permian Basin regions as defined by [EIA](#)

source: EIA Drilling Productivity Report and API Team calculations



# Natural Gas





# Global LNG prices dropped to roughly half of historical levels...



## Global natural gas landed prices (\$ per million Btu) – April 2019



sources: U.S. [FERC](#) (May 2019) and METI

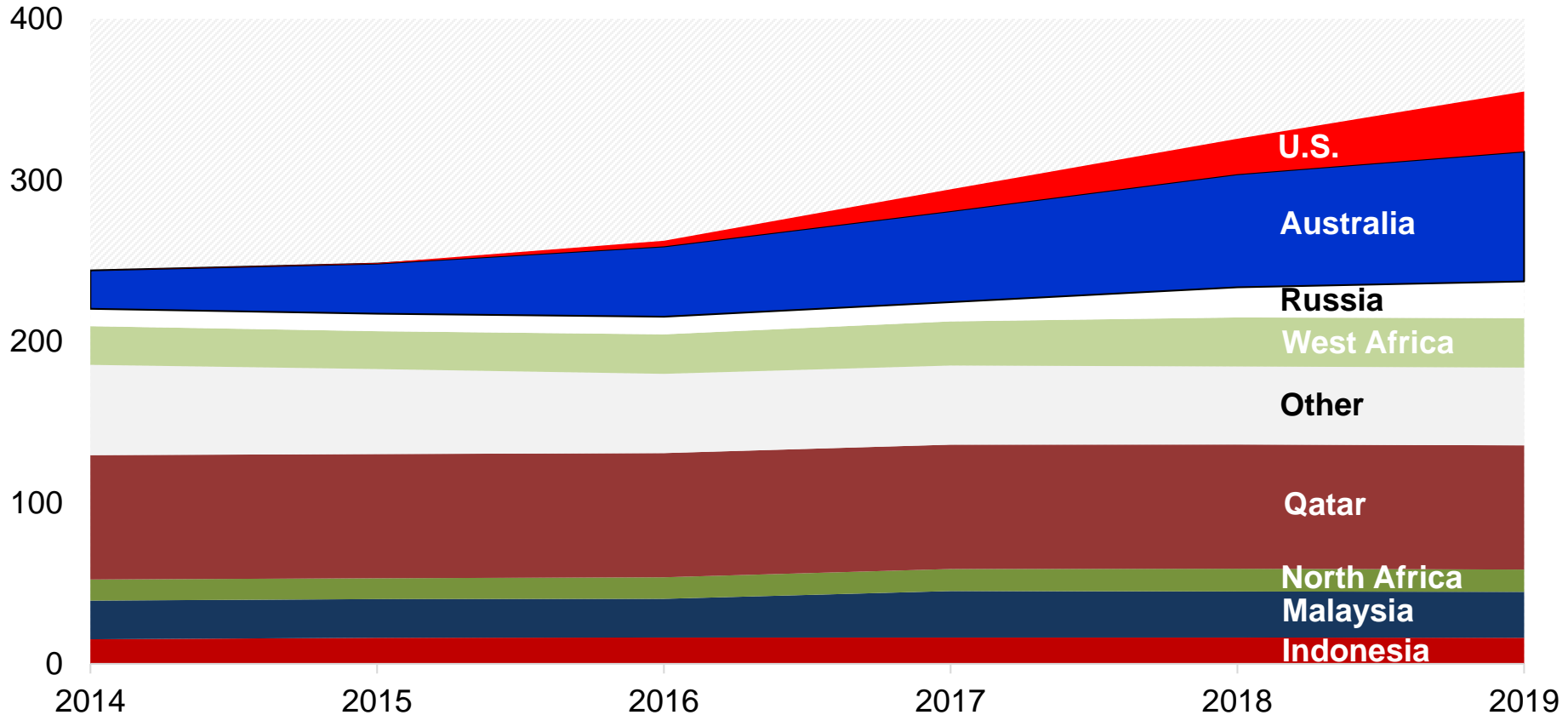
# ...driven largely by strong recent global LNG capacity additions



- ▶ The U.S. and Australia have led global LNG capacity growth that Bloomberg estimates will exceed 29 million tons per annum (mmtpa) or 9 percent y/y in 2019

## LNG liquefaction capacity by region

Million tons per annum (mmtpa)

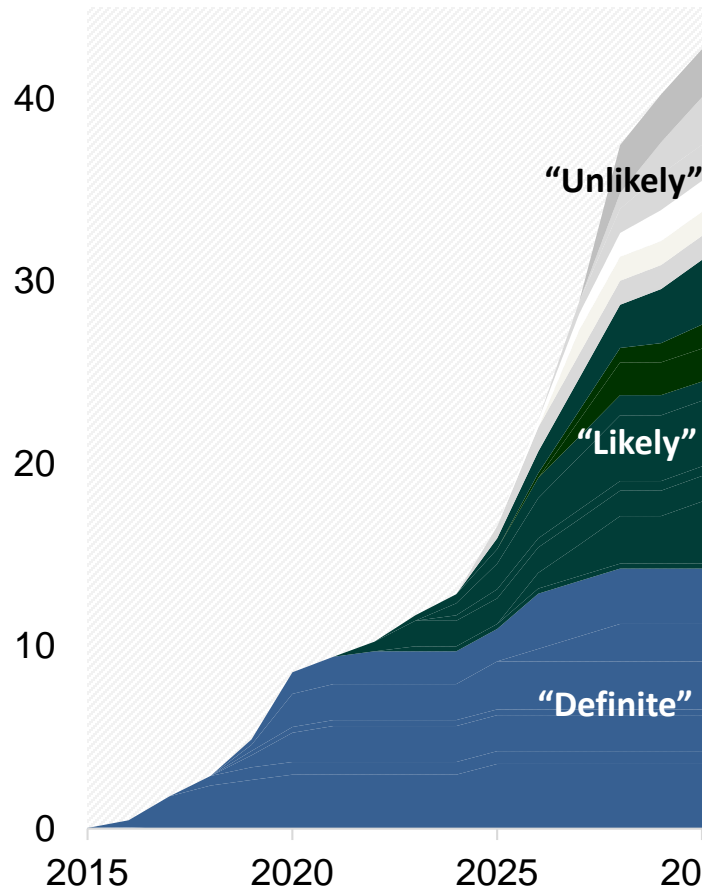




# Bloomberg anticipates about 25 Bcf/d of new North American export capacity by 2030

## North American LNG projects

Billion cubic feet per day (Bcf/d)



Plant name	Bloomberg view of likelihood	Final Investment Decision (FID) Status	2030 capacity (Bcf/d)
Corpus Christi Mod. 1-7	Unlikely	Under regulatory review	3.0
Plaquemines Mod. 1-20	Unlikely	Planning FID	2.6
Freeport LNG Train 4	Unlikely	Planning FID	0.7
Alaska LNG	Unlikely	Planning FID	2.6
Lake Charles	Unlikely	Planning FID	2.0
Delfin FLNG	Unlikely	Planning FID	1.7
Kitimat LNG	Unlikely	Planning FID	1.3
Goldboro LNG	Unlikely	Planning FID	1.3
Rio Grande LNG Tr. 3-6	Unlikely	Under regulatory review	2.4
Monkey Island (SCT&E)	Unlikely	Under regulatory review	1.6
Port Arthur LNG	Likely	Planning FID	1.8
LNG Canada Tr. 3-4	Likely	Planning FID	1.6
Magnolia LNG	Likely	Planning FID	1.1
Rio Grande LNG Tr. 1-2	Likely	Planning FID	1.2
Driftwood	Likely	Planning FID	3.6
Texas LNG	Likely	Planning FID	0.5
Calcasieu Pass	Highly Likely	Planning FID	1.4
LNG Canada Tr. 1-2	Likely	FID taken	1.6
Woodfibre LNG	Likely	FID taken	0.3
Sabine Pass Tr. 6	Likely	Under construction	0.6
Golden Pass	Likely	Under construction	2.1
Corpus Christi Tr. 1-3	In operation/definite	Under construction	1.8
Freeport LNG Tr. 1-3	In operation/definite	Under construction	2.0
Elba Island	In operation/definite	Under construction	0.3
Cameron LNG	In operation/definite	Operational (T1); Under construction (T2-3)	2.0
Cove Point	In operation/definite	Operational	0.7
Sabine Pass Tr. 1-5	In operation/definite	Operational (Tr. 1-4); Construction (Tr. 5)	3.6

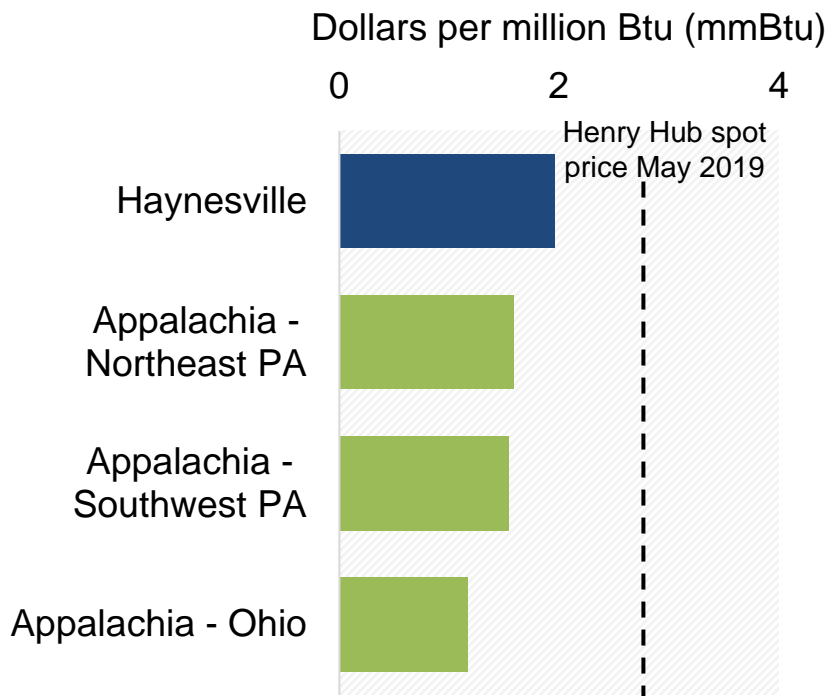
source: Bloomberg New Energy Finance (June 2019), amended for Sabine Pass T6 FID; Golden Pass construction; Port Arthur regulatory approval and commercial HOA with Saudi Aramco; and, Cameron T1 completion

# Solid productivity and cost effective production underpin continued U.S. natural gas production growth



- ▶ BTU Analytics estimates breakeven prices among major producing regions range from \$1.17 per million Btu (mmBtu) to \$1.96 per mmBtu – well below recent Henry Hub prices

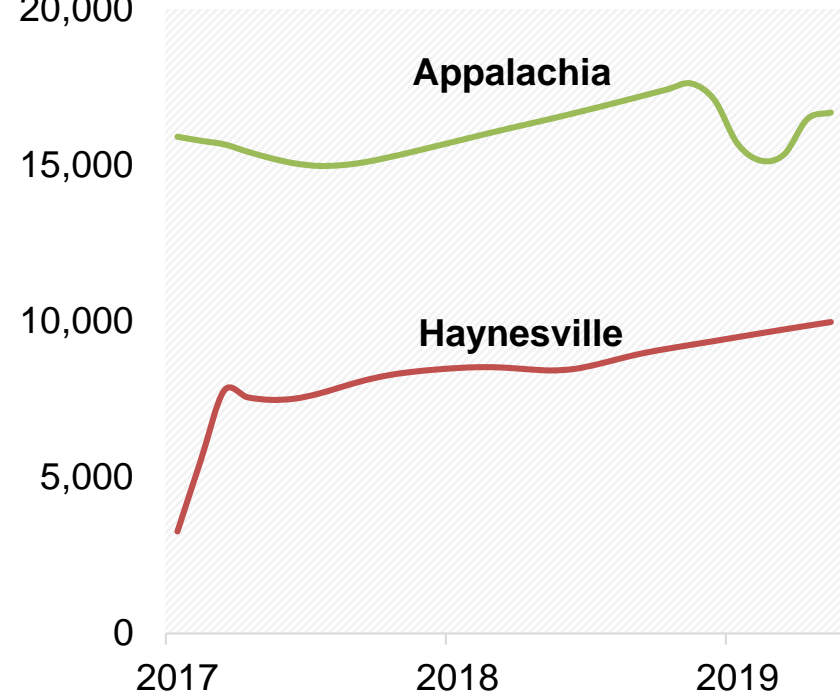
## Breakeven prices for selected gas plays\*



\*Half cycle breakevens assuming 10% discount factor and play-specific costs  
source: BTU Analytics

## U.S. natural gas productivity –new well production per rig (quarterly avg.)

Thousand cubic feet per day nat. gas-equivalent  
20,000



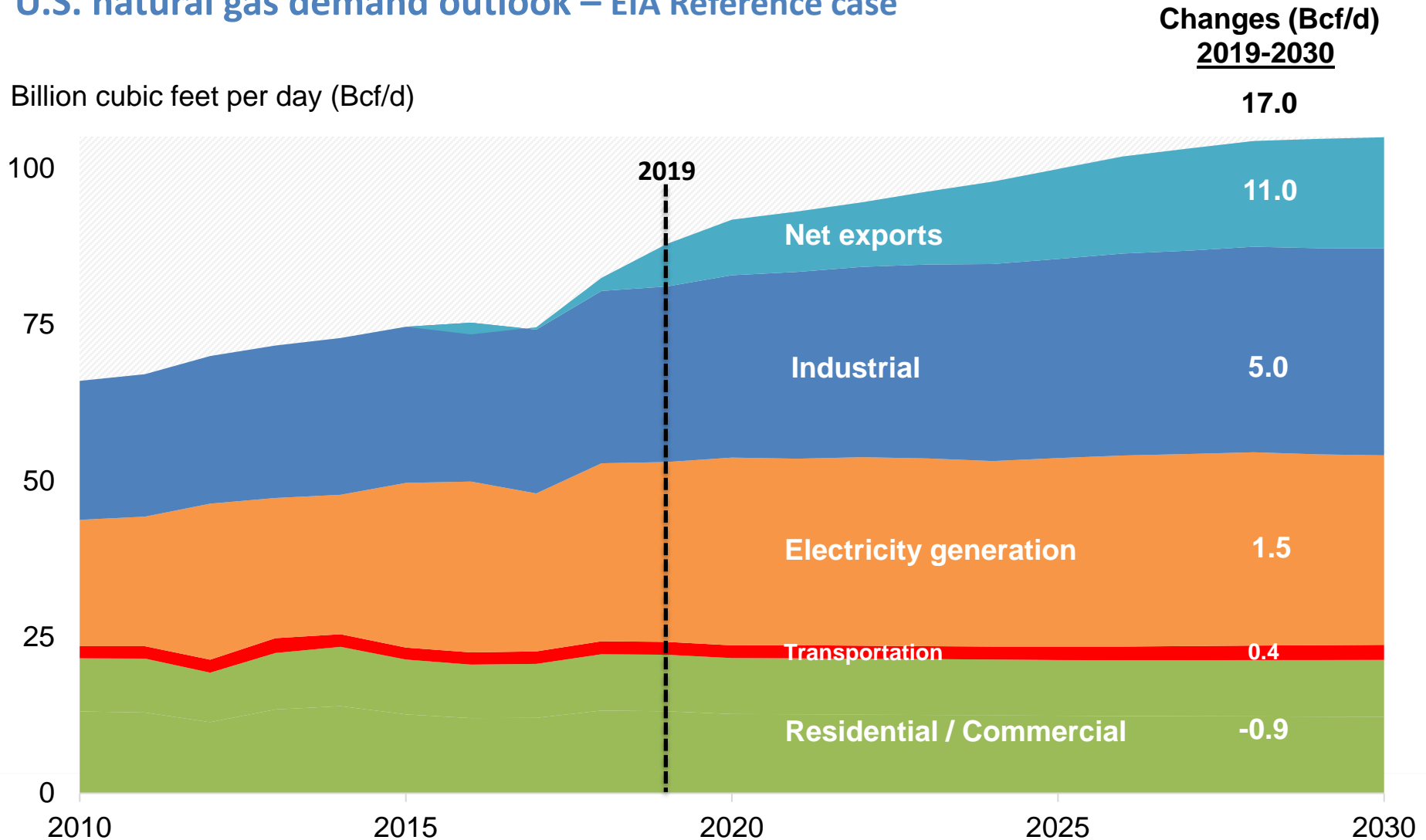
source: EIA Drilling Productivity Report



# U.S. natural gas exports and industrial demand should be the main drivers of domestic natural gas production growth



## U.S. natural gas demand outlook – EIA Reference case



source: EIA AEO (2019)

# Permian Basin 5.0 bcf/d of new pipeline capacity additions are expected by the end of 2019 (Q4 19 vs. Q4 18)

- ▶ The project slate suggests relief for bottlenecks by late 2019, but not all projects shown are likely to be constructed

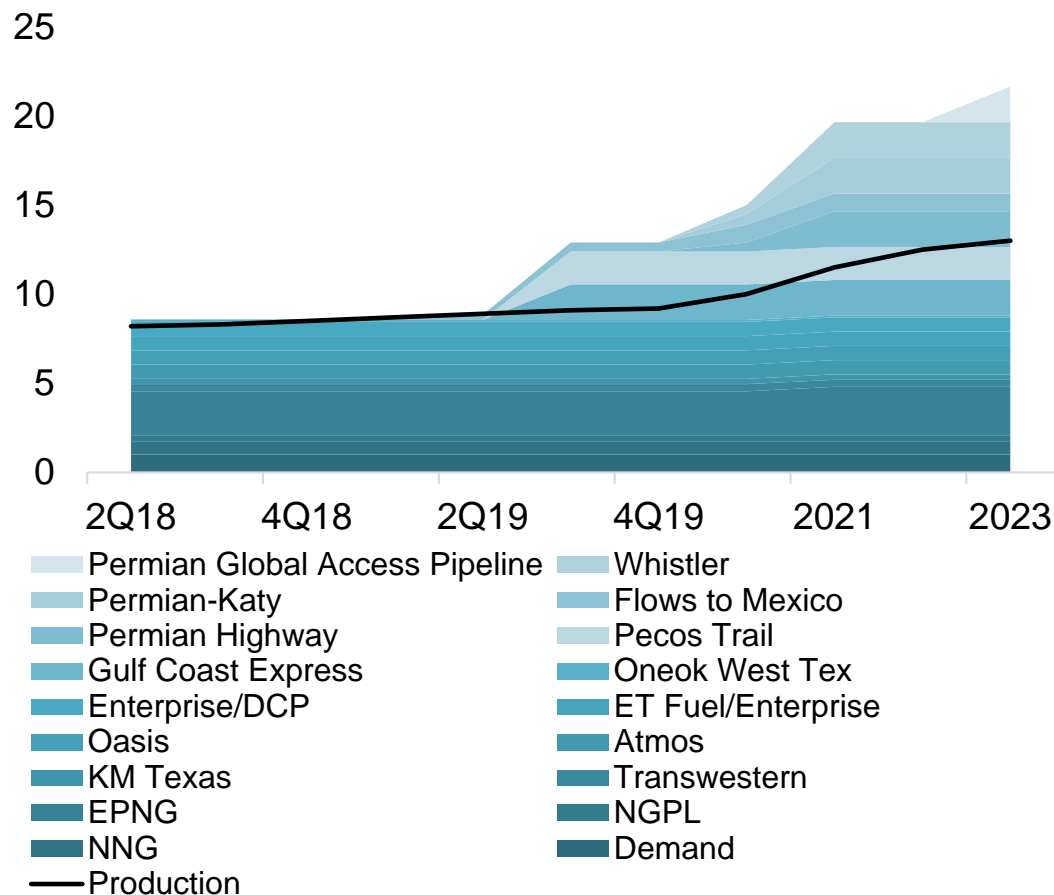
## Permian Basin – recent natural gas pipeline expansions

- Permian Global Access Pipeline
- Gulf Coast Express
- Permian Highway
- Pecos Trail
- Permian-Katy
- Whistler



## Permian Basin gas pipeline utilization

Billion cubic feet per day (bcf/d)



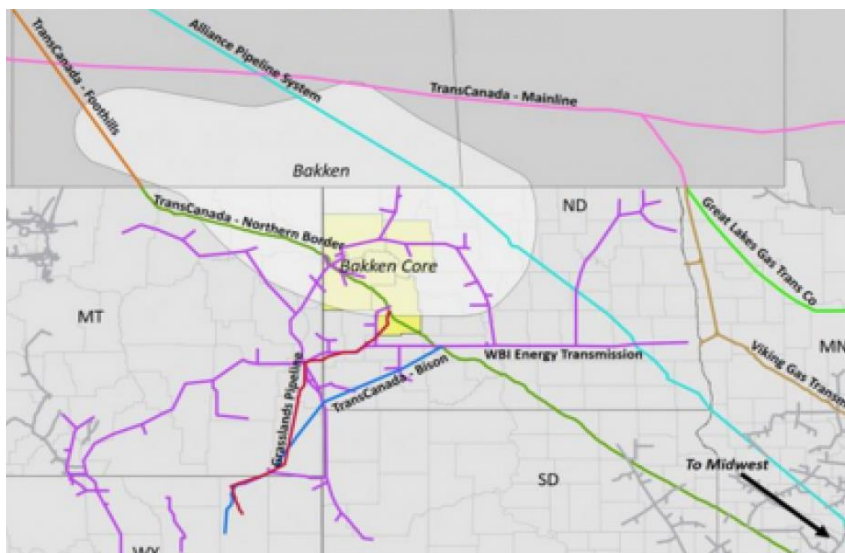
source: [Permian Texans for Natural Gas](#)

sources: RBN Energy, Permian Texans for Natural Gas, EIA

# Bakken 0.3 bcf/d of pipeline capacity expansions are expected by the end of 2019 (Q4 19 vs. Q4 18)

- ▶ About half of Northern Border Pipeline's 2.4 bcf/d of capacity serves the Bakken, while the remainder and most Alliance Pipeline capacity transports Canadian gas, resulting in a relatively tight natural gas supply/demand balance for the Bakken region
- ▶ Gas processing capacity has expanded, helping to move supply to market in different forms

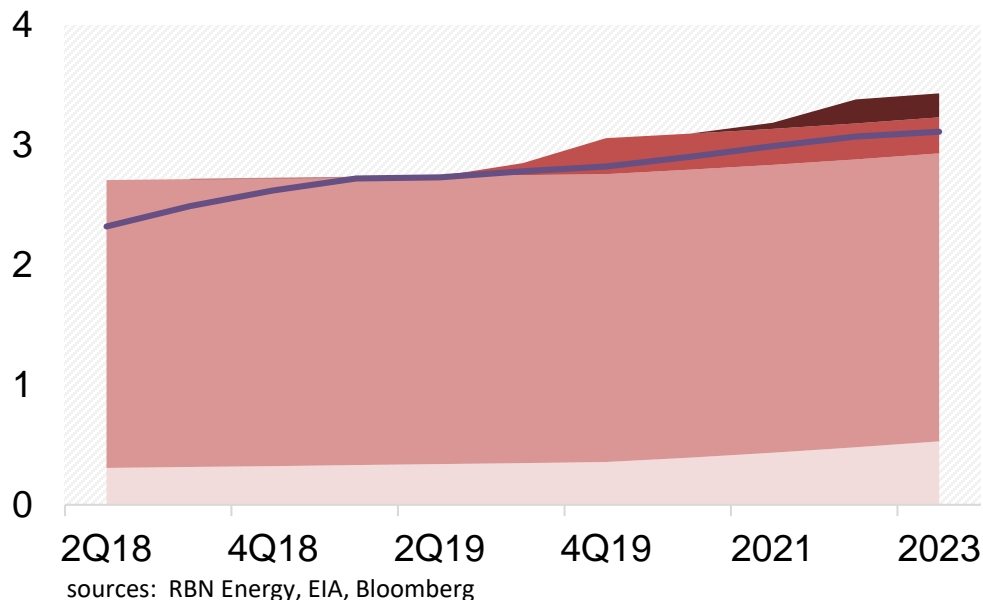
## Bakken –natural gas pipelines



source: RBN Energy

## Bakken gas pipeline utilization

Billion cubic feet per day (bcf/d)



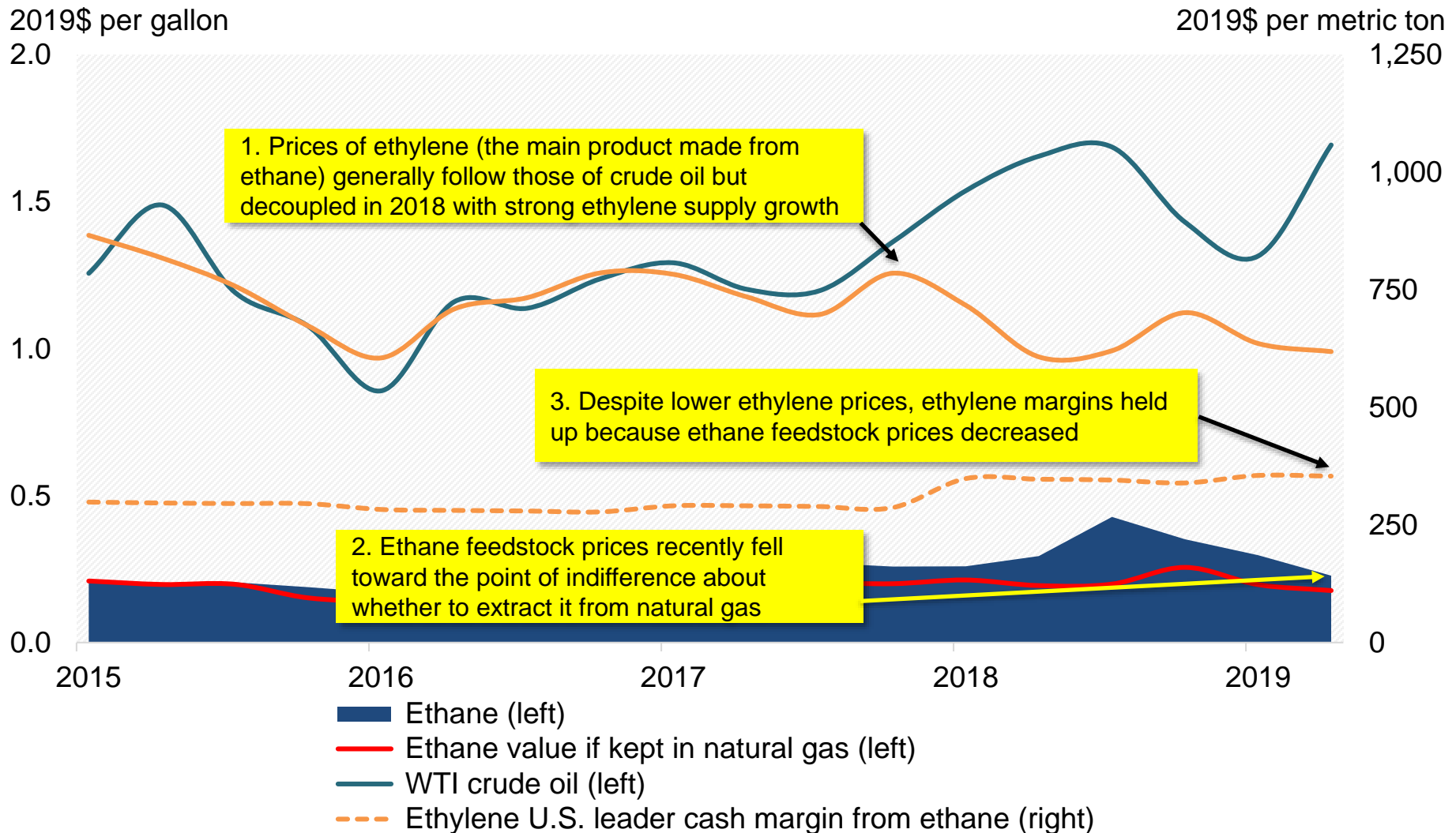
- North Bakken Expansion
- Demicks Lake to Northern Border Pipeline
- Current Bakken egress on Northern Border and Alliance pipelines
- Demand
- Production



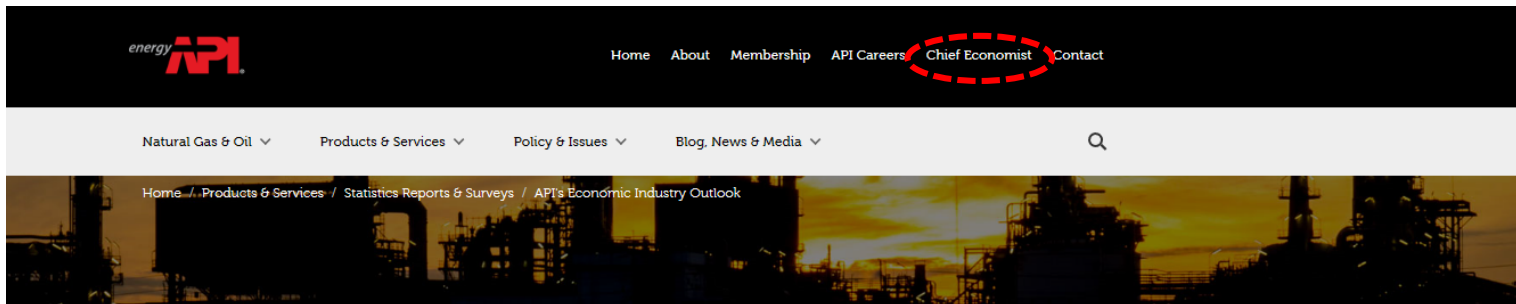
# The energy revolution has made ethane abundant and, in turn, U.S. petrochemical production globally competitive



## U.S. ethylene prices, margins and ethane feedstock costs through March 2019



# Resources: Chief Economist's section at www.api.org



## API'S ECONOMIC INDUSTRY OUTLOOK

- Reports & Surveys
- Weekly Statistical Bulletin
- Monthly Statistical Report
- Economic Outlook**



Dean Foreman (left) and podcast hosts

The API Industry Outlook, developed by API's Chief Economist, Dr. R. Dean Foreman, is a quarterly report that provides an overview of the natural gas and oil industry as it relates to the U.S. and global economies.

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