

# API Industry Outlook Fourth Quarter 2021

R. Dean Foreman, Ph.D.

December 16, 2021



# Key points – Q4 2021

## Economy

- Global and U.S. GDP consensus expectations for above-average growth to 2023 have persisted despite the pandemic, some slowing and high price inflation
- Uncertainties: pandemic, price inflation; U.S. dollar exchange value; debt ceiling/debt financing
- Work force, supply chain, financial and energy policy issues have continued to represent headwinds to oil and natural gas investment, drilling and production
- Industry capital investment rose to \$43 billion in Q3 2021; 4<sup>th</sup> lowest on record

## Oil

- Global oil demand near 100 million barrels per day (mb/d) in Q4 per EIA
- If the economy stays on track, 2022 global demand could outstrip supply without supply growth by OPEC+ (3.2 mb/d) and the U.S. (1.4 mb/d) per EIA
- U.S. supply growth hinges on investment/drilling as well as leveraging the inventory of drilled but uncompleted wells, which has diminished

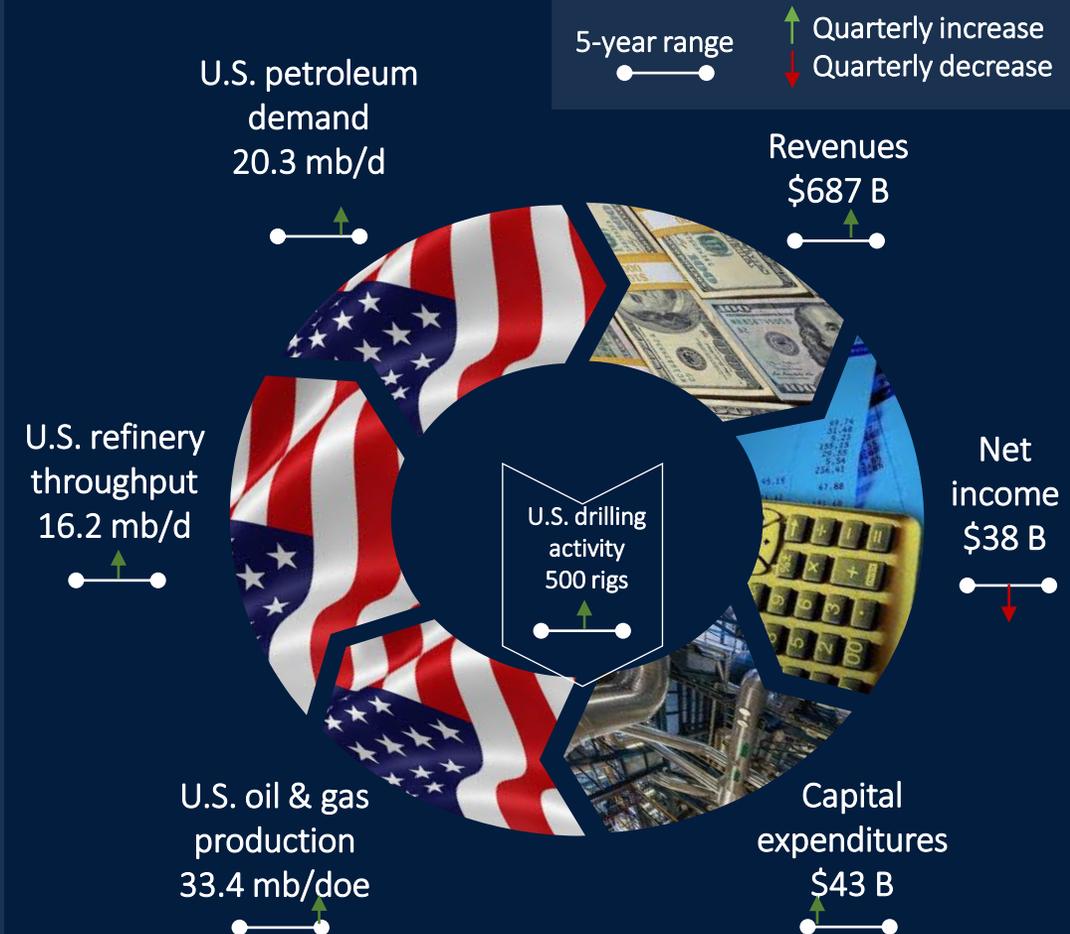
## Natural gas

- Global natural gas markets remained in disarray entering winter 2021, maximizing the pull for U.S. exports
- With record-high well productivity, U.S. natural gas supply has remained ample despite muted drilling activity

## Third quarter 2021 by the numbers

### Benchmark price averages

Brent crude oil: \$73.47 per barrel    WTI crude oil: \$70.62 per barrel  
 NGL composite: \$9.69 per mmBtu    Natural gas (Henry Hub): \$4.35 per mmBtu



• Financial compilation based on API 200 companies with shares listed on U.S. stock exchanges.  
 sources: EIA; API Monthly Statistical Report; Bloomberg and company reports; Baker Hughes; API Team analysis

# Key implications – Q4 2021

## For consumers

- › The demand for oil and natural gas has continued to grow with the economy, and price pressures have impacted consumer sentiment – and could persist if the economy remains on track

## For natural gas and oil industry producers

- › Industry capital investment picked up in Q3 2021 but remained at historically weak levels
- › Work force, supply chain, financial and policy uncertainties have muted the historical responsiveness of activity to higher prices – and raised potential cost escalation
- › As the U.S. was a petroleum net importer for six of the past seven months, domestic prices have generally reflected import parity and weakened the advantages that accompanied abundant domestic supplies
- › Blame has been misplaced on U.S. exports for raising prices; focus needs to be squarely on enabling investment, drilling, infrastructure

## For policymakers

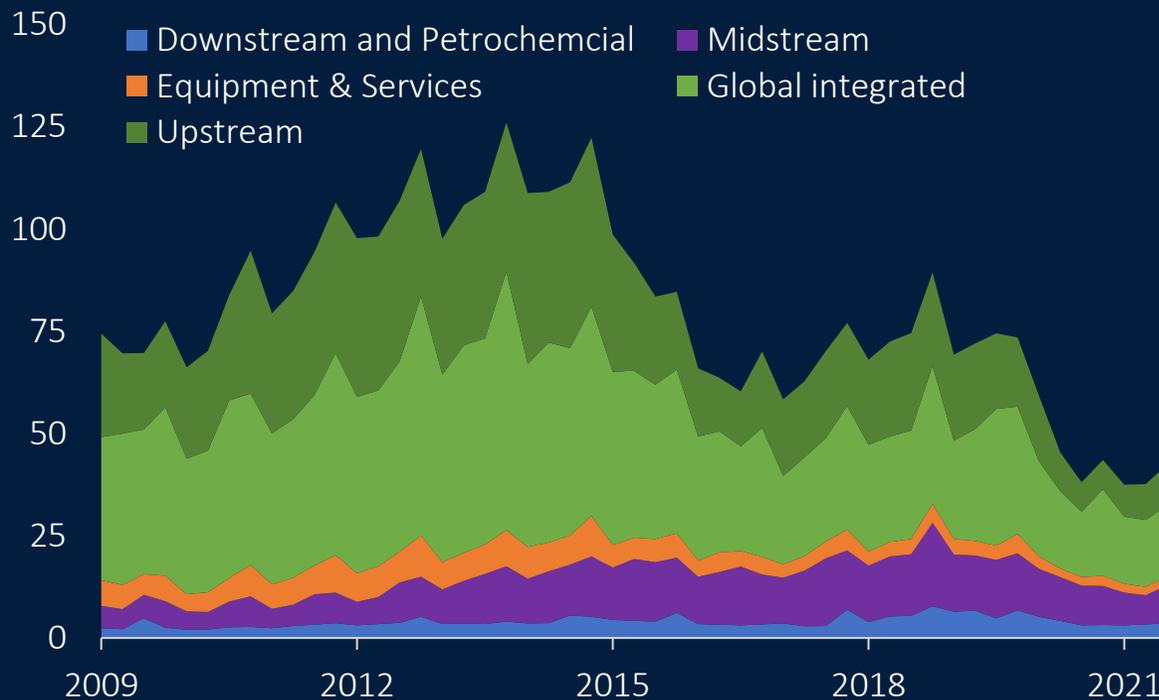
- › Abundant domestic production has historically helped keep downward price pressure, and cogent policies are needed to support it
- › Those who believe most recent price inflation is temporary may misunderstand the time required for oil and natural gas investments
- › Potential monetary, fiscal policy and energy policy instruments could have implications for delicate consumer finances

# In Q3 2021, industry capital expenditures rose by 13.3% q/q in to \$42.5 billion, but the backlog of U.S. projects under construction contracted

- ▶ The industry invested \$42.5 billion in Q3 2021, compared with \$72.3 billion in the same quarter of 2019
- ▶ Across the energy value chain, API is monitoring 94 oil & gas-related projects currently under construction worth \$148 billion

## Capital expenditures by industry segment

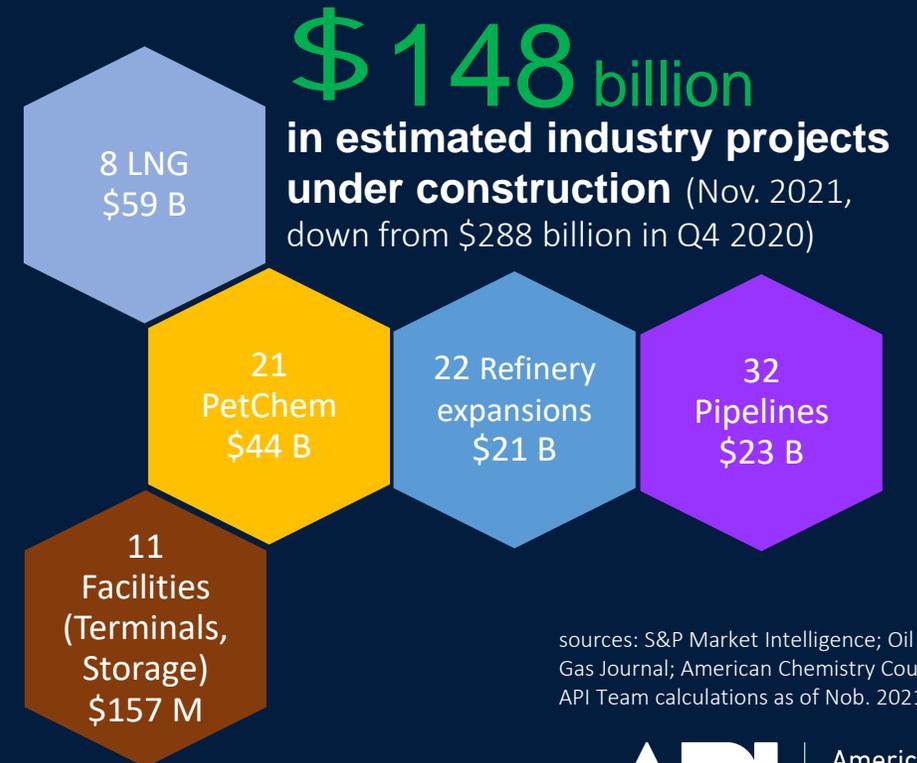
Billion dollars (2021\$)



\* All other oil & gas industry companies

sources: Bloomberg; publicly-available company reports; BLS

## \$148 billion in current U.S. energy infrastructure investments



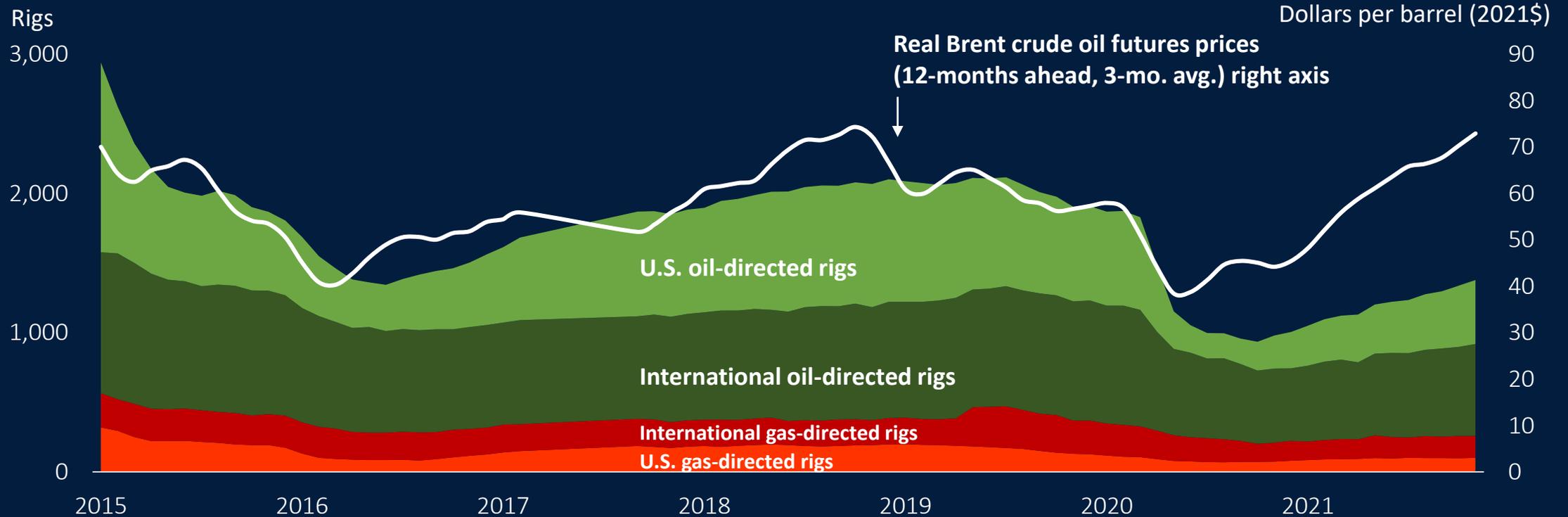
sources: S&P Market Intelligence; Oil & Gas Journal; American Chemistry Council; API Team calculations as of Nov. 2021



# Global drilling activity has lagged its levels in 2019 and its historical responsiveness to prices

- ▶ In Nov. 2021, global oil & gas drilling activity was down by 27.8% compared with Nov. 2019. Changes vs. 2019 by segment:
  - U.S. oil drilling (-32.7%)
  - U.S. natural gas drilling (-21.4%)
  - International oil drilling (-22.9%)
  - International natural gas drilling (-34.6%)

## Global oil drilling activity and Brent crude oil prices, monthly



sources: Baker Hughes ; Bloomberg; CME Group

# Global Economy



# What we're watching now



- Key themes this quarter are 1) precarious government debt situations 2) how supply chain bottlenecks could affect long-term wage and inflation expectations; and 3) strong assumptions about prospective U.S. and OPEC+ supply growth

## Fiscal Monitor

- Debt is expected to remain persistently higher than projected before the pandemic—almost 20% higher among advanced economies to 2026 – and could lead to increased government financing to cover both new and maturing debt
- Growth has resumed across all income groups, but in emerging markets and low-income developing countries GDP could remain at long-lastingly lower levels than pre-pandemic projections, leading to lower fiscal revenues
- With record-high debt, countries are exposed to changes in global interest rates, refinancing risks and reduced fiscal space to respond to future shocks
- Debt service could be strained in emerging and developing economies with shorter public debt maturities and persistently low tax revenues

[International Monetary Fund](#), Oct. 2021

## Bottlenecks: causes and macroeconomic implications

- Bottlenecks in the supply of commodities, intermediate goods and freight transport began as pandemic-related supply disruptions amid strong demand from the global economic recovery. But they have been aggravated by the attempts of supply chain participants to build buffers in already lean production networks – so-called bullwhip effects
- The direct inflationary effect of bottlenecks will likely be limited after relative prices have adjusted. However, sustained inflationary pressures could emerge if bottlenecks persist long enough to trigger an upward shift in wage growth and inflation expectations

Rees, D. , Rungcharoenkitkul, P., [Bank for International Settlements](#), Nov. 2021

## Oil Market Report, December 2021

- IEA projects demand growth of 3.3 mb/d in 2022
- Global oil production is poised to outpace demand from December, led by growth in the U.S. and OPEC+ countries.
- “The steady rise in supply combined with easing demand has considerably loosened our balances for 1Q22.”

[International Energy Agency](#), Dec. 2021



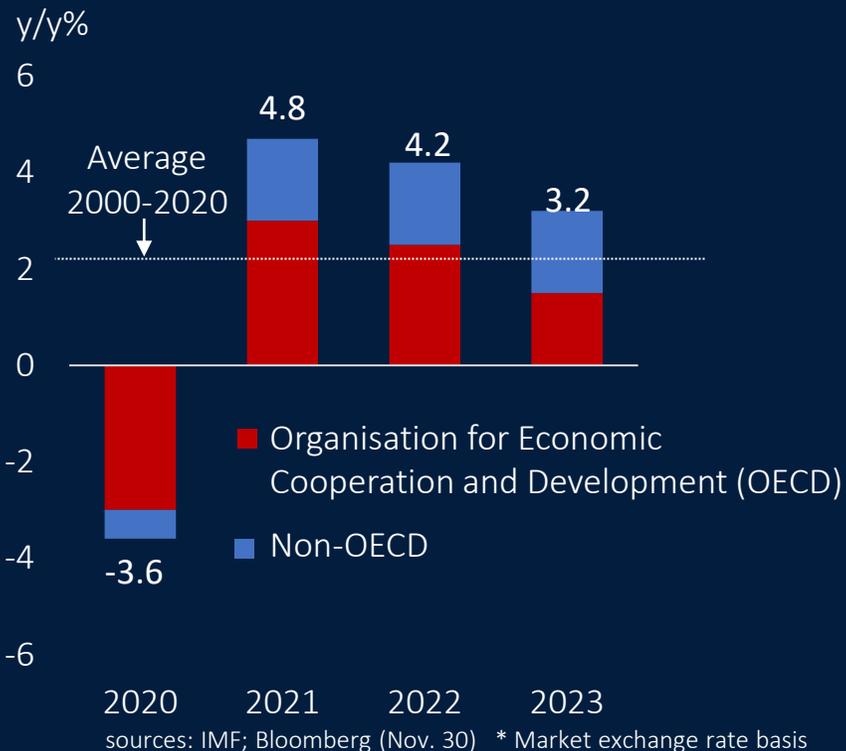
American  
Petroleum  
Institute



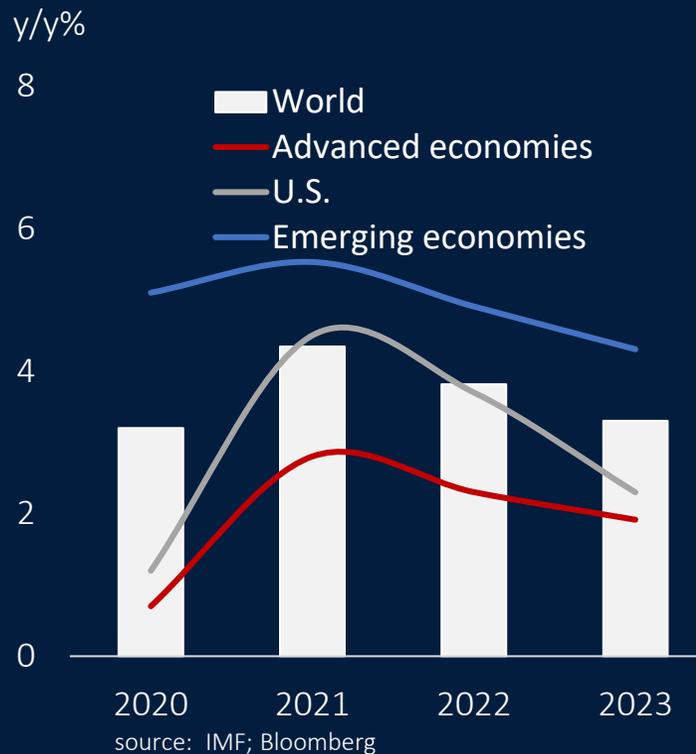
# Bloomberg consensus economic growth expectations have remained historically strong despite higher price inflation

- Consensus expectations are for above-average through 2023, with limited price inflation and monetary policy responses
- U.S. oil and natural gas industry inputs across the value chain continued to outpace over the rate of broad price inflation

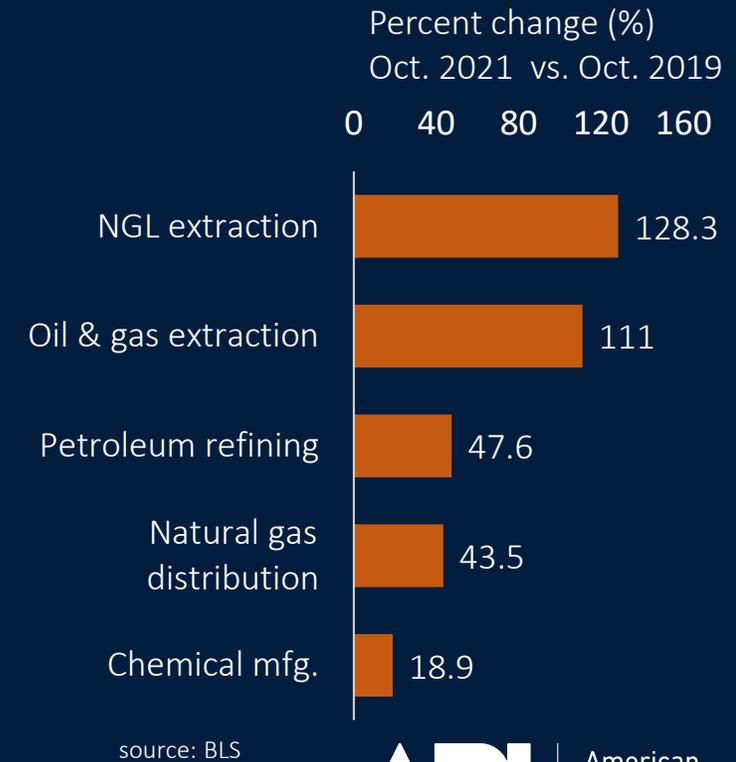
## Global GDP outlook



## Consumer price inflation



## U.S. producer price inflation

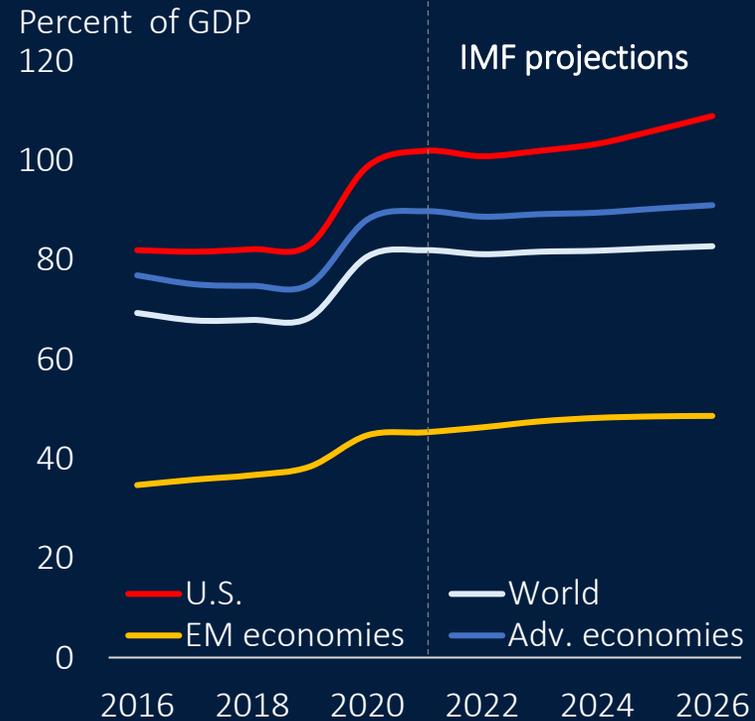




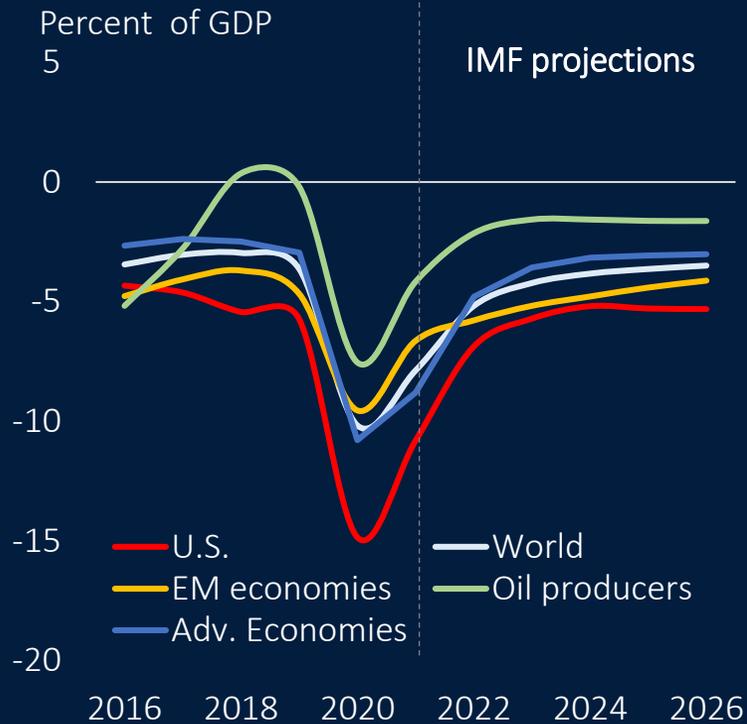
# The IMF expects protracted high debt, deficits and debt service requirements

- ▶ U.S. net debt has outpaced the advanced economies' average, and IMF expects protracted government deficits
- ▶ Even if a government has fiscal headroom and minimal re-financing risks, large financing needs to cover new and maturing debt raise the possibility of having to withdraw fiscal support more quickly than expected

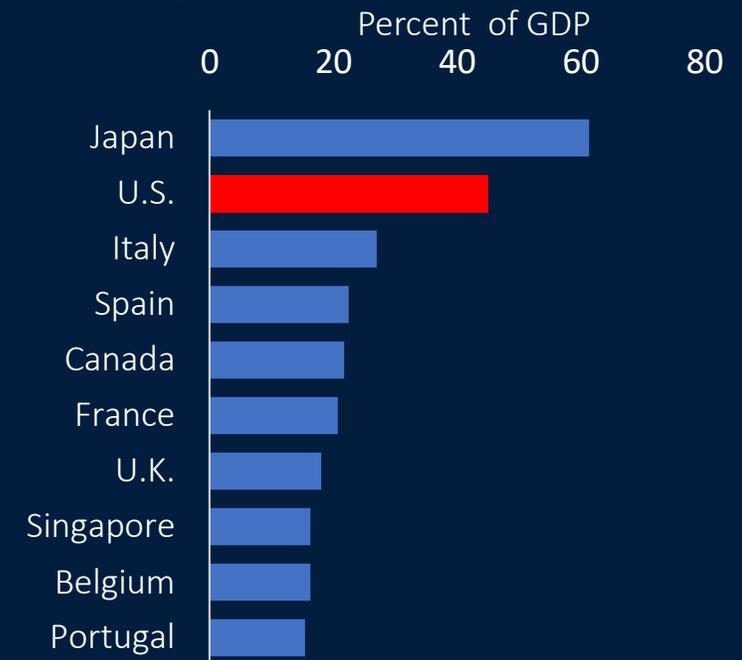
## General government net debt



## Government fiscal balance



## 2021 gross financing need\*



\*Gross financing need defined as projected overall deficit and maturing government debt in 2021

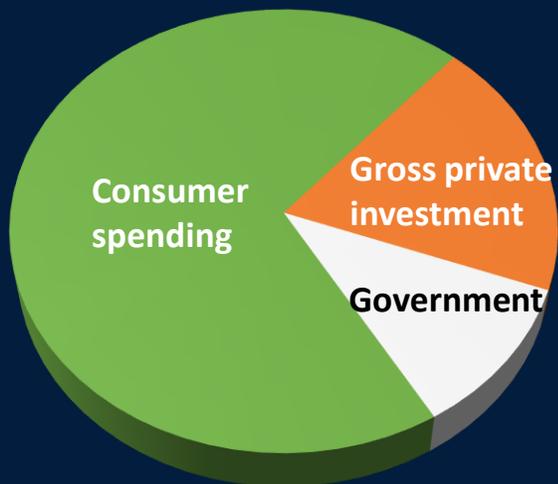


# U.S. economic growth has historically been driven by consumer spending that has recently been hampered by weakened consumer sentiment

- ▶ The Univ. of Michigan consumer sentiment index recently dropped to its lowest in a decade due to prices inflation concerns, which has historically correlated with changes in consumer spending

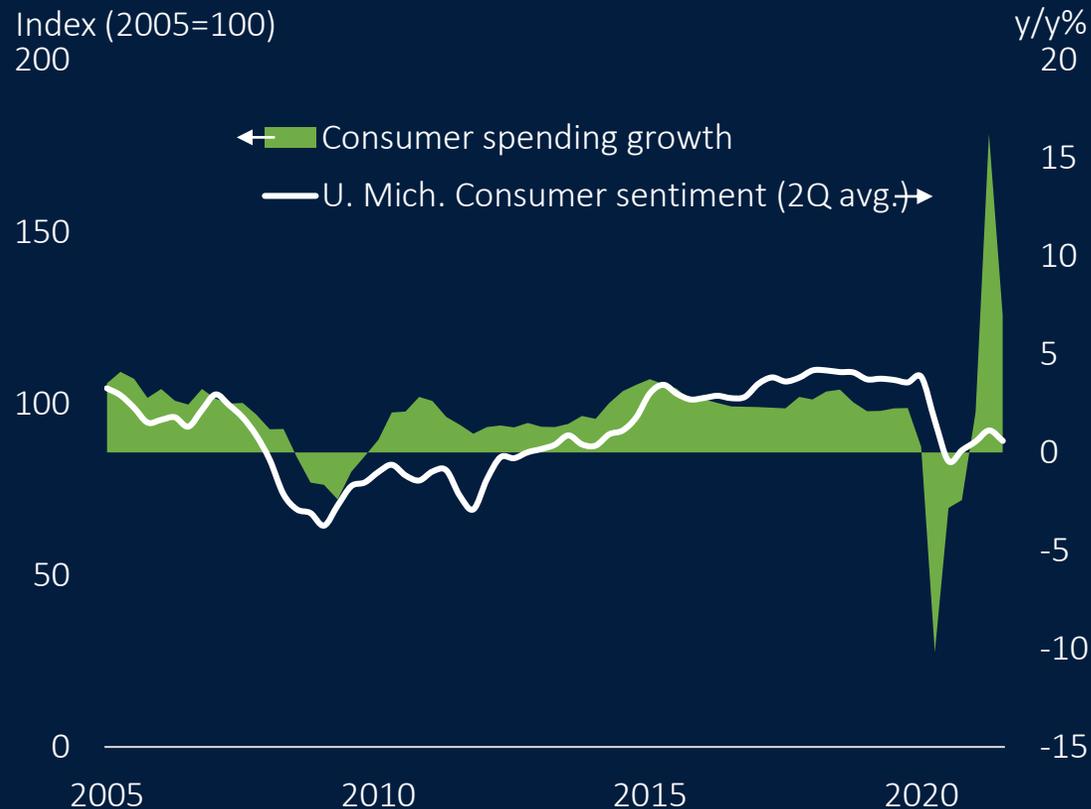
## Contributions to real U.S. growth, Q3 2014 to 2021

- ▶ U.S. domestic demand grew by \$3.1 trillion between 2014 and 2021, but was partially offset by \$0.7 billion increased net imports



source: Bureau of Economic Analysis (BEA)

## U.S. consumer sentiment and real spending growth



sources: BEA; Univ. of Michigan Survey of Consumers



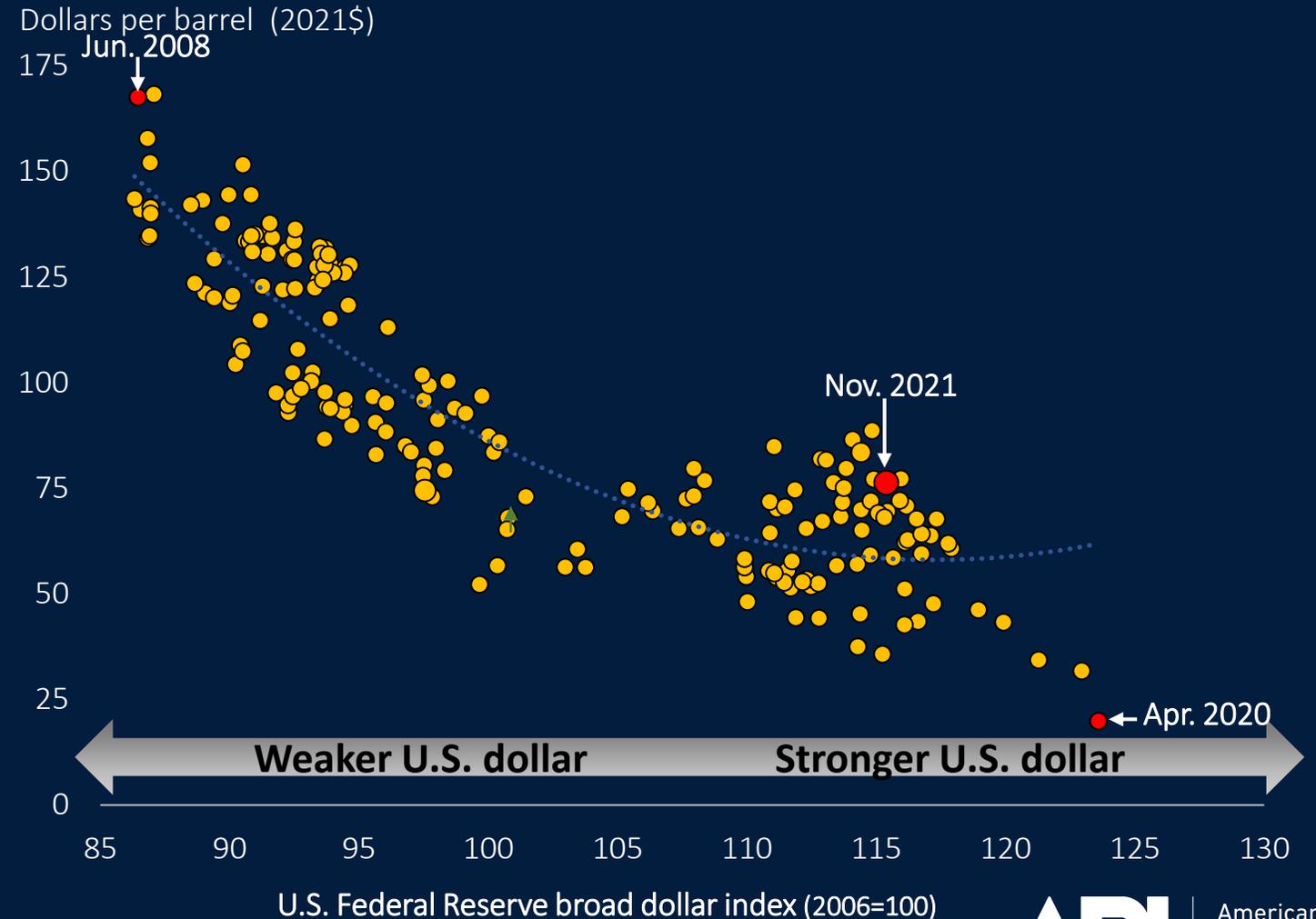
American Petroleum Institute

# Global oil prices depend on many factors, but an inverse correlation with the U.S. dollar has held for over 15 years



- ▶ The U.S. dollar and global oil prices both respond to global economic and financial conditions
- ▶ June 2008, just prior to the Great Financial Crisis, marked the weakest broad U.S. dollar exchange rate and highest oil price
- ▶ With the COVID-19 pandemic, April 2020 reflected the opposite extreme of the strongest U.S. dollar and lowest oil prices since 2006
- ▶ As of Nov. 2021, the dollar depreciated by 6.6% over the past 18 months, and increased oil prices have broadly reflected tighter market fundamentals

U.S. Brent crude oil prices and broad real dollar index, Jan. 2006- Nov. 2021



sources: Federal Reserve Board; Bloomberg; Bureau of Labor Statistics

# Oil Markets



# Oil prices have historically related to many uncertain factors

## CURRENT FACTORS

## FUTURE EXPECTATIONS



## FINANCIAL MARKETS

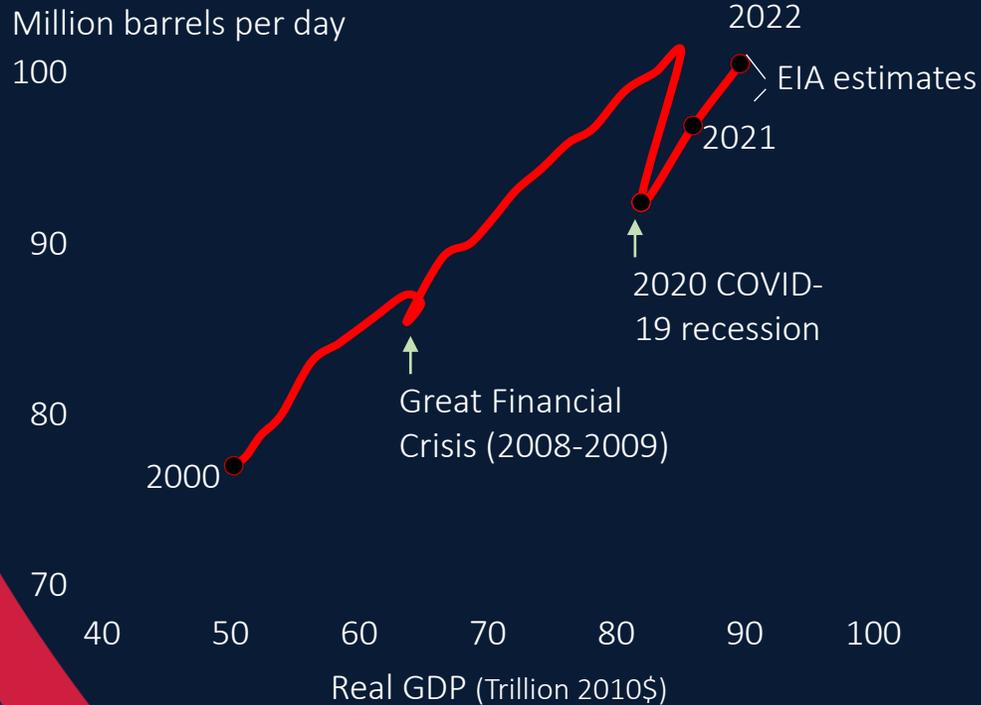
interest rates, foreign exchange rates, equity markets

# Led by emerging economies, global oil demand could near its record highs by the end of 2022 per EIA



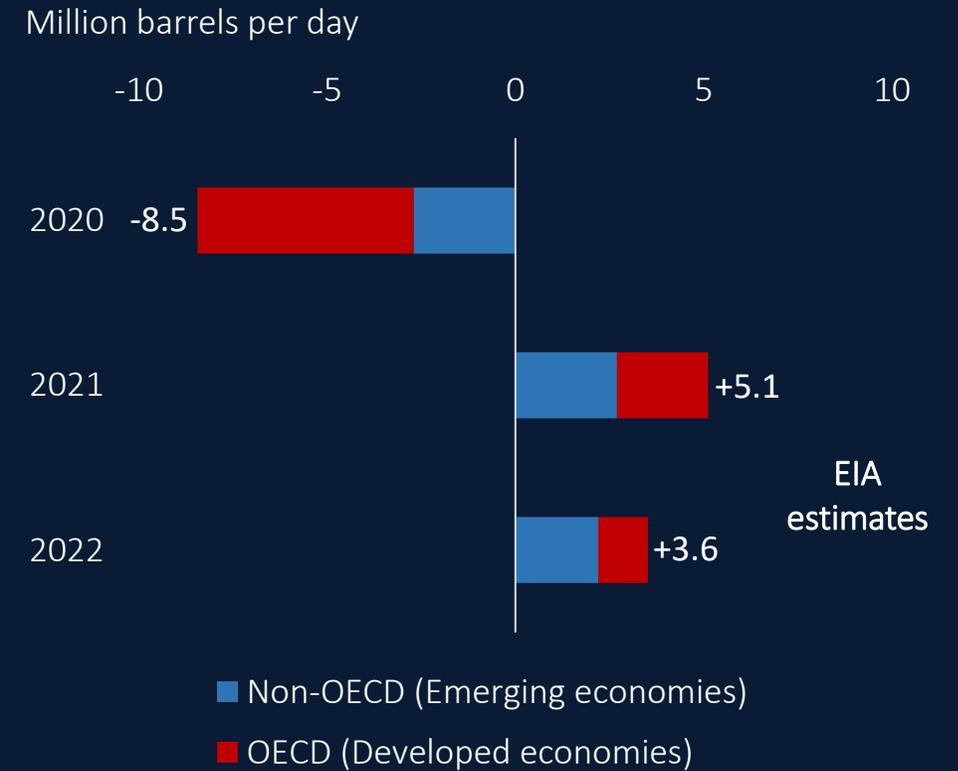
▶ Global oil demand has historically changed in tandem with the economy, and this relationship remained intact through the 2020 COVID-19 recession

## Global oil demand and GDP



\*Market exchange rate basis  
sources: EIA; Bloomberg; IMF; API Team calculations

## Global oil demand changes by region



source: EIA STEO (Dec. 2021)

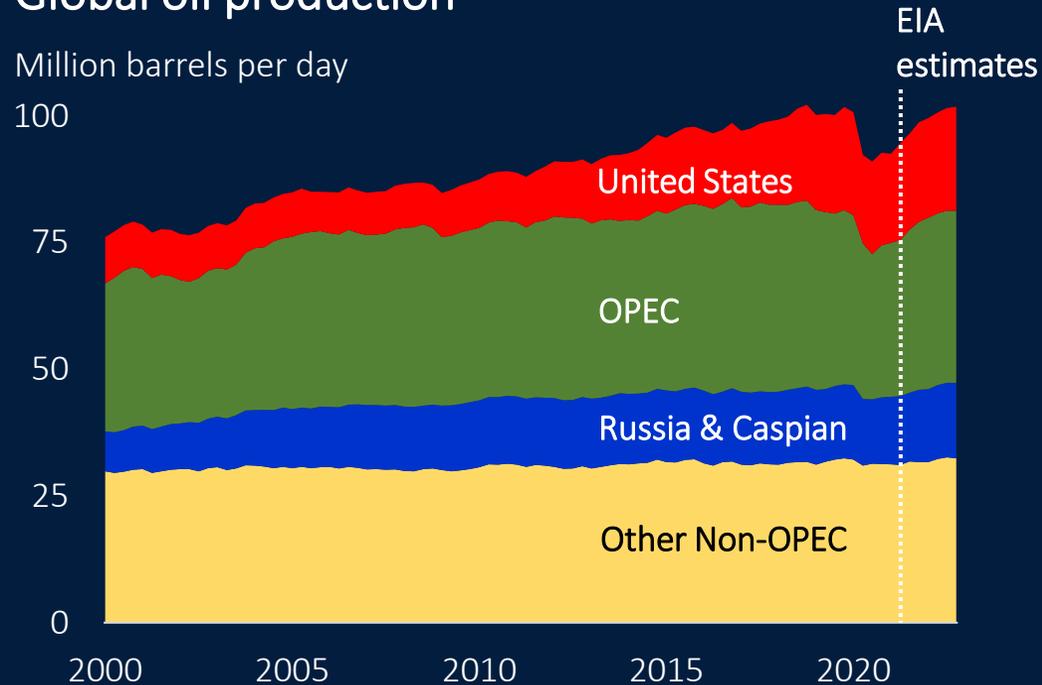
# Global oil production could tie a world record 102.0 mb/d by Nov. 2022 per EIA



- ▶ EIA projects the U.S. (+1.3 mb/d), OPEC (+2.3 mb/d) and Russia (+1.0 mb/d) will lead global production in 2022
- ▶ EIA also projects Brazil (+0.3 mb/d), Central/S. Am. (+0.2 mb/d) and Canada (+0.3 mb/d) to grow

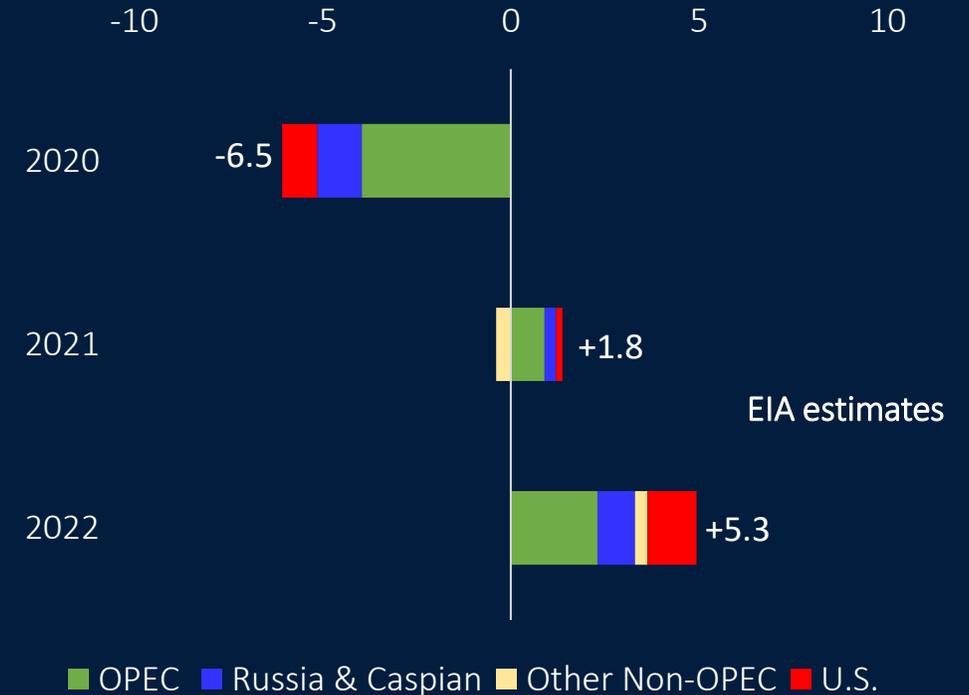
## Global oil production

Million barrels per day



## Global oil supply changes by region

Million barrels per day



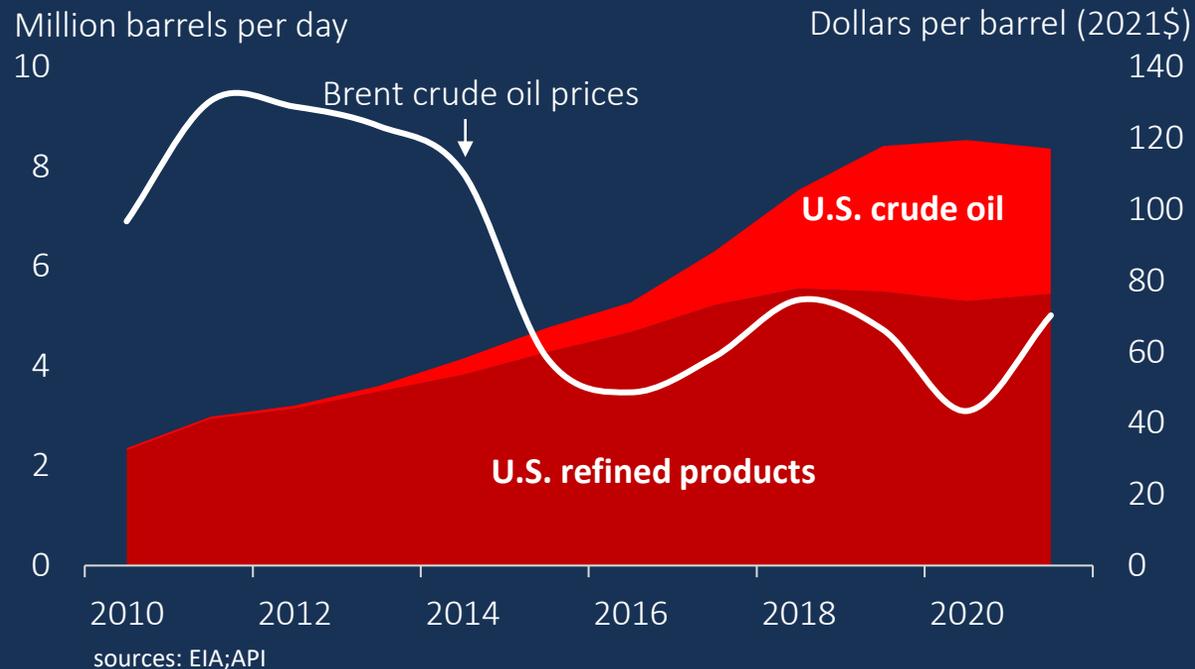
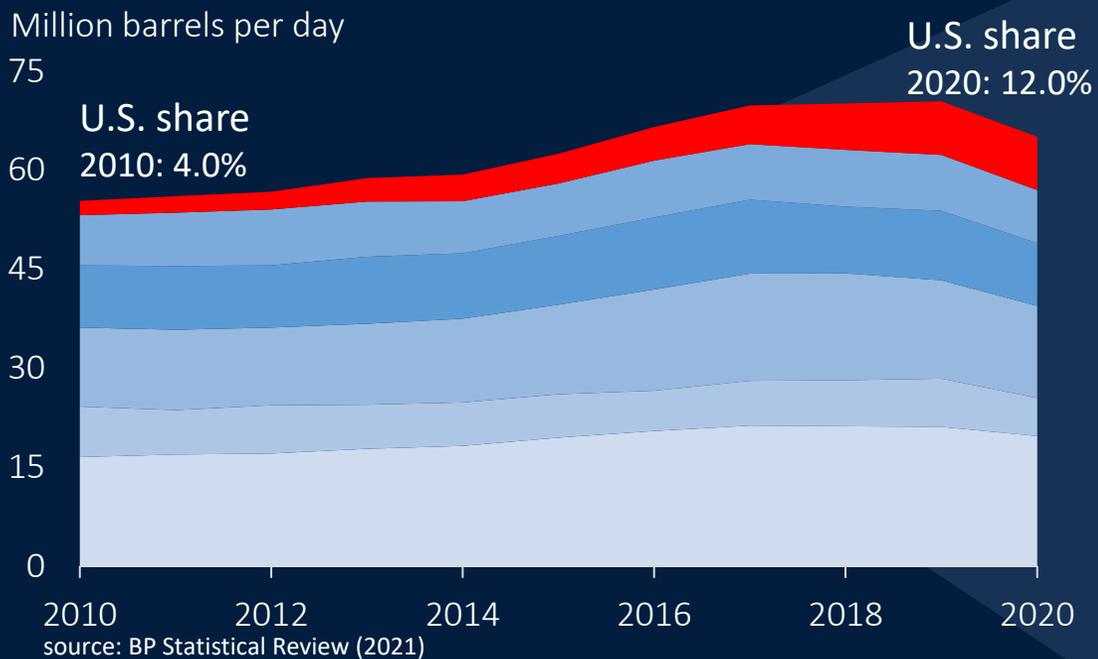
source: EIA STEO (Dec. 2021)



# U.S. crude oil exports of about 3.0 mb/d are material to global supply

U.S. oil export growth helped to reduce global prices and represented about 12% of the world's total petroleum exports in 2020

## U.S. petroleum export growth and the fall of global oil prices



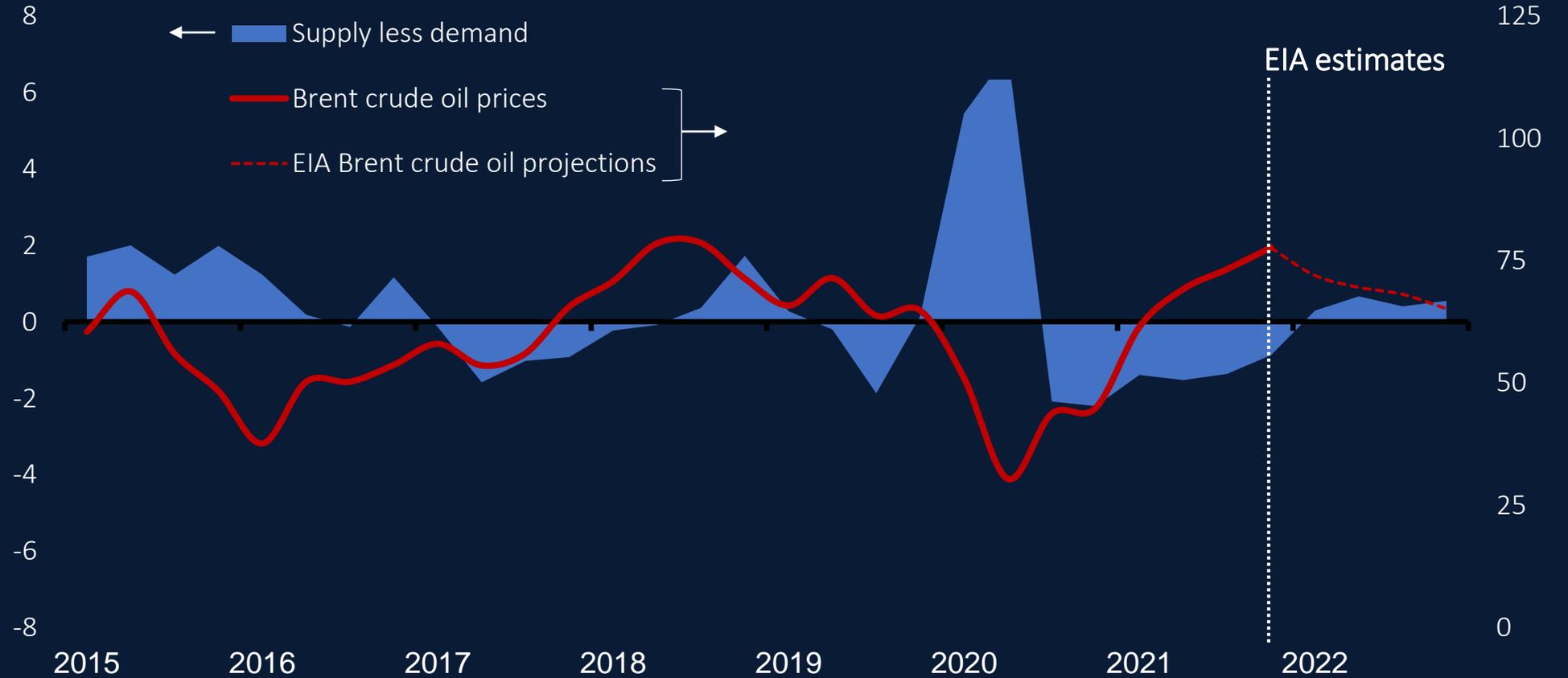
- Rest of World
- Middle East (ex Saudi Arabia)
- Saudi Arabia
- Africa
- Russia & Caspian
- U.S.

# EIA expects that global oil demand could continue to exceed supply through early 2022 and support oil prices of \$70 per barrel in 2022



## EIA global supply/demand and Brent price estimates as of November 2021

Million barrels per day (mb/d)

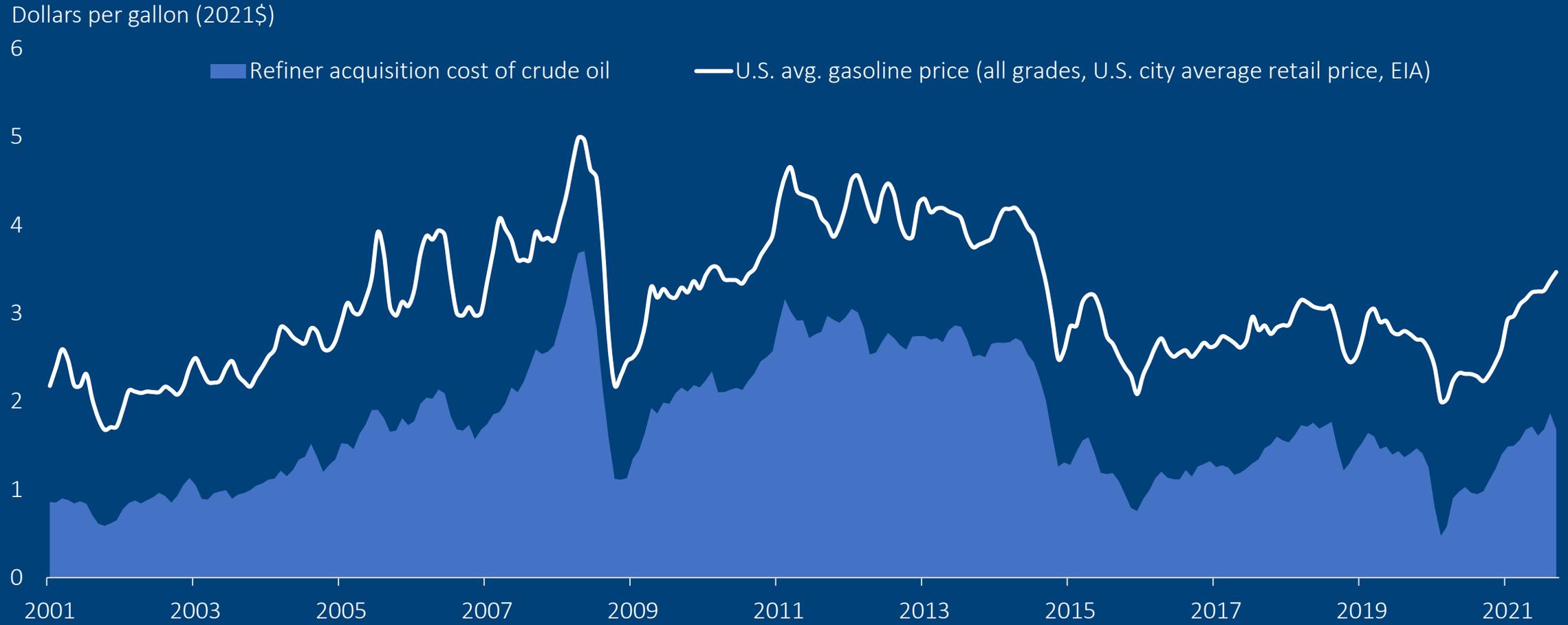


sources: EIA STEO (Dec. 2021); CME Group; Bloomberg; Bureau of Labor Statistics

# Gasoline prices have historically reflected those of oil, which remained relatively low since 2015 but recently climbed to their highest levels since 2014



EIA-reported refiner acquisition cost of crude oil prices versus U.S. average gasoline prices, adjusted for price inflation



sources: Bloomberg; AAA; Bureau of Labor Statistics; API Team analysis

# In 2022, U.S. liquid fuels consumption could exceed its 2019 levels per EIA



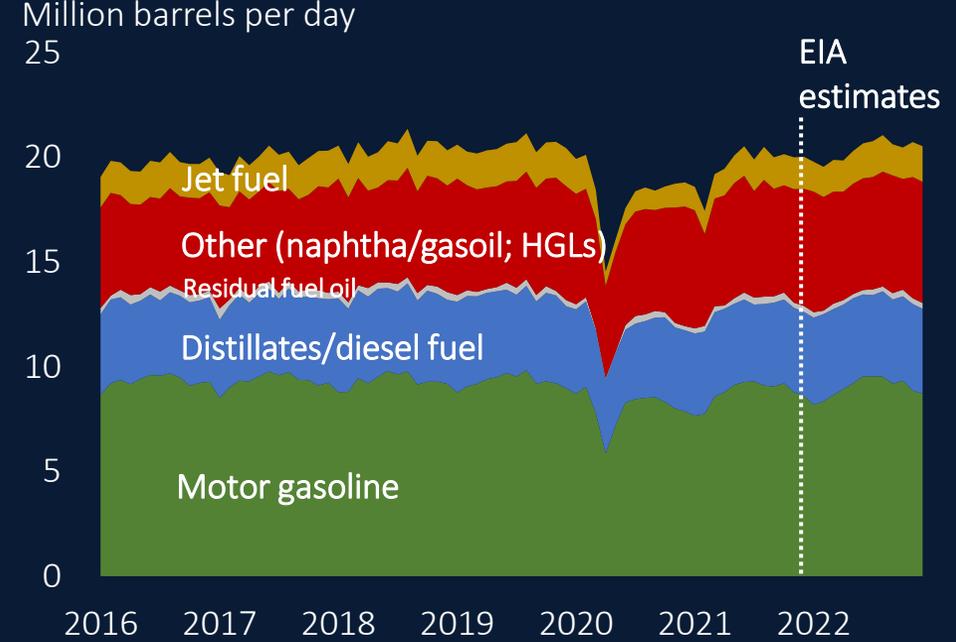
- High-frequency indicators of transportation and industrial activity have continued to improve through Nov. 2021
- EIA projects U.S. oil consumption growth of 3.9% (0.8 mb/d) to 20.4 mb/d in 2022, led by jet fuel, gasoline and other oils

## Refined product key U.S. demand indicators, y/y%



sources: Apple; DAT Trendlines; FlightRadar24; TSA; FRB

## U.S. liquid fuel consumption by fuel

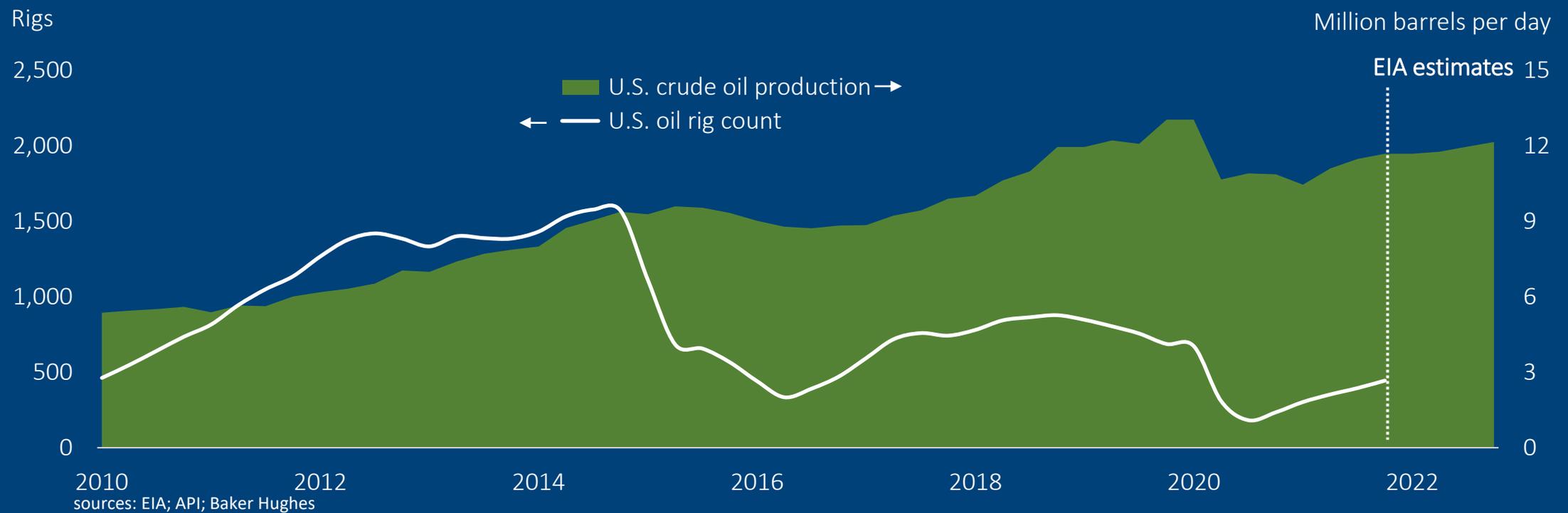




# U.S. oil production has sustained strong levels despite historically low drilling activity, and growth likely requires greater drilling activity

▶ U.S. oil drilling in Q4 2021 remained more than 30% lower than its level at the same point in 2019; this and the inventory of drilled but uncompleted wells has sustained but not grown oil production up to this point

## U.S. oil drilling and production

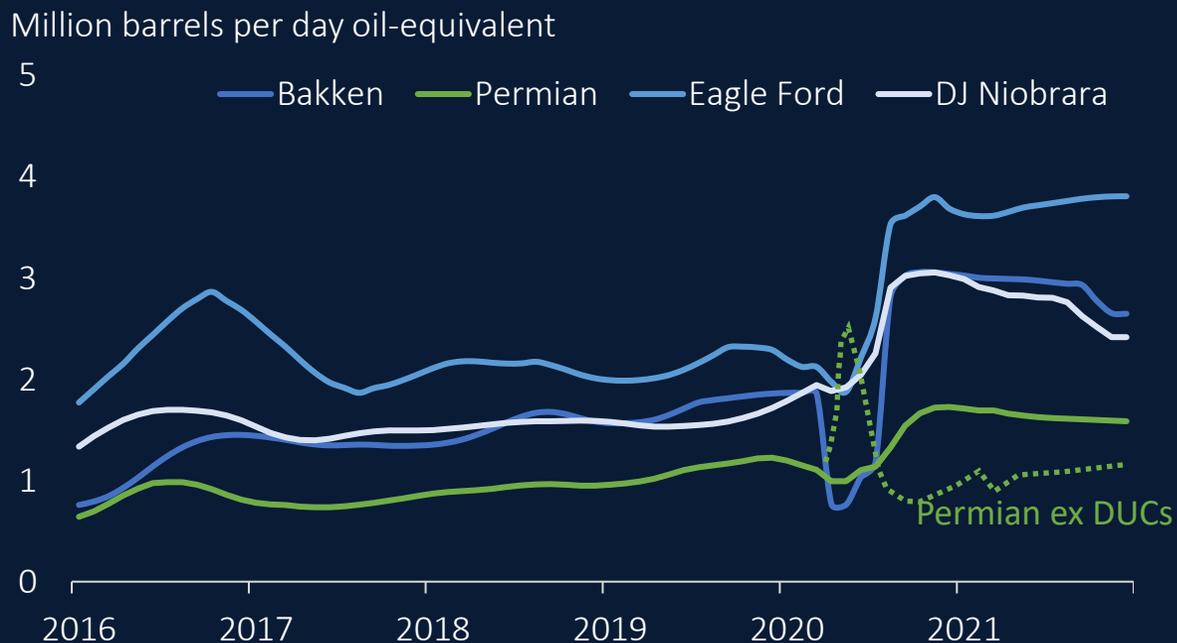




# As U.S. oil well productivity fell in Q4 2021 per EIA, and breakeven prices as estimated by BTU Analytics were mixed among regions

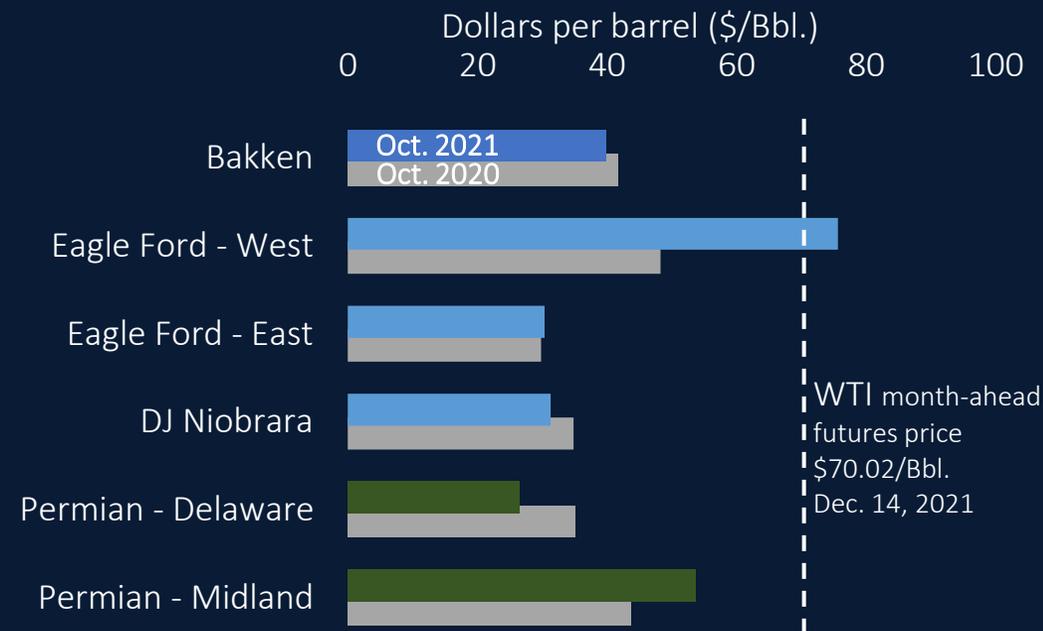
- ▶ EIA estimated oil well productivity fell in the Permian (-8% y/y), Bakken (-13% y/y) and DJ Niobrara (-20% y/y)
- ▶ BTU Analytics' estimated breakeven prices rose in three oil basins but generally remained below recent market prices

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



sources: EIA Drilling Productivity Report; Finley, M. (Oct. 2021) "U.S. Oil Productivity Is Up But Will The Numbers Last?." Rice Baker Institute.

## Oil estimated breakeven prices\*



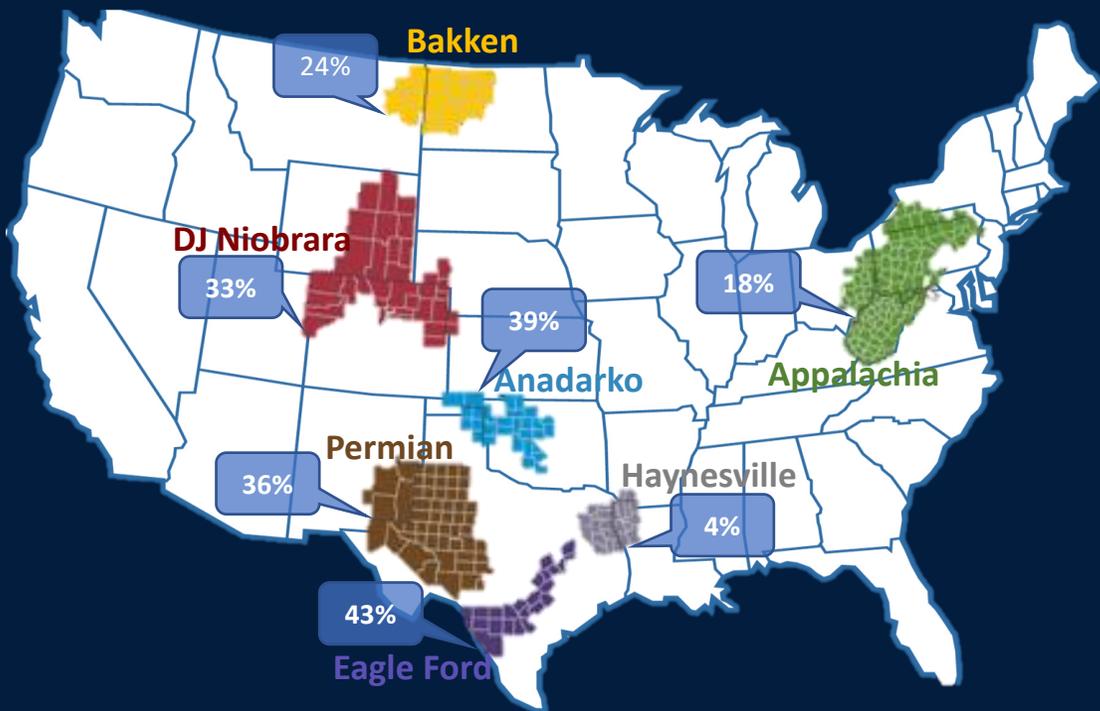
\*Half cycle breakevens assuming 10% discount factor. sources: BTU Analytics; CME Group



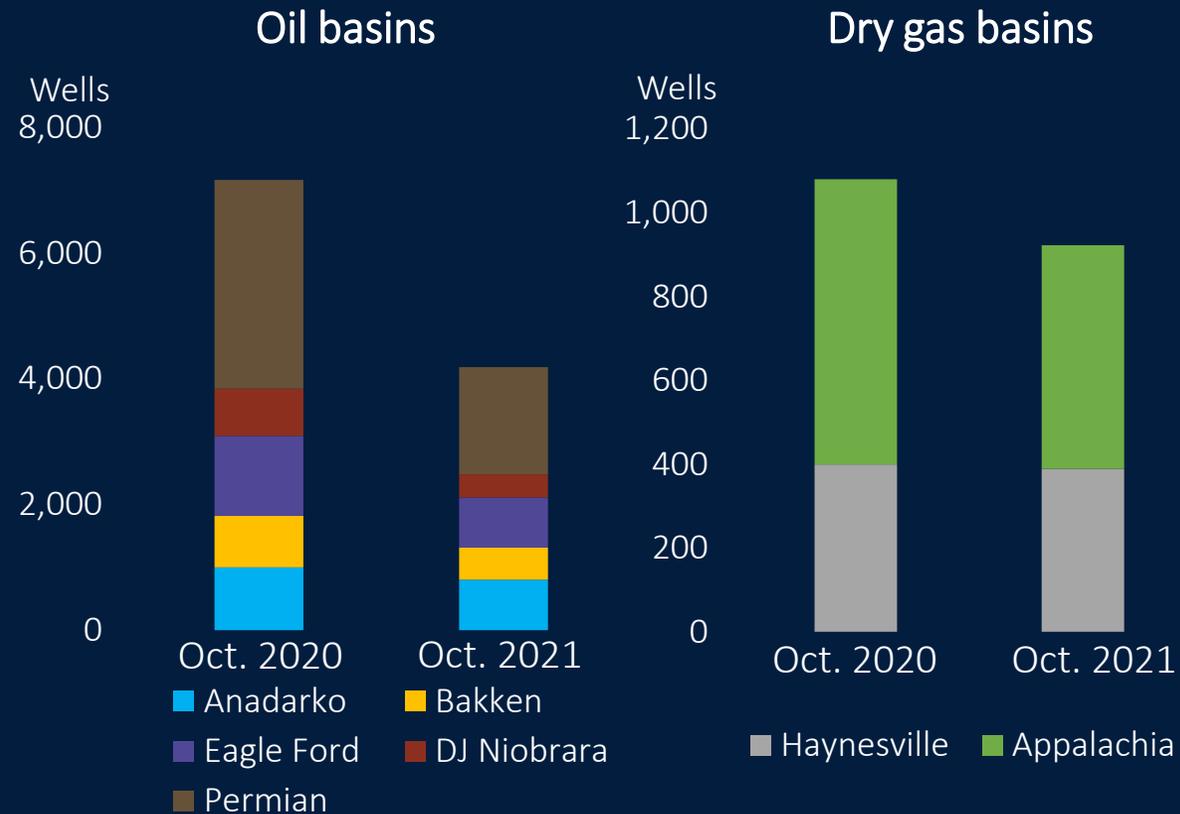
# Drilled but uncompleted wells (DUCs) have contributed significantly to Permian and other oil production, but relatively fewer remain

By contrast, natural gas drilling has not relied as heavily on DUCs, so relatively more drilling is required to achieve EIA's outlook

### Percent of 2021 oil and natural gas well completions from DUCs, by basin Oct. 2021 ytd



### Drilled by uncompleted wells, by basin



source: EIA (Nov. 2021)

# Natural Gas



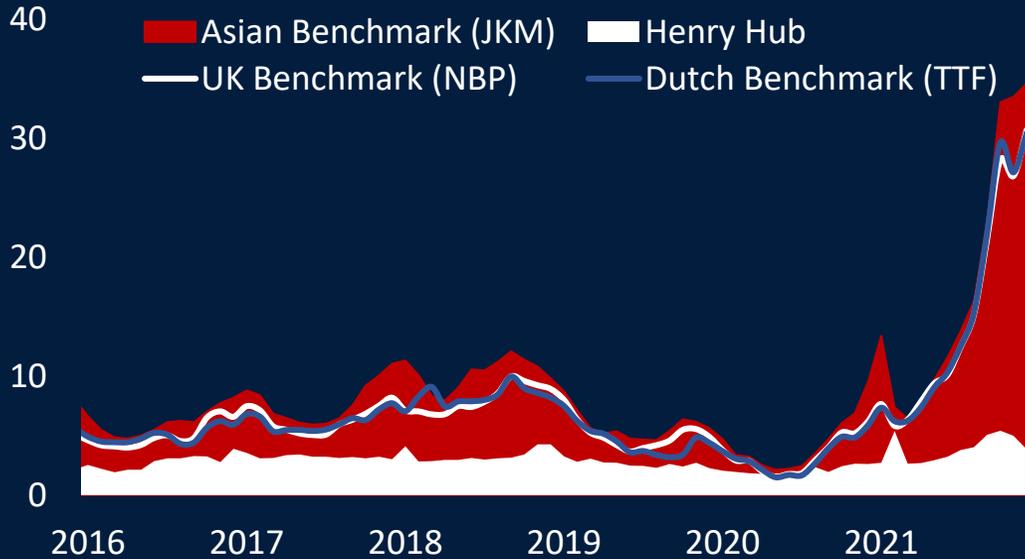
# Historically strong global natural gas prices have spurred U.S. natural gas exports



As natural gas prices in Europe and Asia rose to unprecedented levels, U.S. natural gas exports via liquefied natural gas (LNG) and pipeline have achieved record levels

## Global natural gas prices

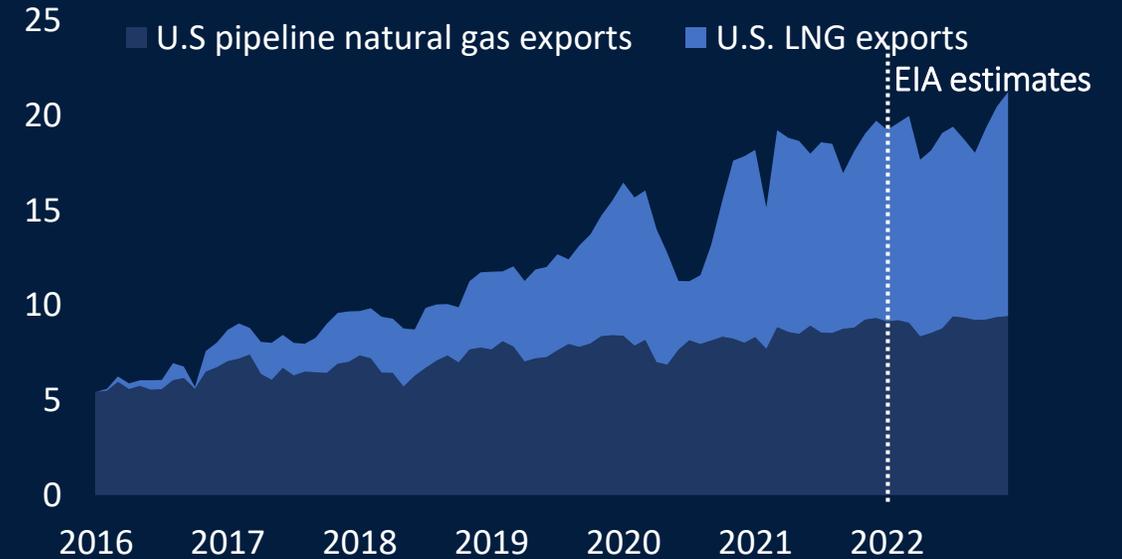
\$2021 per mmBtu, monthly



source: Bloomberg

## U.S. natural gas exports

Billion cubic feet per day

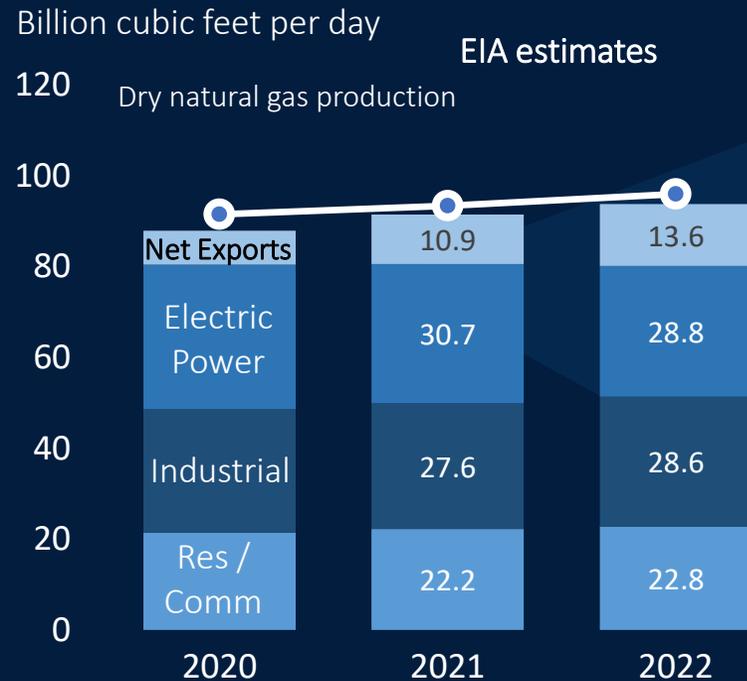


source: EIA

# EIA expects natural gas production to grow and support higher net exports but lower domestic consumption in 2022

- ▶ In 2022, EIA expects natural gas production growth of 3.9 bcf/d and 2.3 bcf/d higher net exports
- ▶ 3.3% less net electricity generation from natural gas year-to-date through November 2021, particularly across regions with strong coal availability

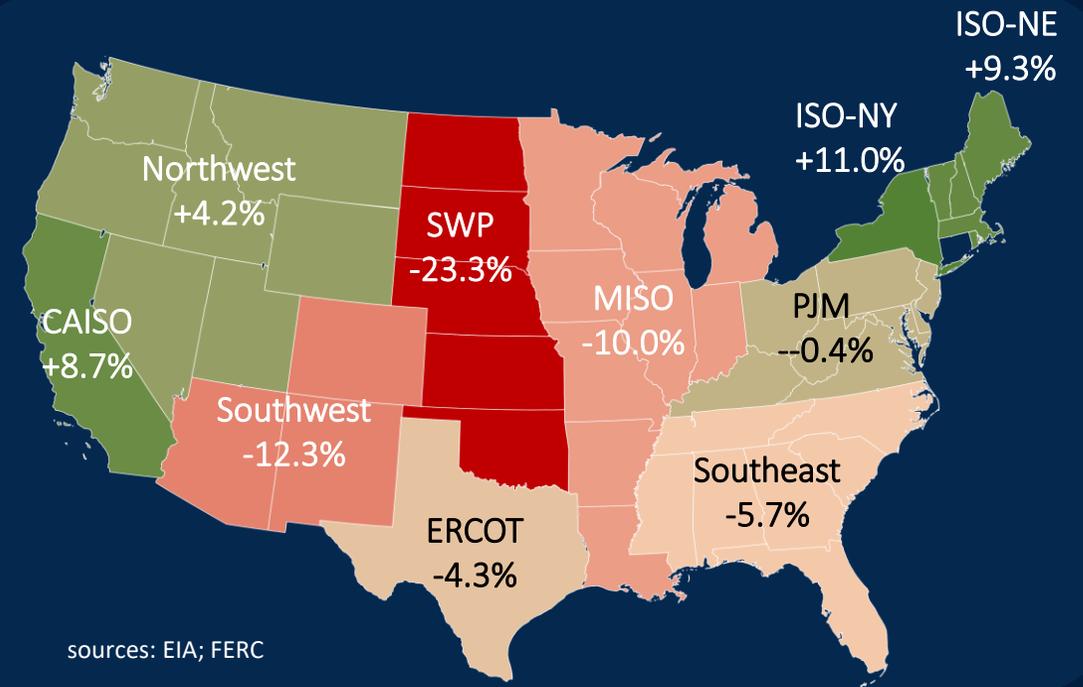
## Natural gas consumption and production by sector



source: EIA (Dec. 2021)

## 2021 U.S. power sector gas consumption

November 2021 year-to-date, year-on-year changes



sources: EIA; FERC

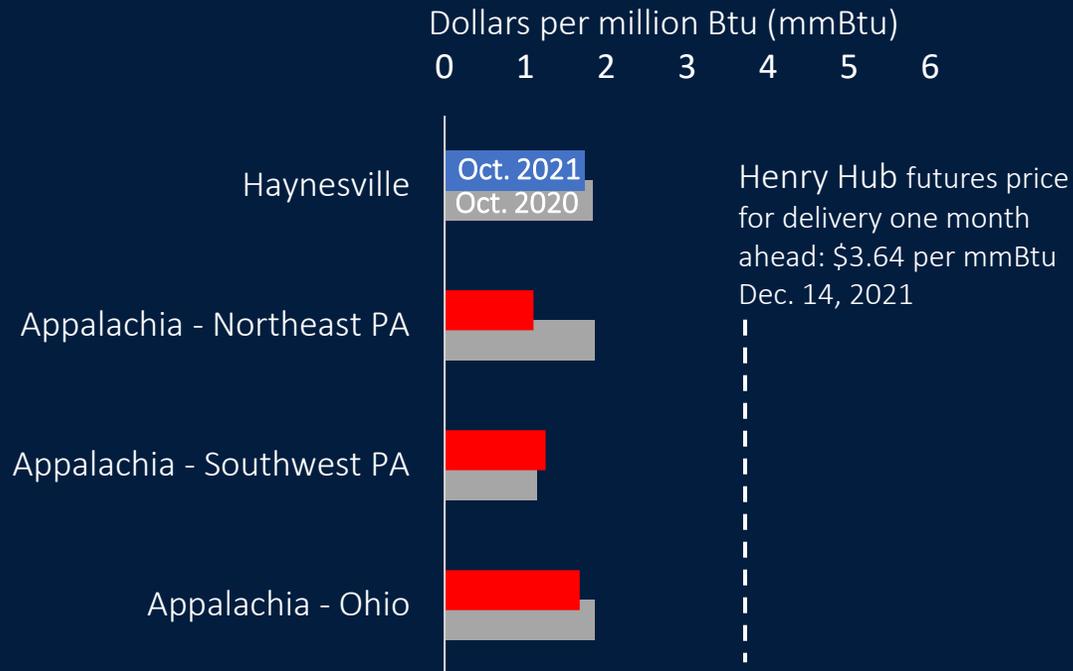
Powered by Bing  
© GeoNames

# Natural gas-dedicated drilling has sustained historically low breakeven prices and record well productivity



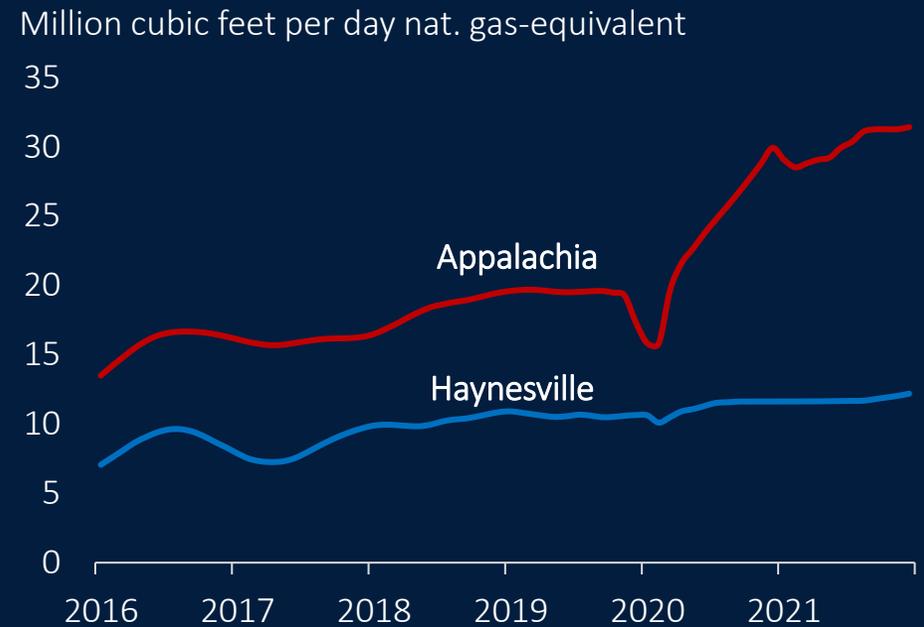
- Estimated natural gas breakeven prices remained below recent natural gas futures prices
- For dedicated dry gas drilling, producers achieved record rig productivity in Q4 2021 per EIA

## Natural gas estimated breakeven prices



\*Half cycle breakevens assuming 10% discount factor and play-specific costs  
sources: BTU Analytics; CME Group

## Natural gas well productivity – production per rig



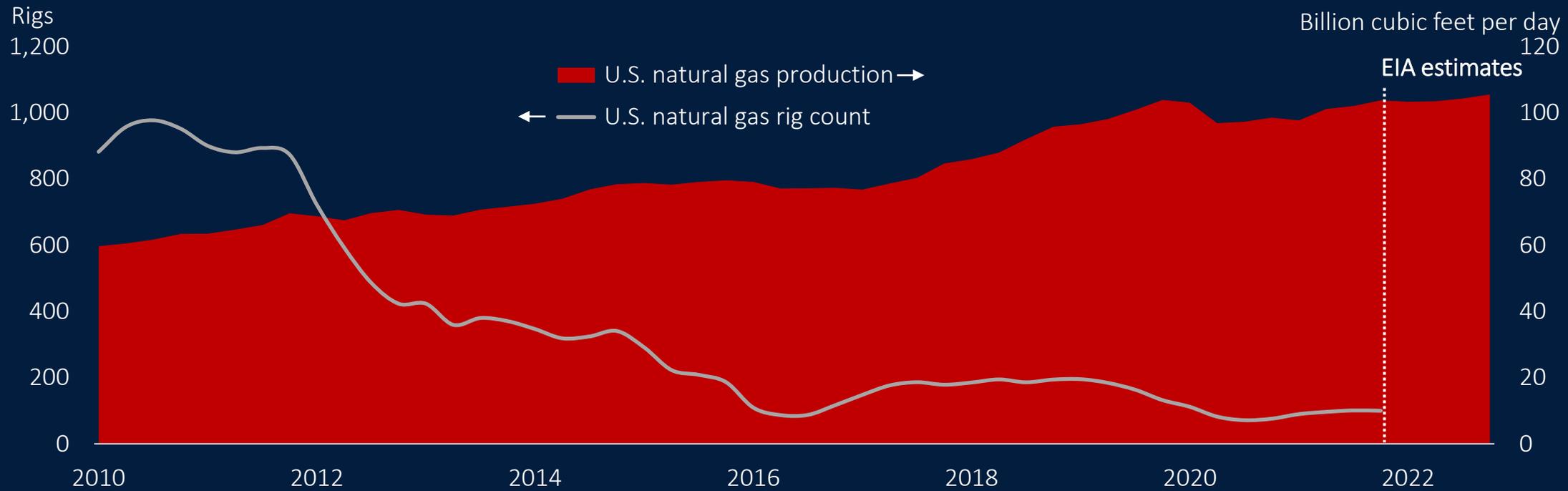
source: EIA Drilling Productivity Report



# U.S. natural gas production could be challenged to grow unless drilling activity accelerates from its historic lows

▶ U.S. natural gas marketed production rose to 103.7 bcf/d in Q4 2021 and is expected by EIA to grow in 2022 despite historically low drilling activity

## U.S. natural gas drilling and production



sources: EIA; Baker Hughes

# API economics resources available at [www.api.org](http://www.api.org)

The screenshot shows the API website homepage. At the top, the API logo and 'American Petroleum Institute' are on the left. The navigation menu includes 'Home', 'About', 'Membership', 'API Careers', 'Chief Economist' (circled in red with an arrow pointing to it), and 'Contact'. Below the navigation, there are dropdown menus for 'Natural Gas & Oil', 'Products & Services', 'Policy & Issues', 'Climate Action', and 'Blog, News & Media'. A search icon is on the right. The main banner features a photo of two workers in hard hats and safety vests, with the text 'Home / Products & Services / Statistics Reports & Surveys / API's Economic Industry Outlook'. Below the banner is the title 'API's Economic Industry Outlook' and a description: 'The API Industry Outlook, developed by API's Dean Foreman, is a quarterly report that provides natural gas and oil industry as it relates to the economies.' To the right of the main content is a sidebar with 'Read The Blog:', 'Read The News Releases:', and 'Downloads' sections. The 'Downloads' section lists several reports with file sizes. On the left side of the screenshot, there are callouts for various data visualization resources, each with a title, description, and 'Explore Visualization .url' link. A red arrow points to the 'U.S. Consumer Expenditure Burden By Income Level' callout.

**Data Visualization**

Explore API's Interactive Data Visualizations.

- Tracking U.S. Oil Demand**  
Primary monthly API data tracking refined product consumption  
[Explore Visualization .url](#)
- U.S. Consumer Expenditure Summary**  
Summarizing leading U.S. consumer expenditure categories over time  
[Explore Visualization .url](#)
- API's Distillate Economic Indicator™**  
API's proprietary Distillate Economic Indicator™ leverages refined product demand estimates to broadly track economic activity  
[Explore Visualization .url](#)
- U.S. Consumer Expenditure Flows By Income Level**  
Mapping U.S. consumer expenditure flows by income level and spending category  
[Explore Visualization .url](#)
- U.S. Consumer Expenditure Burden By Income Level**  
Measuring U.S. consumer expenditure burden by spending category and income level  
[Explore Visualization .url](#)

**Reports & Surveys**

- Weekly Statistical Bulletin
- Monthly Statistical Report
- Economic Outlook**
- Data Visualization

**Read The Blog:**  
[Chief Economist's Posts on the Energy Tomorrow blog](#)

**Read The News Releases:**  
[Chief Economist's News Releases, 2017](#)  
[Chief Economist's News Releases, 2018](#)  
[Chief Economist's News Releases, 2019](#)  
[Chief Economist's News Releases, 2020](#)

**Downloads**

- [Monthly Statistical Report](#)  
File Size: .4 MB
- [Q2 2020 Quarterly Outlook \(Jun 2020\)](#)  
File Size: 1.9 MB
- [Q3 2020 Quarterly Outlook \(Sep 2020\)](#)  
File Size: 1.9 MB
- [Q4 2020 Quarterly Outlook \(Dec 2020\)](#)  
File Size: 2.4 MB
- [Q1 2021 Quarterly Outlook \(Mar 2021\)](#)