

API Industry Outlook

Fourth Quarter 2022

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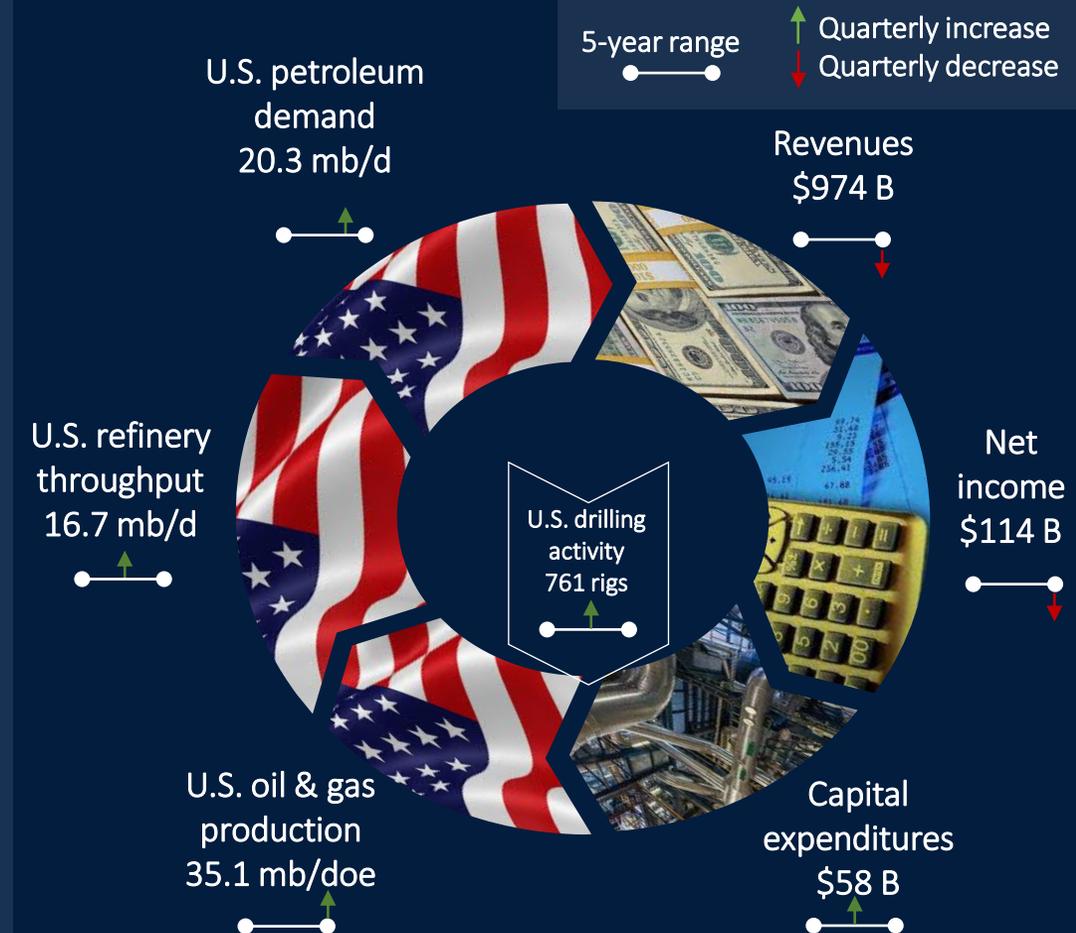
Key points

- ▶ **Economy.** IMF and consensus expectations have dropped but still imply likely higher demand for oil and natural gas in 2023 and 2024
 - Weakened and uneven consumer conditions have prompted concerns for a recession in 2023, led by the U.S. and Europe
 - Strong U.S. dollar appreciation has added stress to many emerging market economies
 - Global population milestone of 8.0 billion amplifies energy, food, environmental issues
- ▶ **Oil.** Strong global demand coupled with supply challenges has been partially assuaged by releases of government-controlled reserves, which are slated to end
 - Global oil demand of 100.5 mb/d in 2023 and 102.2 mb/d in 2024 expected by EIA
 - Global oil drilling fell by 12.1% in Dec. 2022 compared with Dec. 2019 per Baker Hughes
 - U.S. oil-directed rig productivity fell by nearly 20% y/y in Oct. per EIA, while the historical production boost from drilled but uncompleted wells (DUCs) disappeared
 - U.S. oil production resilience requires greater participation by CO, NM, ND, and WY
 - With continued work force, supply chain, financial, and policy headwinds, [IEA](#), the [KSA](#), and [OPEC](#) have said that global oil investment and spare capacity could struggle to meet demand in 2023
- ▶ **Natural gas.** Resilient U.S. natural gas production could serve as a model for oil
 - Record U.S. natural gas production in Q4 2022 with growth led by Louisiana and Texas
 - U.S. spot prices fell despite record-high natural gas exports

Third Quarter 2022 by the numbers

Benchmark price averages

Brent crude oil: \$99.07 per barrel WTI crude oil: \$91.63 per barrel
NGL composite: \$10.89 per mmBtu Nat. gas Henry Hub: \$7.98 per mmBtu



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

Implications

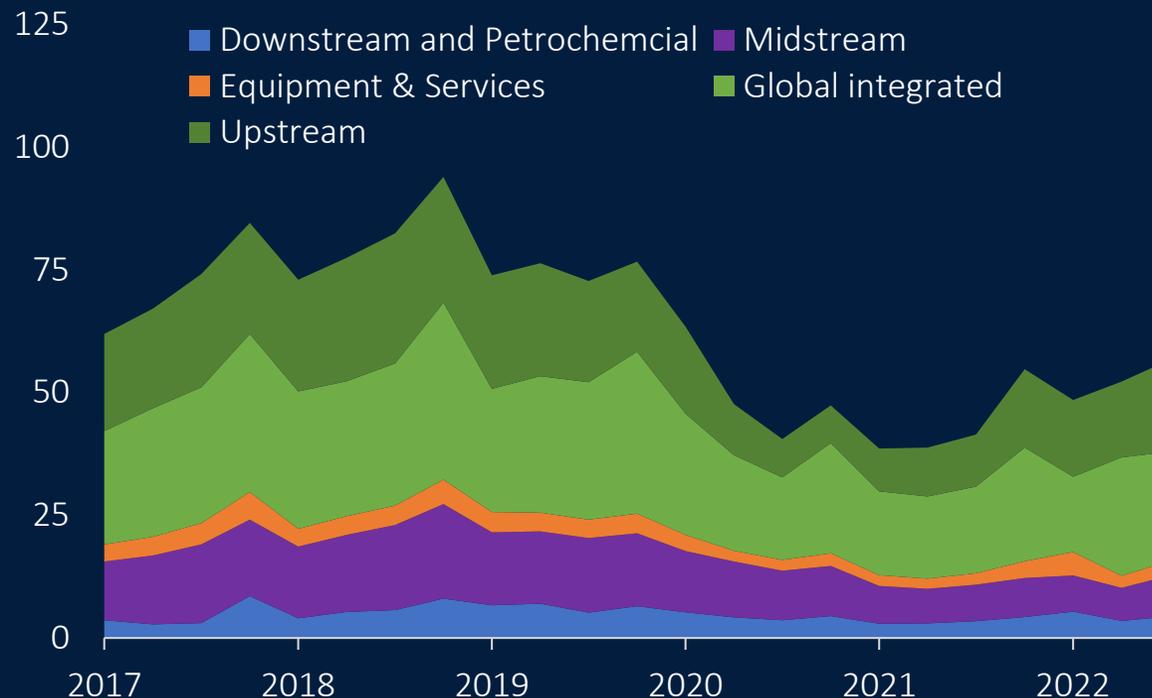
- ▶ Energy demand appears likely to grow despite diminished economic growth expectations
- ▶ U.S. oil investment and drilling have risen, but more is needed to increase production in light of cost escalation, lower rig productivity, and reduced contributions from previously drilled but uncompleted wells
- ▶ Although work force, supply chain, financial, and policy issues have affected U.S. production, natural gas ' recent resiliency shows how quickly progress can be made with access to resources, an enabling business environment, and strong supporting infrastructure
- ▶ Distillates inventories have recovered towards their historical norms, but factors that could affect inventories include supply disruptions and winter weather severity
- ▶ While focus has remained on commodity prices, fostering infrastructure investments and project execution is critical
- ▶ Energy policymakers have a dilemma with solid oil demand but the lowest strategic petroleum reserves in nearly 40 years – little margin for error

In Q3 2022, the natural gas and oil industry invested \$58.0 billion, and the backlog of U.S. projects under construction increased

- ▶ The industry invested \$58.0 billion in Q3 2022, compared with \$41.1 billion in Q3 2021
- ▶ Across the energy value chain, API is monitoring 141 oil & gas-related projects currently under construction worth \$218 billion

Capital expenditures by industry segment

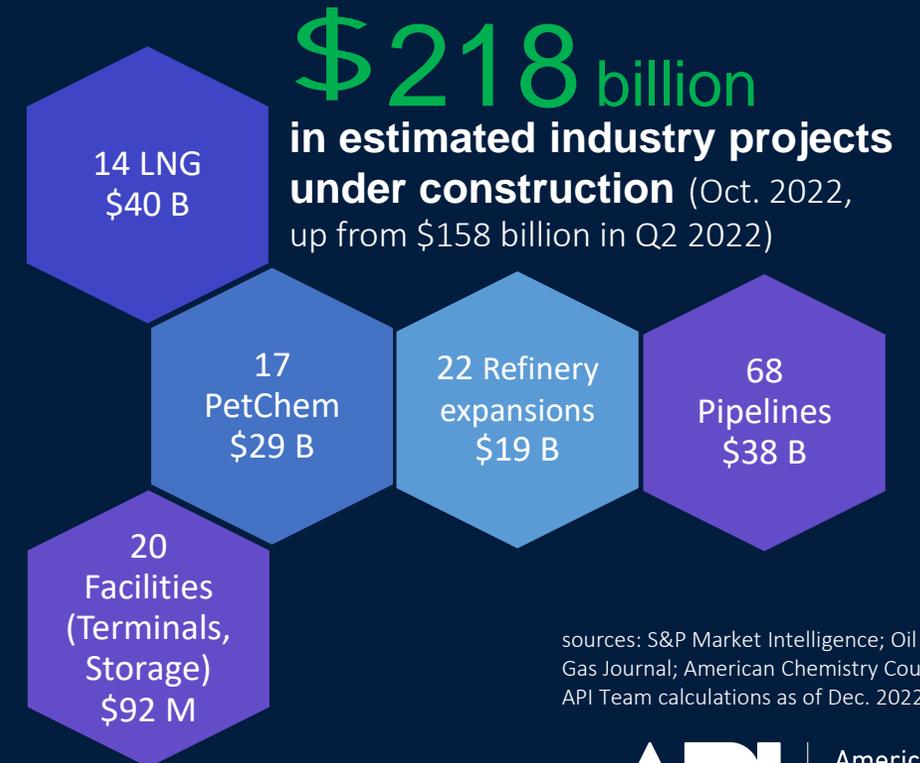
Billion dollars (2022\$)



* All other oil & gas industry companies

sources: company financial reports to the U.S. Securities and Exchange Commission; BLS

Current backlog of U.S. energy infrastructure investments



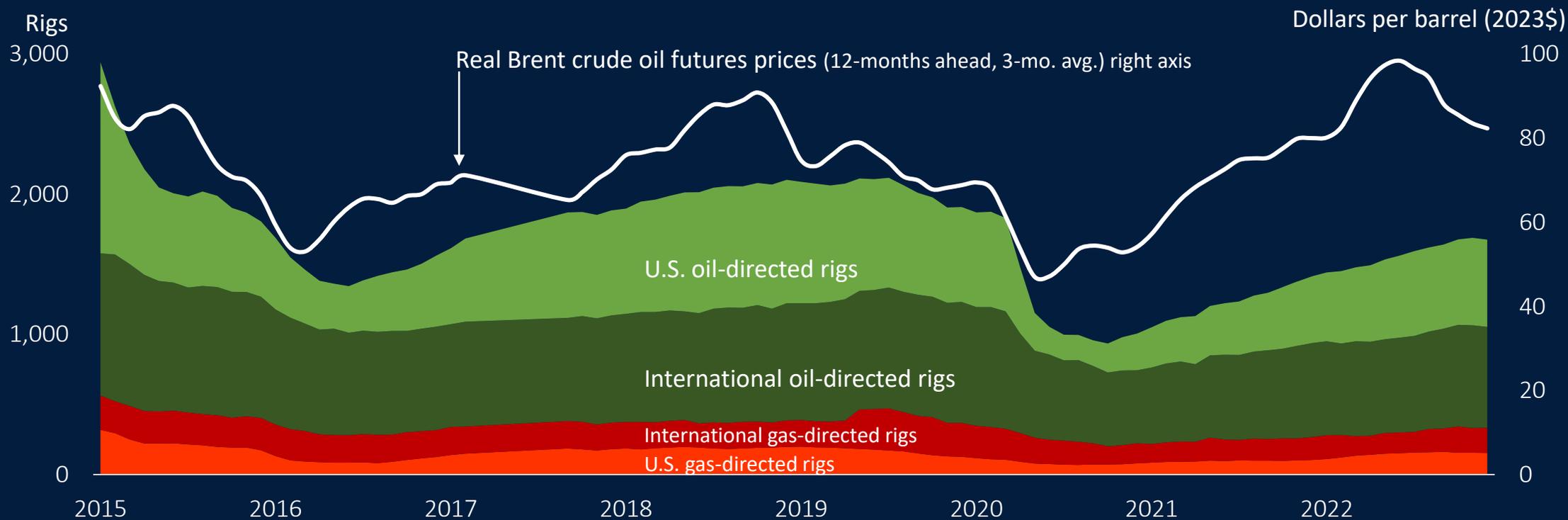
sources: S&P Market Intelligence; Oil & Gas Journal; American Chemistry Council; API Team calculations as of Dec. 2022



Global oil drilling activity has continued to lag its 2019 levels, but U.S. natural gas drilling surpassed its pre-pandemic levels in Q4 2022

- ▶ In Dec. 2022, global oil & gas drilling activity was down by 12.1% compared with Dec. 2019. Changes vs. 2019 by segment:
 - U.S. oil drilling (-8.0%)
 - U.S. natural gas drilling (+20.7%)
 - International oil drilling (-16.5%)
 - International natural gas drilling (-25.7%)

Global oil drilling activity and Brent crude oil prices, monthly



sources: Baker Hughes; CME Group; Bureau of Labor Statistics

Global Economy



What we're watching now



- Key themes: 1) the path of global GDP growth; 2) a milestone for global population; 3) monitoring the U.S. dollar's global role; and 3) IEA oil market projections that require 1.9 mb/d more oil next year amid historically low inventory levels

World Economic Outlook

- Global GDP growth could slow to 2.7% y/y in 2023 from 3.2% y/y in 2022
- Risks: Monetary policy errors; sovereign debt; U.S. dollar appreciation; China's real estate crisis
- Opportunities: Reforms to lower inflation, improve productivity, and easing supply constraints

[International Monetary Fund, Oct. 2022](#)

Day of Eight Billion

- On Nov. 15, 2022, the world's population was projected to have reached 8.0 billion people
- The UN sees economic progress as advancing human development but amplifying food, energy, and environmental challenges

[United Nations, Nov. 2022](#)

Revisiting the International Role of the U.S. Dollar

- The international role of the U.S. dollar (USD) has remained unrivalled, with at least 85% of trading in currency spot, forward and swap markets features
- USD dominance is due to its 1) use as a vehicle currency for foreign exchange transactions; 2) footprint in offshore funding markets, where market participants raise debt; and 3) popularity in international trade and global payments
- Consequently, USD appreciation to historically strong levels this year has compounded inflationary pressures for economies that purchase commodities in USD and have intertwined supply chains

[Bank for International Settlements, Dec. 2022](#)

Oil Market Report, January 2023

- World oil demand growth of 1.9 mb/d in 2023
- “Two wild cards dominate the 2023 oil market outlook: Russia and China. This year could see oil demand rise by 1.9 mb/d to reach 101.7 mb/d, the highest ever, tightening the balances as Russian supply slows under the full impact of sanctions”
- “World oil supply growth in 2023 is set to slow to 1 mb/d...The US ranks as the world's leading source of supply growth and, along with Canada, Brazil and Guyana”
- “The well-supplied oil balance at the start of 2023 could quickly tighten however as western sanctions impact Russian exports. Product markets, especially diesel, are most at risk just as demand growth recovers”

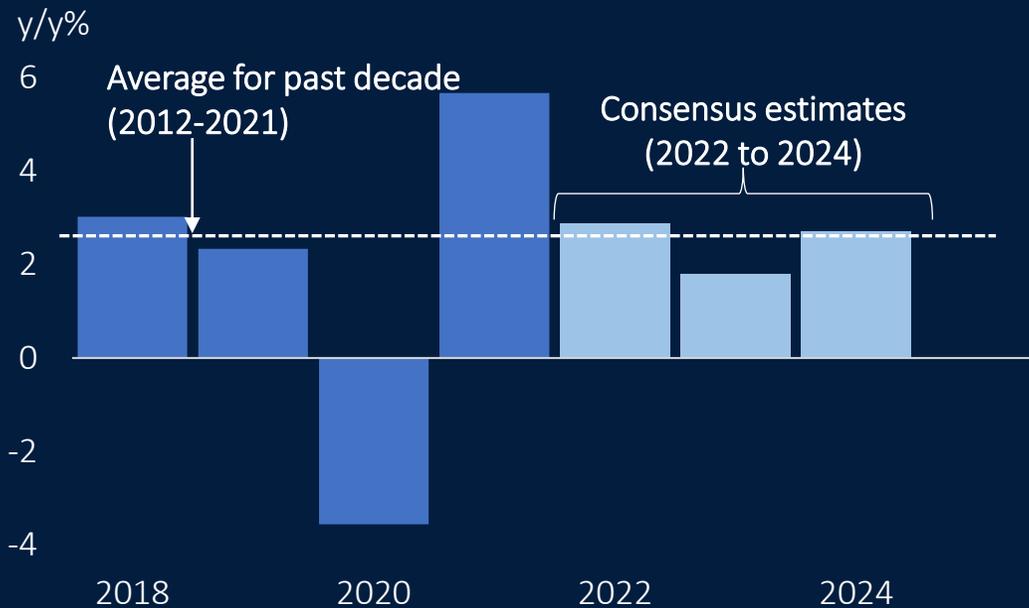
[International Energy Agency, Jan. 2023](#)

Despite solid industrial activities, the economic consensus expects global GDP growth to slow in 2023, largely due to tighter monetary policies

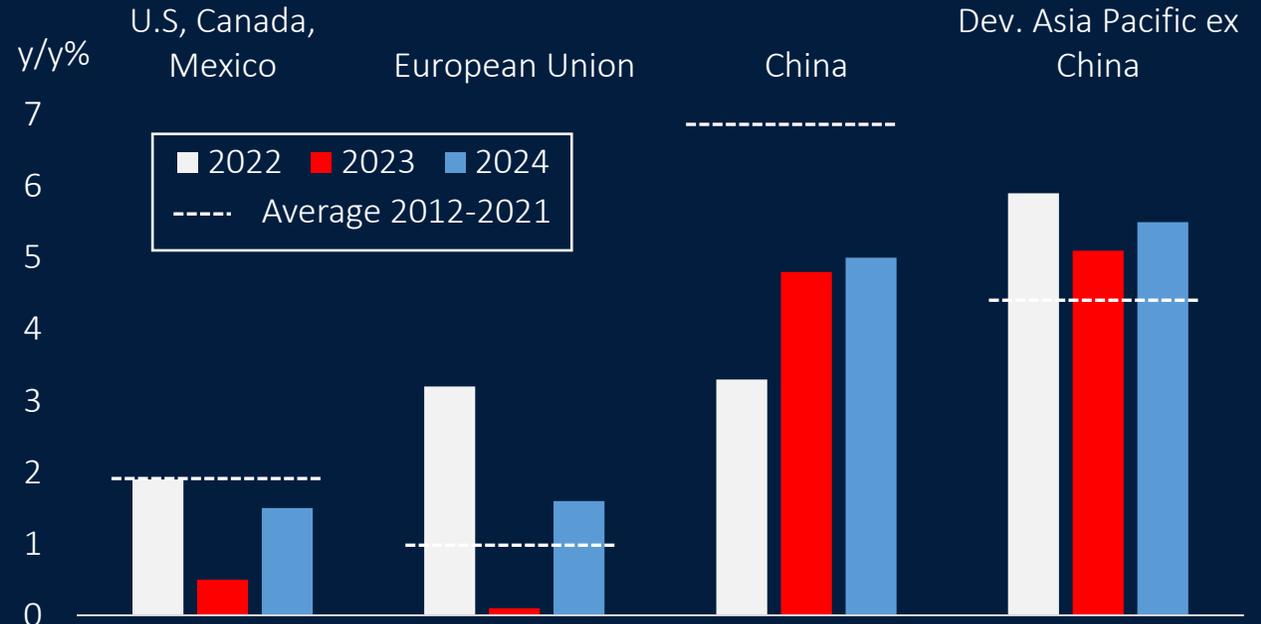


- ▶ Global GDP growth expectations have fallen to 1.8% y/y for 2023 but could rebound to its decade average rate in 2024
- ▶ Economic growth in China and emerging Asia economies is a key uncertainty

Global real GDP growth and consensus estimates*



Real GDP growth by region



* Market exchange rate basis aggregated for 204 countries, compiled Dec. 2022
sources: IMF; World Bank; Bloomberg; API Team calculations

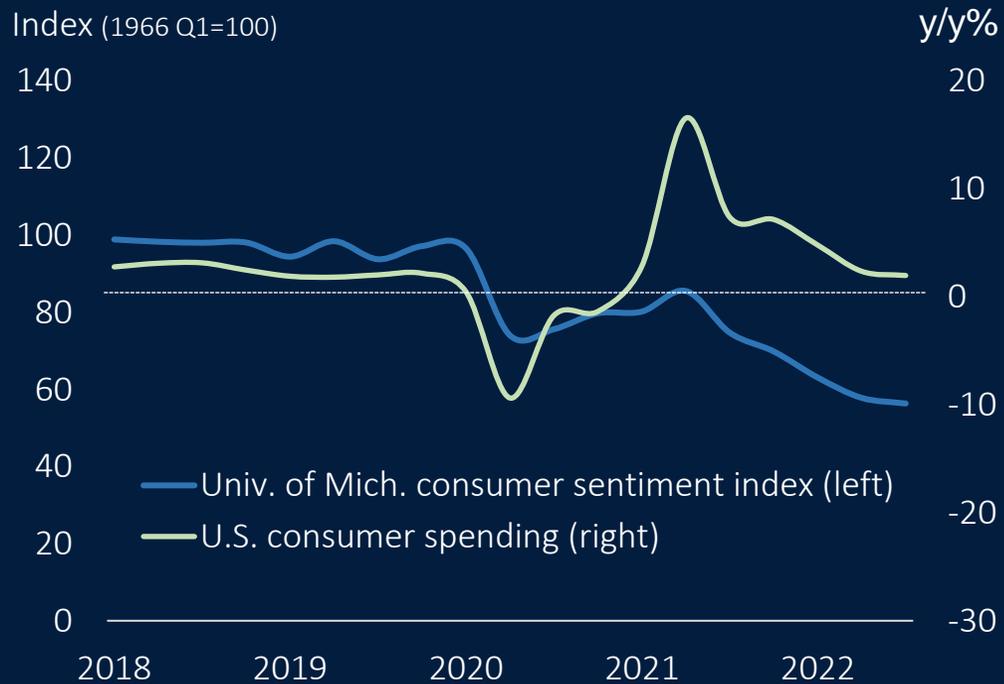
Leading economic indicators showed relative U.S. weakness but China rebound



- ▶ U.S. consumer sentiment recently fell to historic lows, which indicated potential weakness in consumer spending, per the Univ. of Michigan's survey
- ▶ China's GDP growth historically been driven by industrial production (and exports), and an indicator of production – the composite purchasing managers' index – recently improved

Key leading indicators, GDP drivers, and real growth in the U.S. and China

United States: Consumer sentiment vs. spending



China: Purchasing Managers' Index vs. industrial production



sources: BEA; OECD; Univ. of Michigan; China Federation of Logistics and Purchasing

U.S. consumer health: diminished savings did not result in marked debt problems through Q3 2022



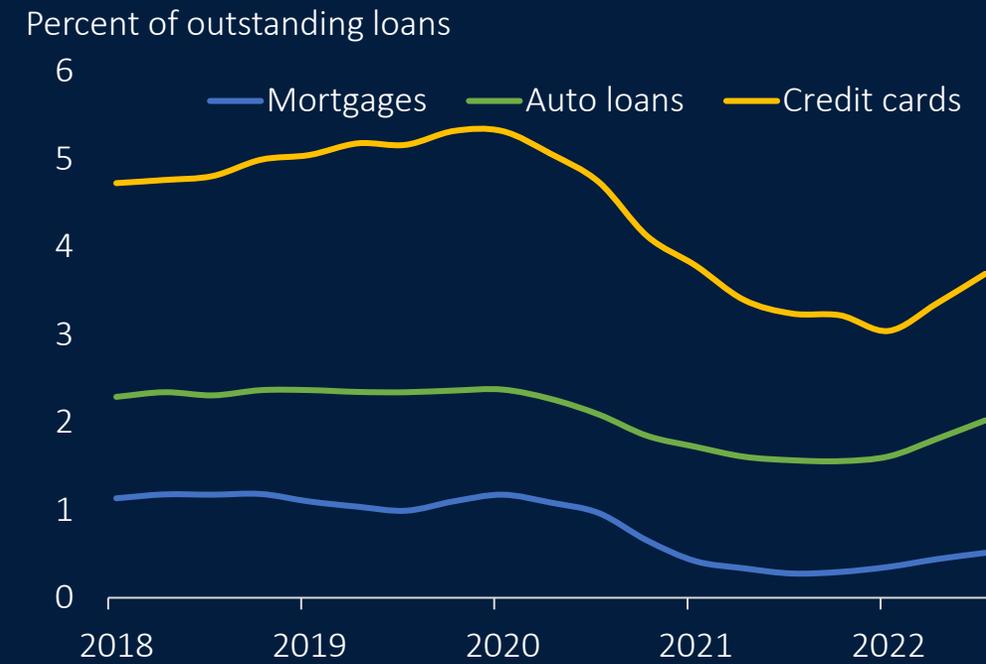
- ▶ The personal savings rate fell to 3.3% in Q3 2022, its lowest since 2010 and just below its minimum of the Great Financial Crisis in 2008-2009
- ▶ Loan delinquencies rose in Q3 2022 but remained historically low

Personal saving as a percent of personal income



source: BEA

Loan delinquencies of 90+ days, by type



sources: New York Fed Consumer Credit Panel/Equifax

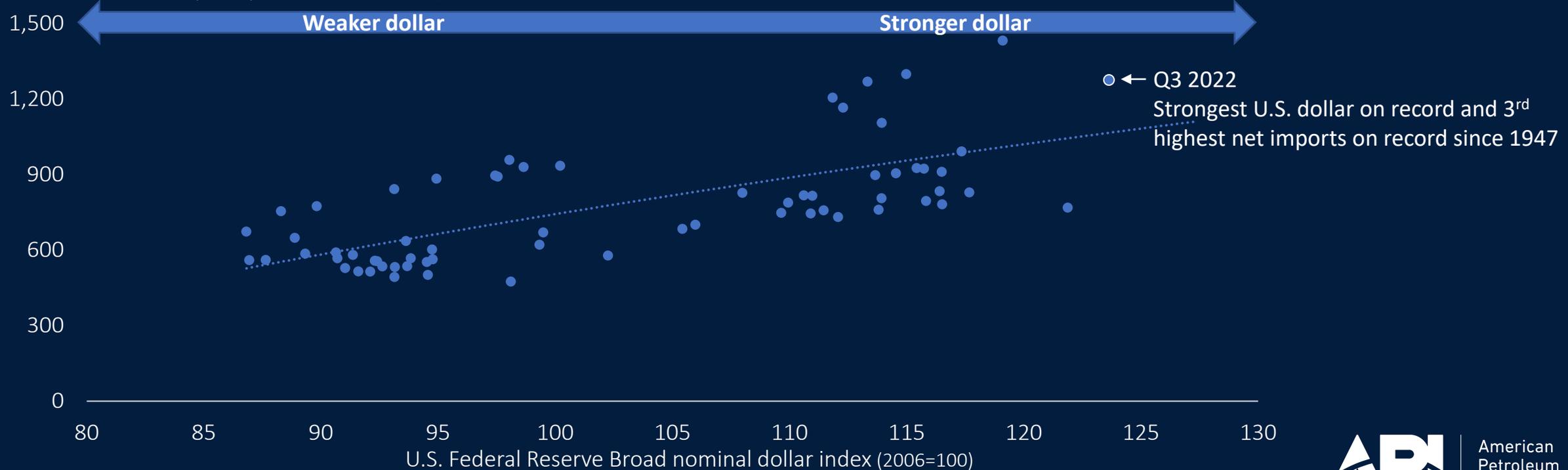
Strong U.S. dollar appreciation has fueled a record trade imbalance



- ▶ With Fed Funds rate increases so far this year, the U.S. dollar appreciated to record-high levels despite the U.S. having been a petroleum net exporter through the first 11 months of 2022
- ▶ U.S. dollar appreciation makes U.S. goods and services imports less expensive and exports less globally competitive, which have historically corresponded with higher U.S. net imports, including a record \$1.5 trillion in Q1 2022 that remained at \$1.3 in Q3 2022

U.S. net imports of goods and services vs. the U.S. dollar's foreign exchange rate with its trading partners, Jan. 2006- Sep. 2022

Billions of chained (2012) dollars, seasonally adjusted at annual rates



sources: Federal Reserve Board; Bureau of Economic Analysis

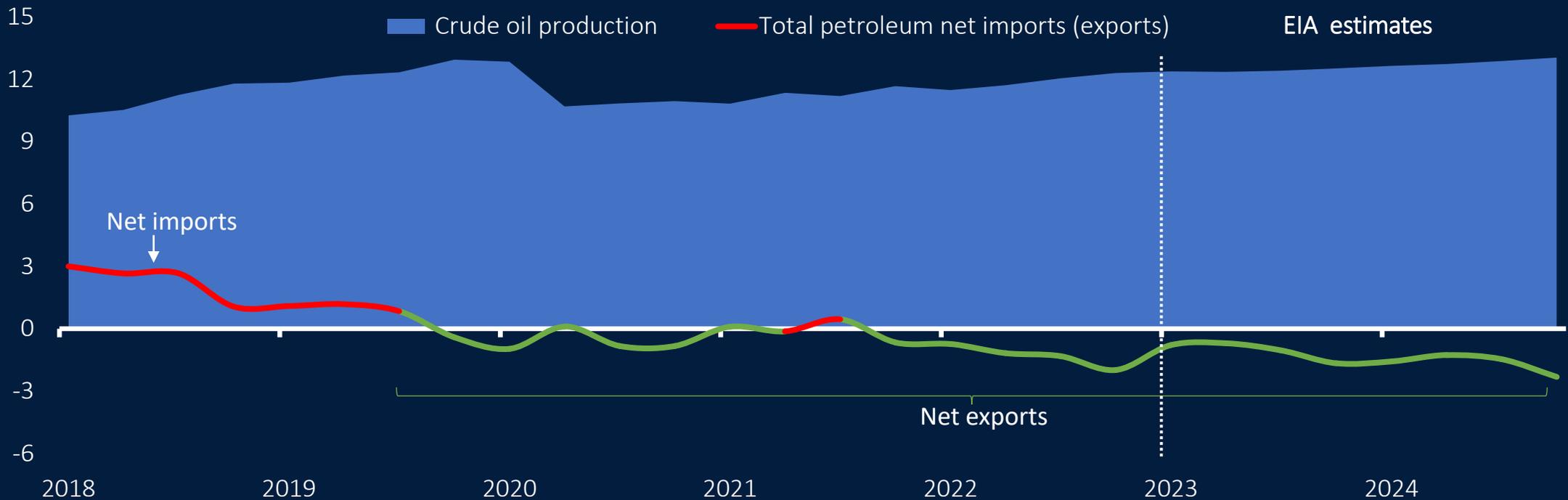


U.S. petroleum net exports set new records in Q4 2022, which EIA expects to ease in 2023 amid modest projected production growth

- ▶ U.S. petroleum net imports (crude oil and refined products) have historically fallen as domestic production grew, but achieved record exports in 2022 despite production that remained 1.0 mb/d below its highest levels
- ▶ EIA projects U.S. crude oil production to decline in Q1 2023 but rebound over the second half of the year, supporting continued net exports in 2023 at lower levels than have occurred in 2022

U.S. crude oil production versus the total petroleum trade balance

Million barrels per day



sources: EIA, API MSR™

Oil Markets



Global oil demand could near its record high in 2023 and set a new record high in 2024 per EIA



▶ EIA expects record-tying global oil demand 100.5 mb/d in 2023 and 102.2 mb/d in 2024

Global oil demand and GDP

Million barrels per day

110

100

90

80

70

40

50

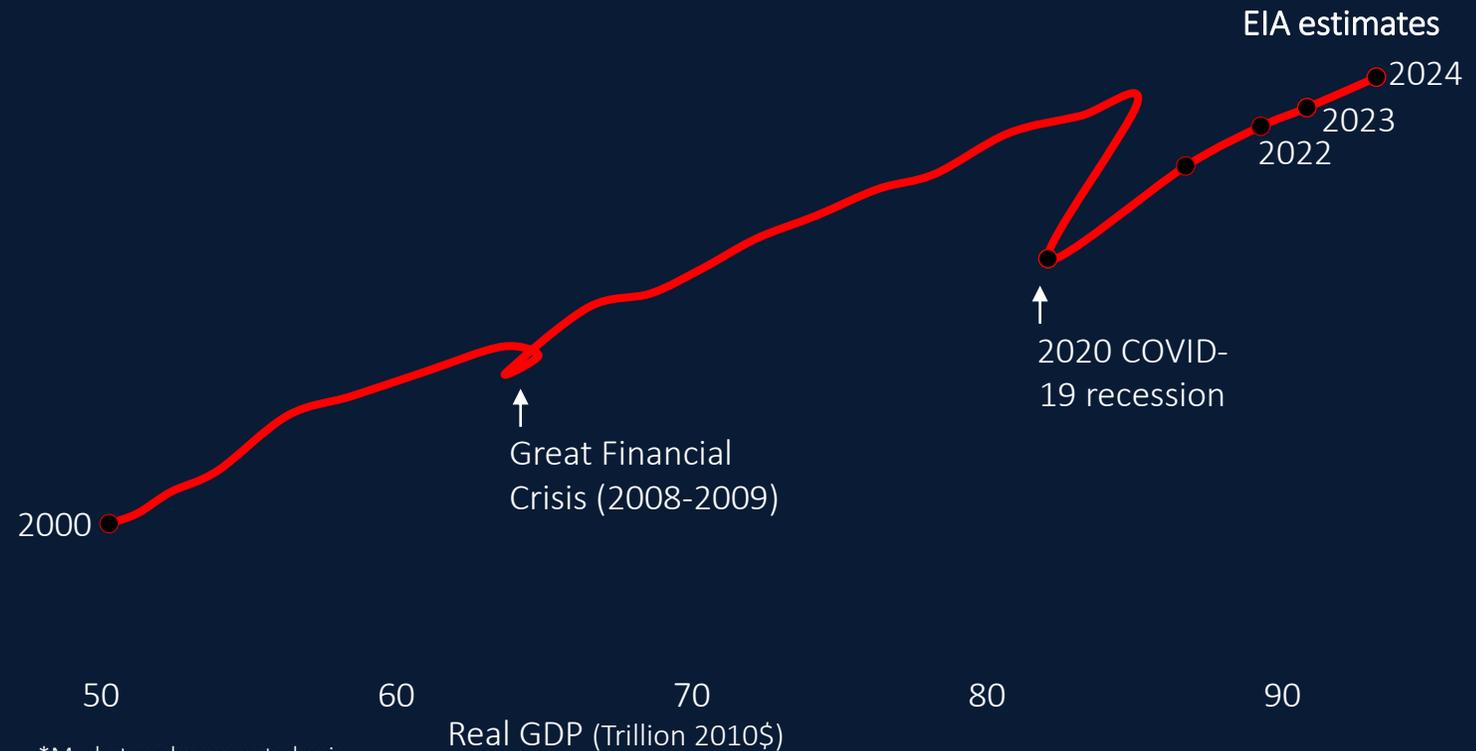
60

70

80

90

100



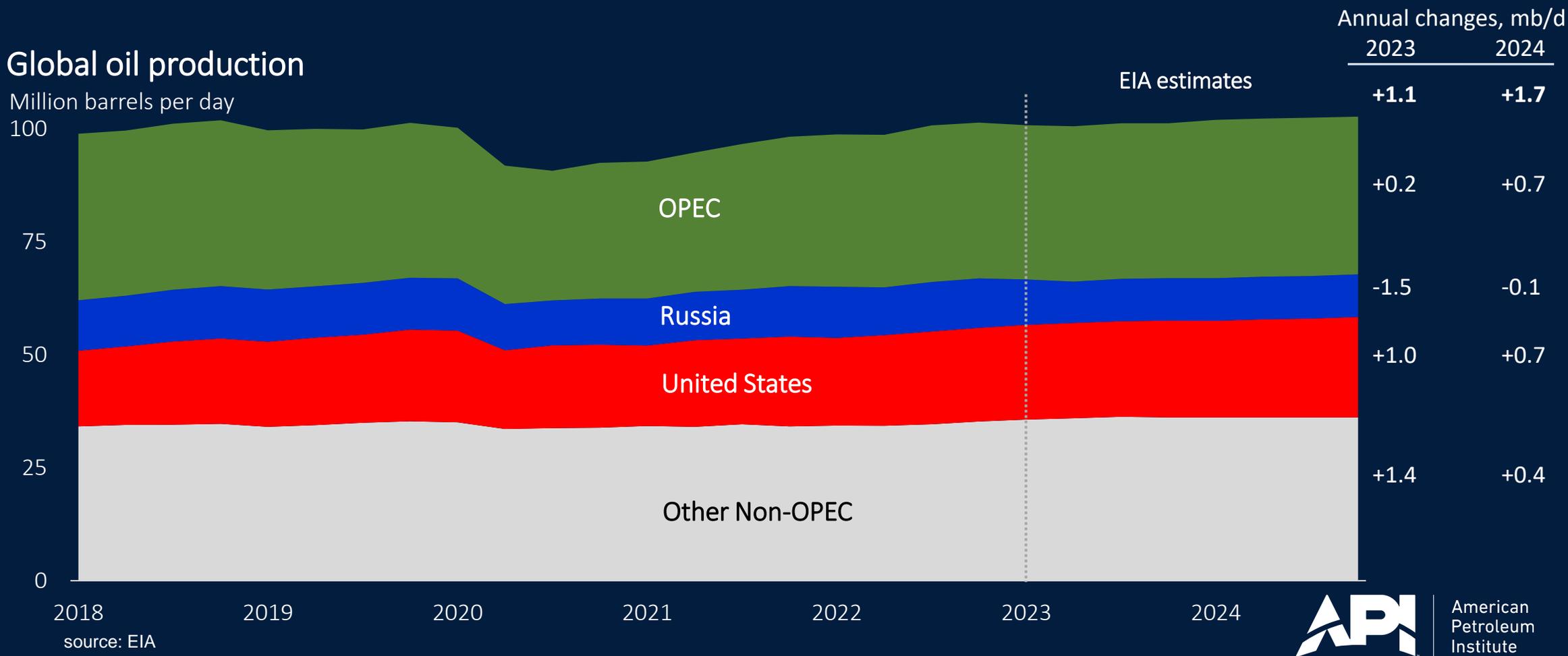
*Market exchange rate basis

sources: EIA; IMF; API Team calculations (Jan. 2023)



EIA projects U.S. and other non-OPEC oil production growth of 1.1 mb/d in 2023 and 1.7 mb/d in 2024 could be needed to balance global markets

▶ The supply projections by EIA should be interpreted as amounts needed to balance global markets in their view

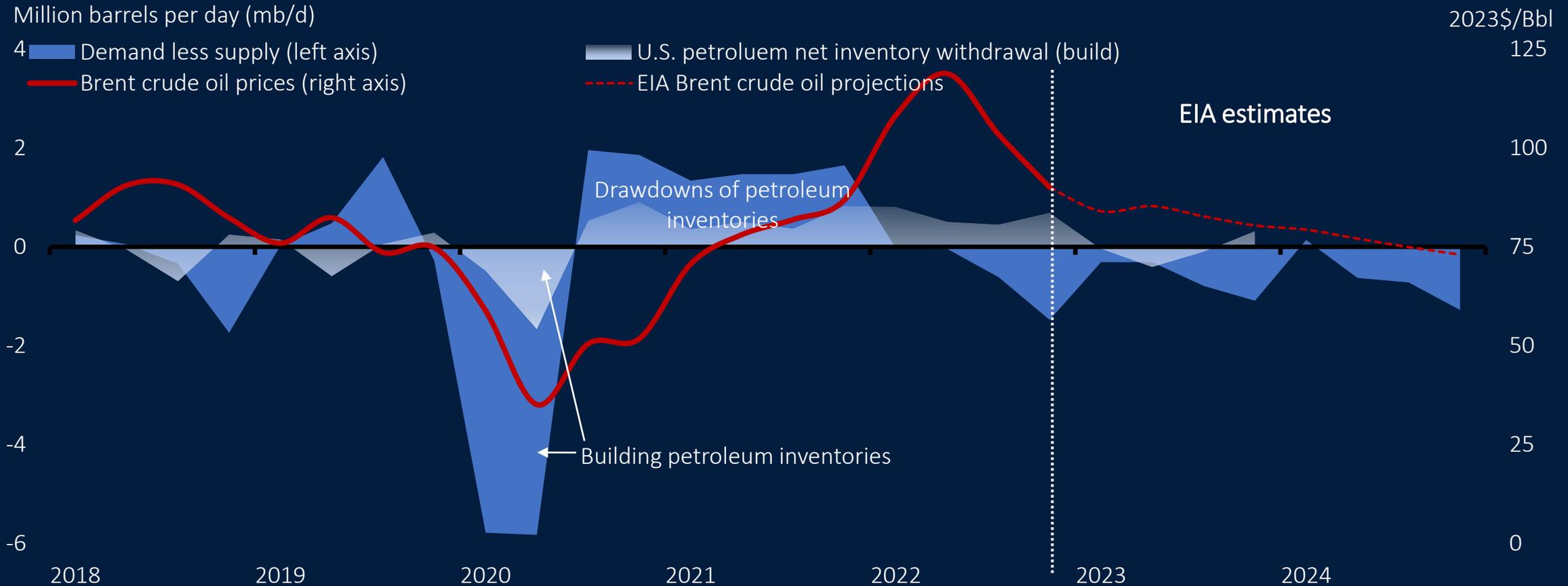




EIA expects the global oil prices of \$83 per barrel in 2023 and \$78 per barrel in 2024

After 10 consecutive quarters of U.S. petroleum inventory drawdowns averaging 0.6 mb/d, EIA projects market balance in Q1 2023 followed by a surplus with stock building of +0.4 mb/d in Q2 2023

EIA global demand/supply and Brent price estimates as of January 2023



sources: EIA; CME Group; Bureau of Labor Statistics

U.S. liquid fuels consumption could near record levels in 2023 and 2024 per EIA

- ▶ High-frequency indicators of transportation and industrial activity showed continued growth
- ▶ EIA projects U.S. annual oil consumption growth of 0.8% y/y in 2023 and 0.9% y/y in 2024

U.S. demand indicators, y/y%



Total flights

Dec. 2022 vs. Dec. 2021

+1.2%



Plastics & rubber

Oct. 2022 vs. Oct. 2021

+0.7%



Manufacturing

Q4 2022 vs. Q4 2021

+1.0%



Vehicle miles traveled

Nov ytd 2022 vs. Nov. ytd 2021

+1.2%



DAT spot truck posts

Dec. 2022 vs. Dec 2021

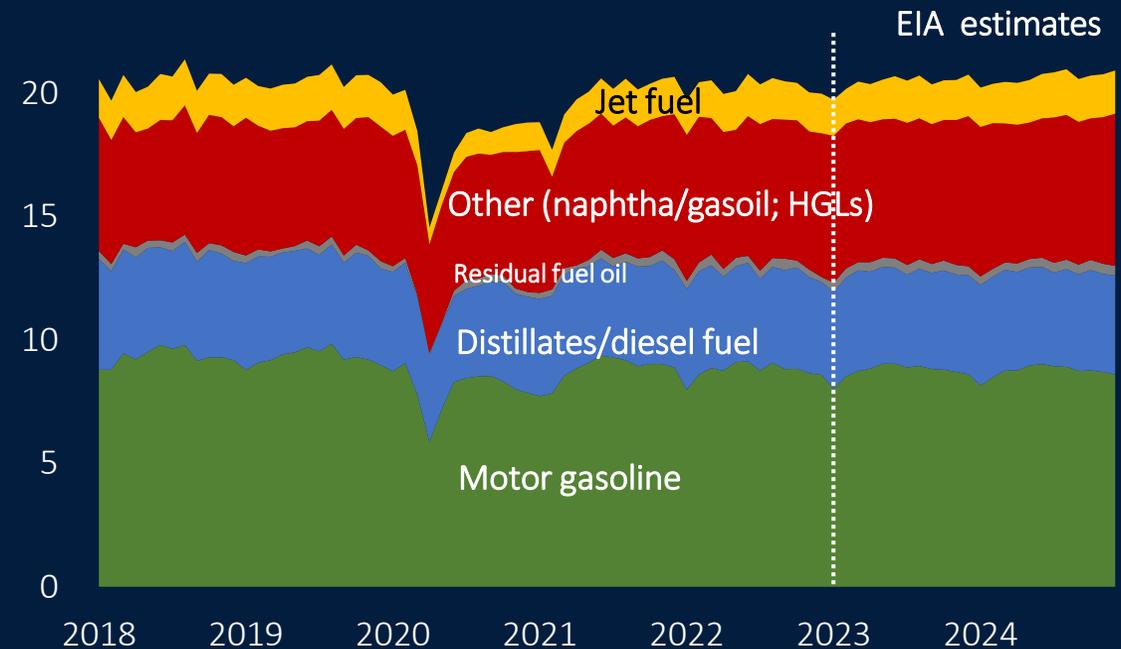
+13.0%

sources: [FlightRadar24](#); [FRB](#); [FHA](#); [DAT Trendlines](#)

U.S. liquid fuel consumption by fuel

Million barrels per day

25



sources: EIA; API

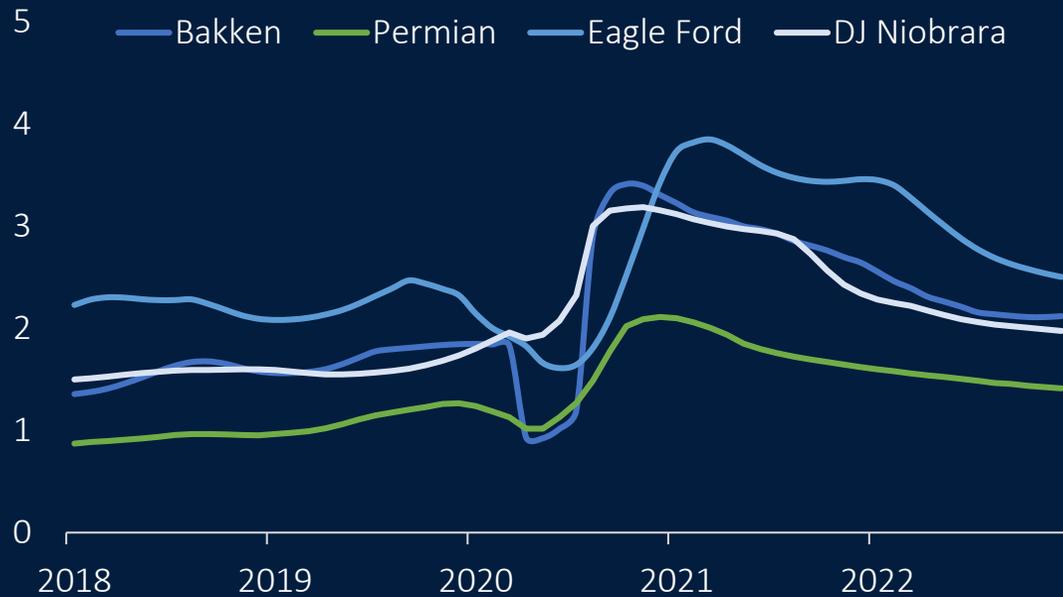
Oil and natural gas rig productivity has decreased by EIA estimates



- ▶ EIA estimated oil well productivity fell in the Permian (-13% y/y), Bakken (-22% y/y) and DJ Niobrara (-19% y/y) as of Q4 2022
- ▶ For dedicated dry gas drilling, rig productivity slipped 15% y/y in Q4 2022 as drilling activity expanded to record levels per EIA

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

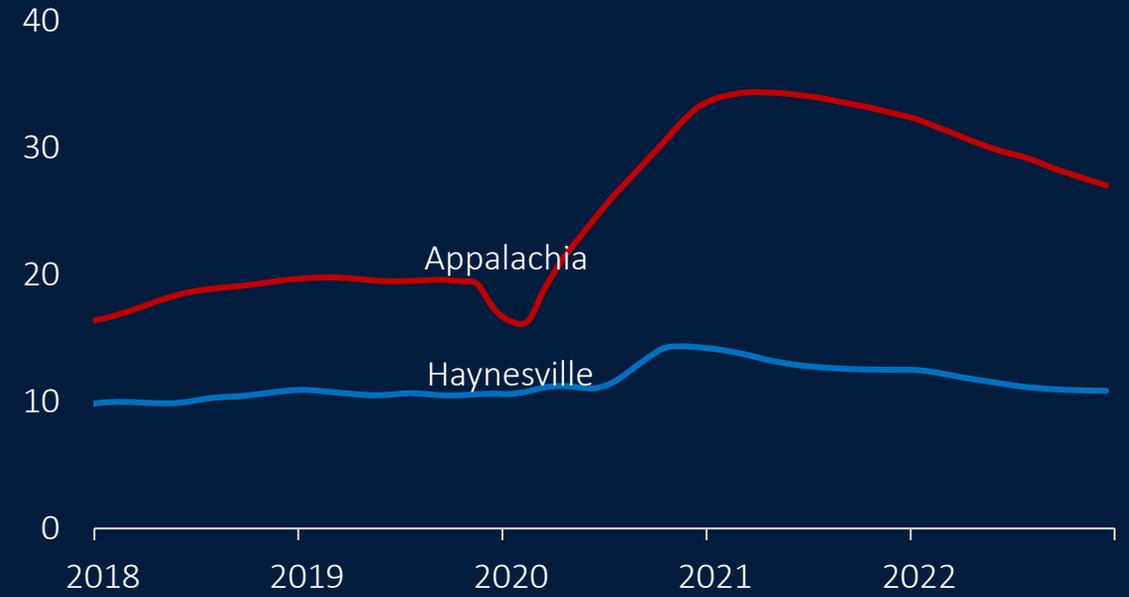
Thousand barrels per day oil-equivalent



source: EIA Drilling Productivity Report (Jan. 2023)

Natural gas well productivity – production per rig

Million cubic feet per day nat. gas-equivalent



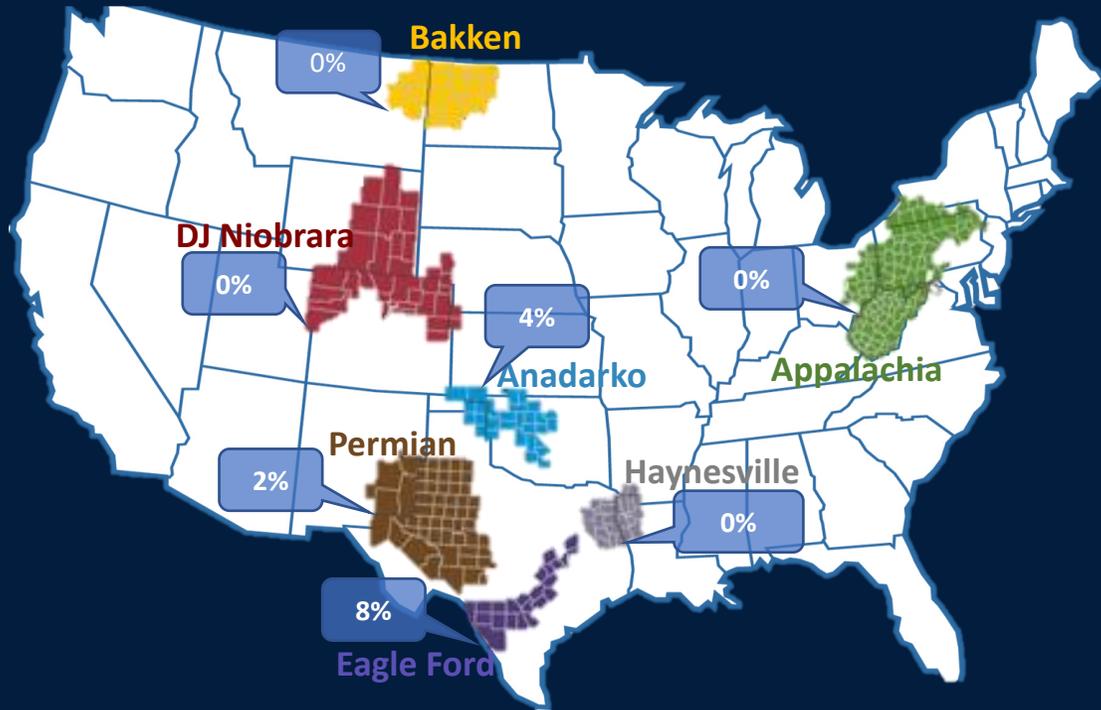
source: EIA Drilling Productivity Report (Jan. 2023)



The historic tailwind for U.S. oil and natural gas production from previously drilled but uncompleted wells (DUCs) all but disappeared in Q4 2022

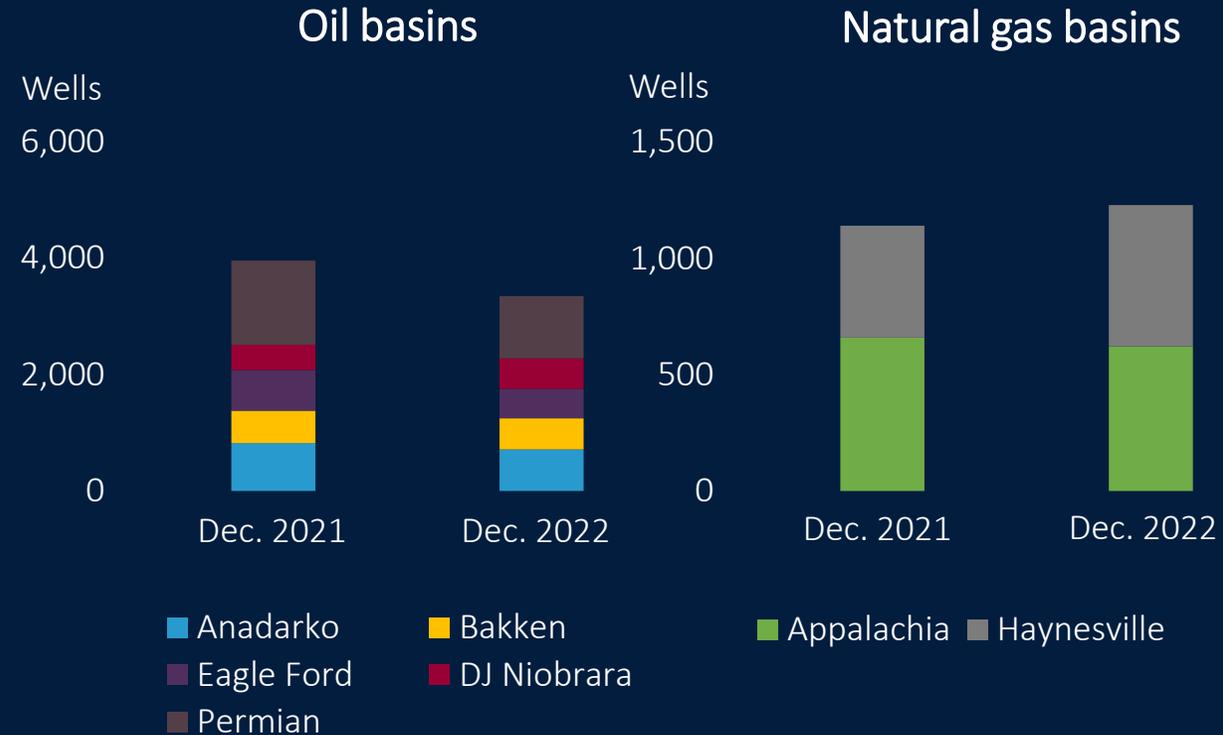
- ▶ In 2021, 30% of U.S. well completions were from wells that were previously drilled but uncompleted (EIA)
- ▶ In Q4 2022, DUCs contributed negligibly to U.S. well completions per EIA

U.S. oil and natural gas well completions from DUCs, by basin in December 2022



source: EIA

Drilled by uncompleted wells, by basin

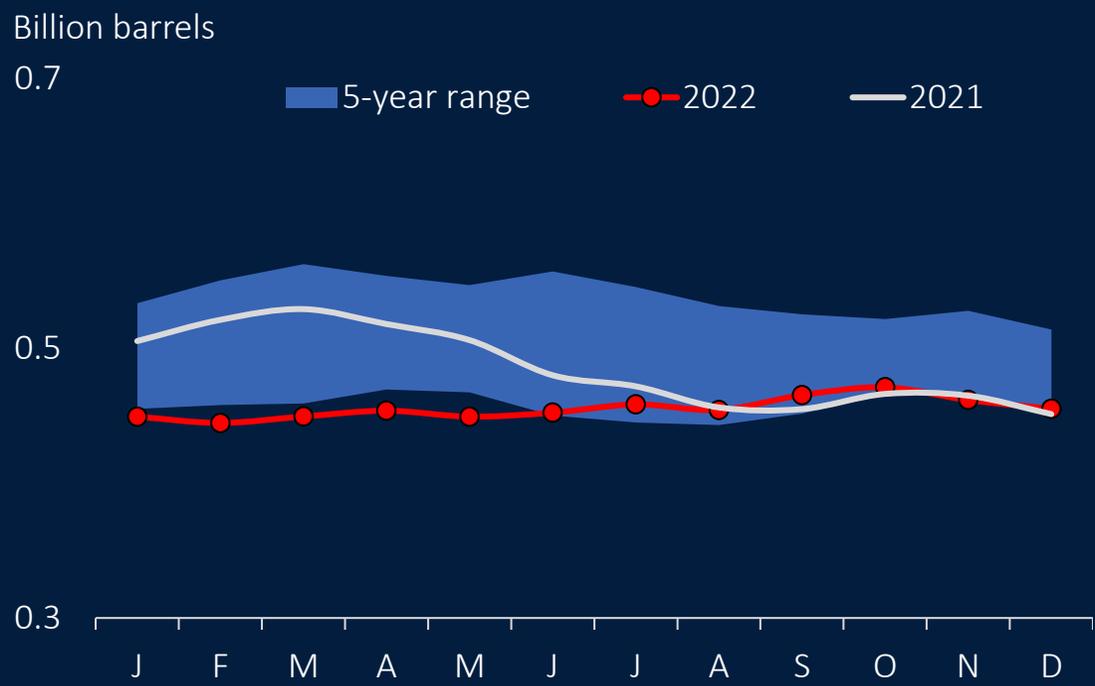




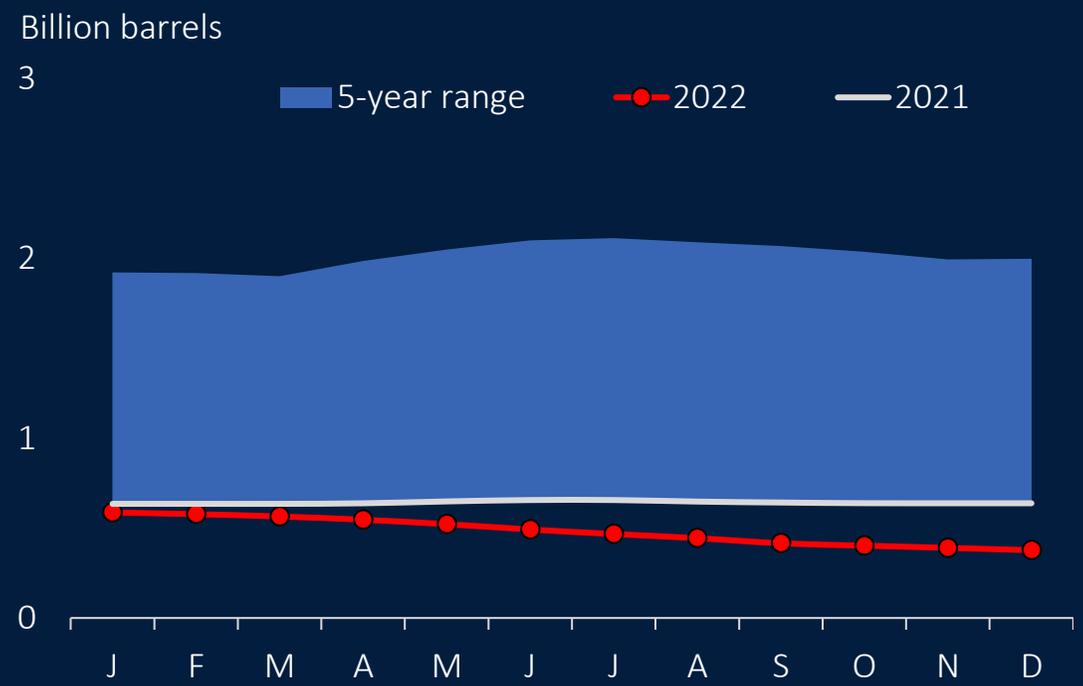
U.S. strategic petroleum inventories have fallen to their lowest levels since 1984

- U.S. commercial crude oil inventories have remained near the bottom of the 5-year historical range
- The U.S. strategic petroleum reserve (SPR) has been sold and drawn down materially in the past five years, which policy makers saw as feasible due to domestic U.S. oil production growth, but recent events could spur a reconsideration of its adequacy

U.S. commercial crude oil inventories



U.S. strategic petroleum reserves



sources: DOE; EIA; API

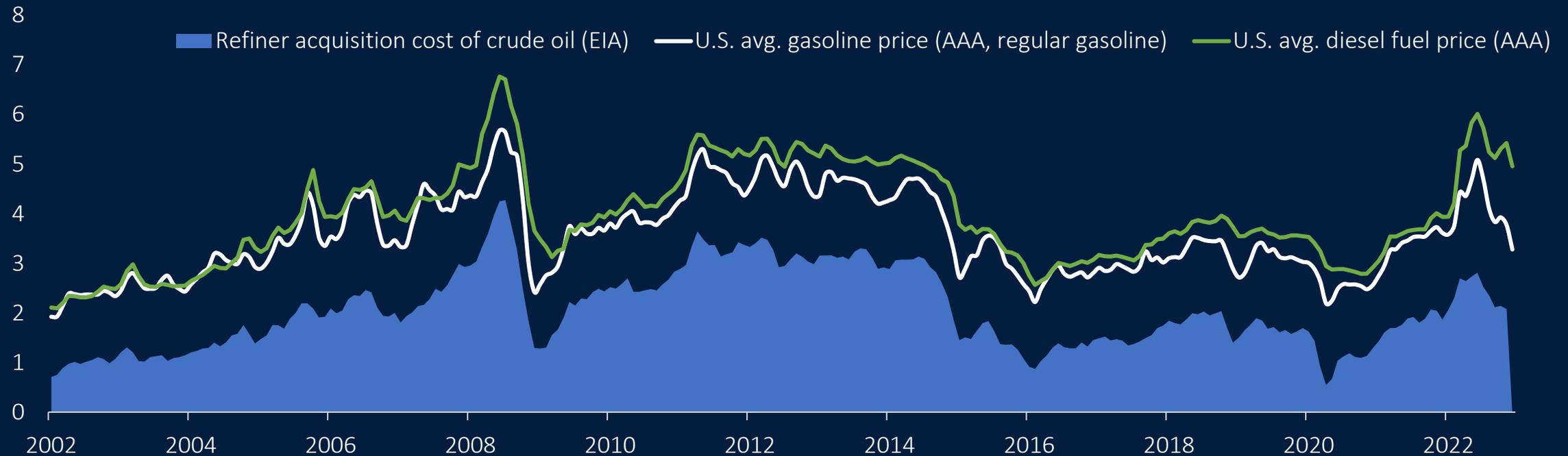
Crude oil prices have remained the predominant driver of gasoline prices, but global market conditions have also influenced diesel fuel prices in 2022



- ▶ Crude oil prices represented over 70% of changes in retail gasoline prices through the first 11 months of 2022 per EIA
- ▶ Diesel fuel prices have remained elevated, however, amid a global shortage of distillates, largely due to the Russia-Ukraine war

Refiner acquisition cost of crude oil prices versus U.S. average gasoline prices, adjusted for price inflation

Dollars per gallon (2023\$)



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

Natural Gas



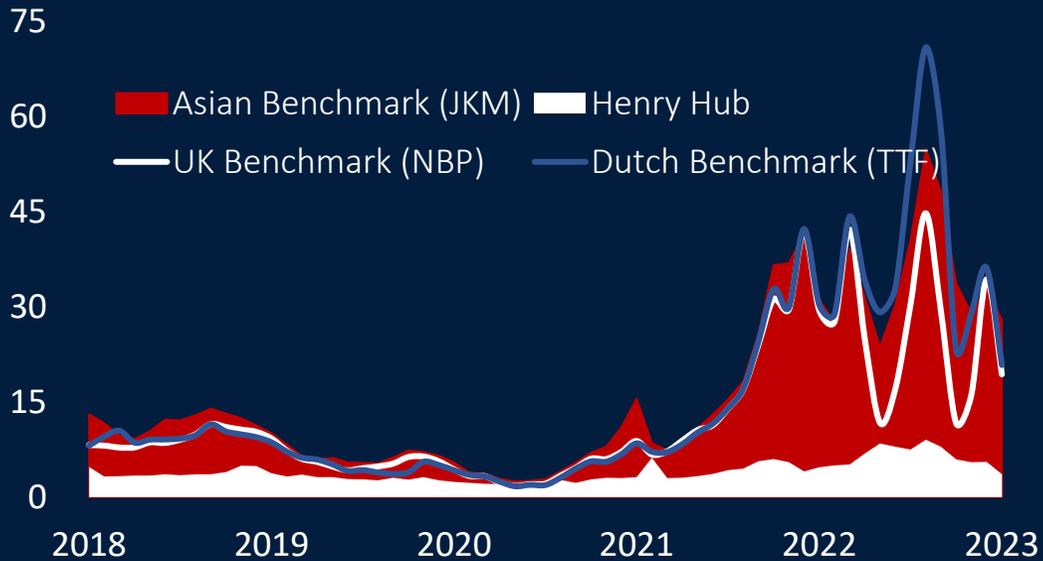
Historically strong global natural gas prices have spurred U.S. natural gas exports



- ▶ As natural gas prices in Europe and Asia remained elevated and volatile, U.S. natural gas exports via liquefied natural gas (LNG) and pipeline have achieved record levels
- ▶ International prices have remained up to 7X higher than U.S. prices at Henry Hub

Global natural gas prices

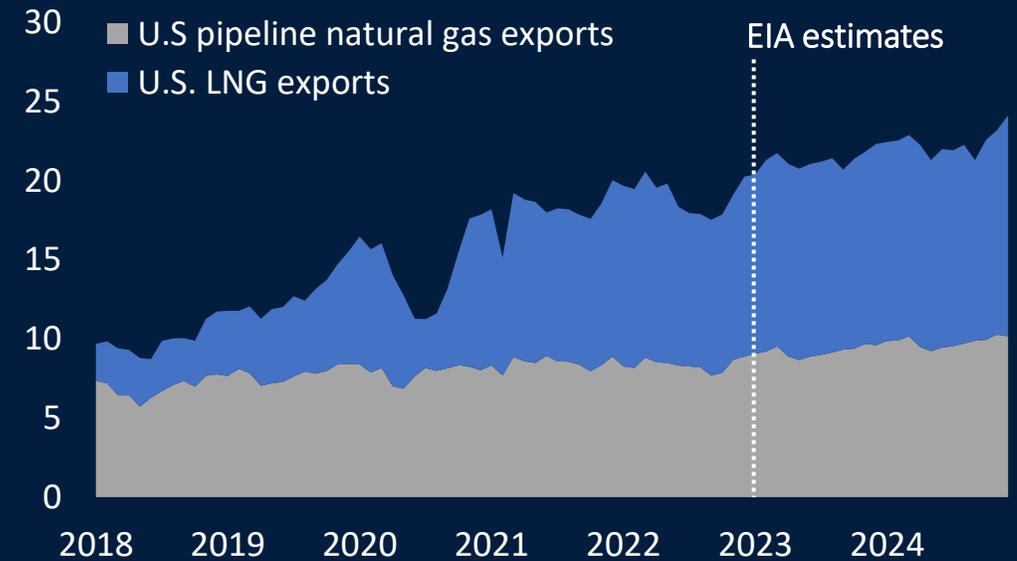
\$2023 per mmBtu



source: EIA; CME Group; The ICE

U.S. natural gas exports

Billion cubic feet per day



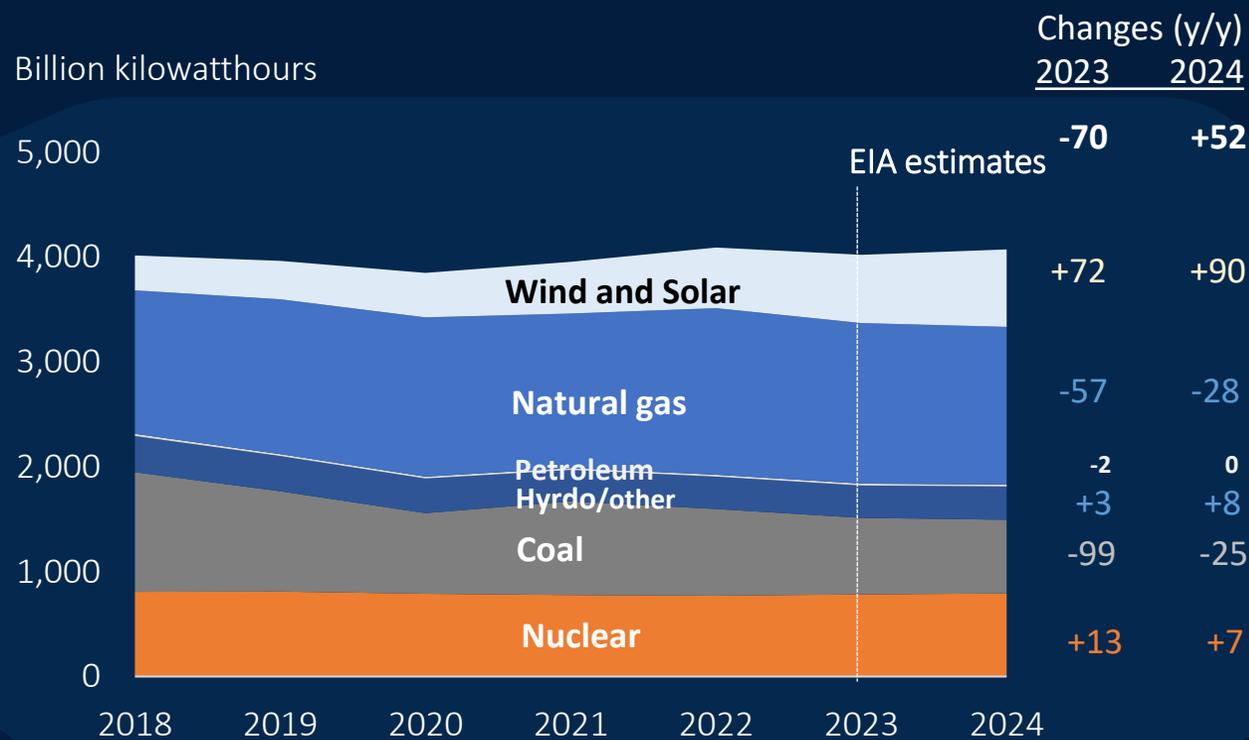
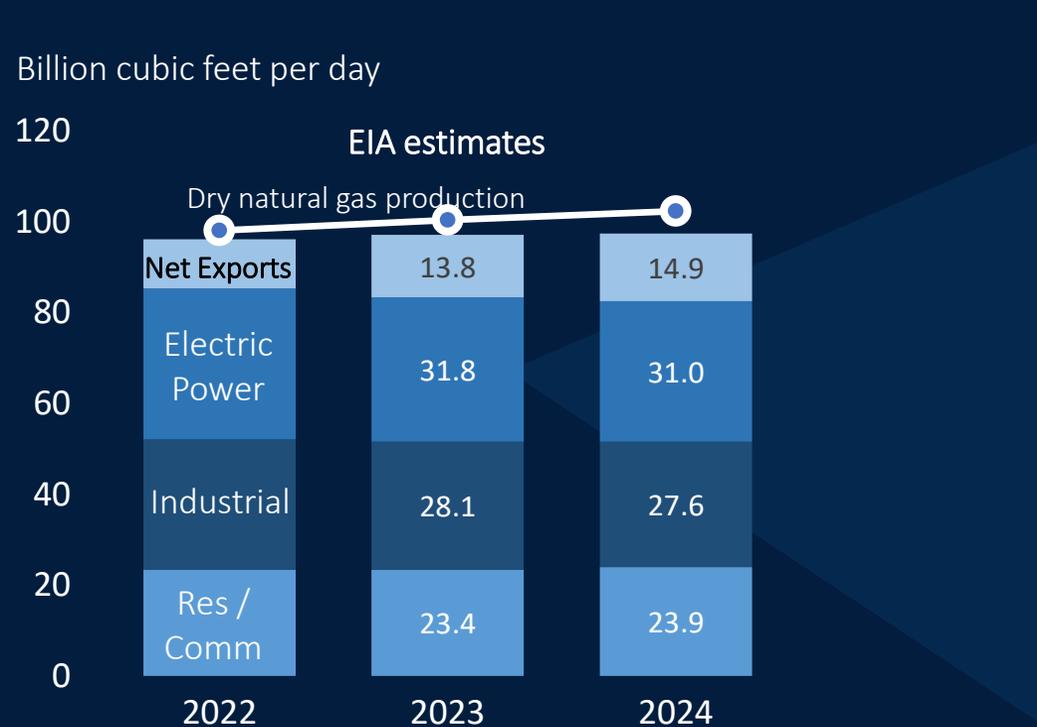
source: EIA



EIA expects 2023 natural gas production growth of 2.3 bcf/d in 2023 could support record LNG exports and 38% of U.S. electricity net generation

- ▶ For 2023, EIA projects growth of LNG exports to more than offset lower natural gas consumption in electricity generation
- ▶ Natural gas could represent 38% of U.S. net electricity generation in 2023 despite increases by other sources per EIA

Natural gas consumption and production by sector Electricity net generation by sector



source: EIA (Jan. 2023)

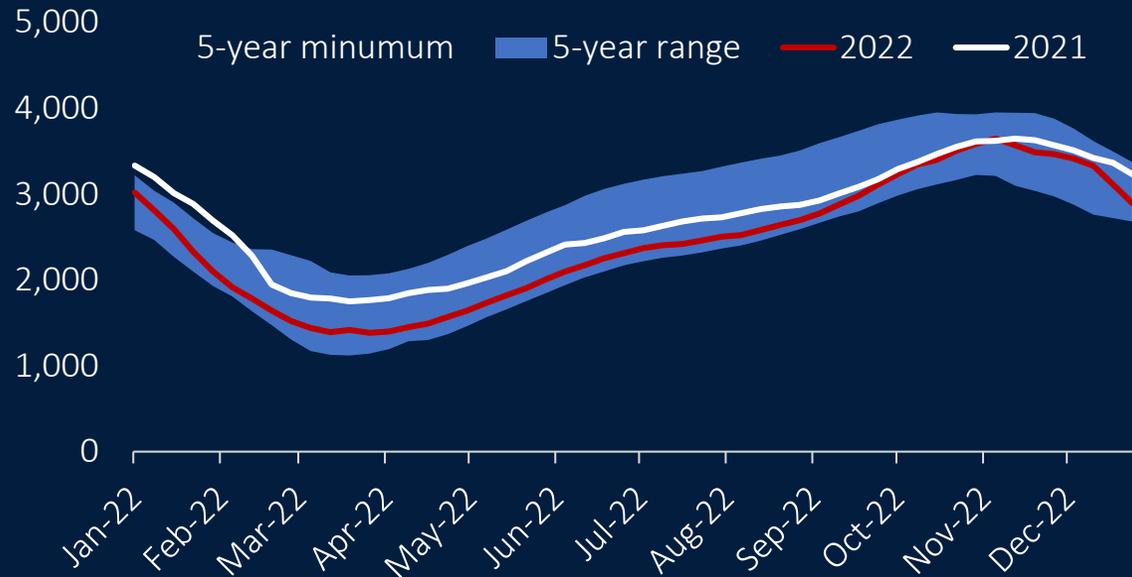
Natural gas prices have remained highly seasonal and could remain elevated per EIA projections



- ▶ Natural gas net injections into underground storage caught up with their 5-year average in November per EIA
- ▶ Natural gas prices through the value chain have risen so far through 2022, and EIA expects elevated prices to persist in 2023

U.S. working gas in underground storage

Billion cubic feet



source: EIA (Jan. 2023)

EIA natural gas prices by end-use sector

Dollars per thousand cubic feet (2023\$)



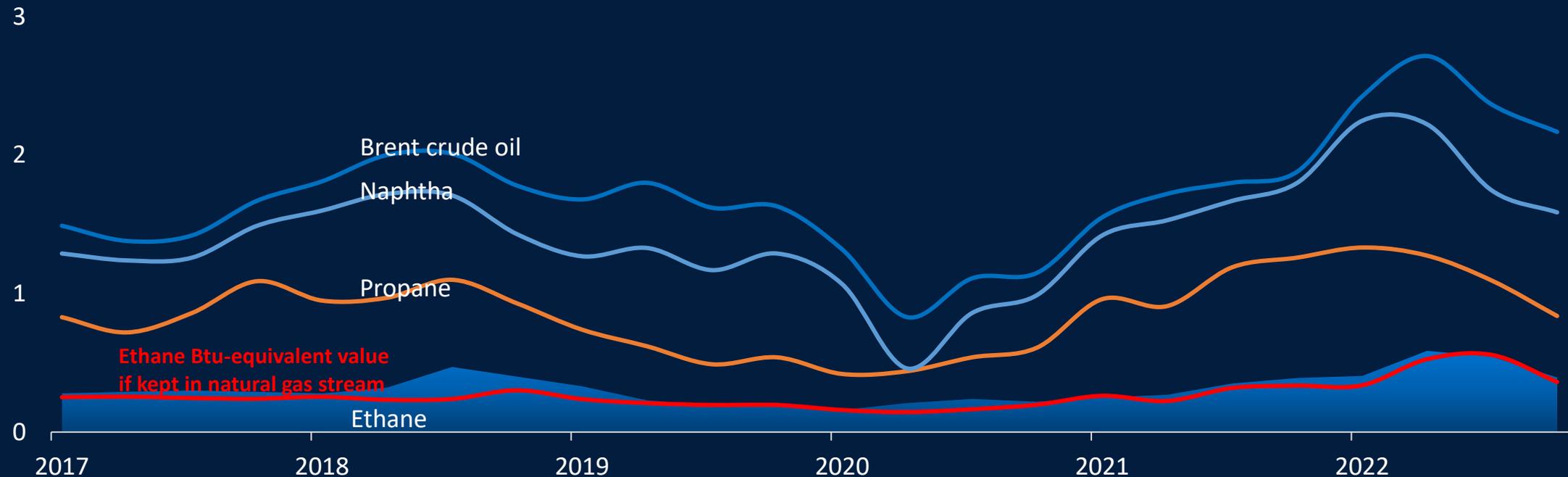
Although U.S. petrochemical feedstock prices recently eased, the economic incentive to extract ethane from natural gas has increased in Q4 2022



- Global naphtha, crude oil and petrochemical prices have historically moved together, while those of ethane and propane have depended on both global petrochemical prices and regional market conditions

U.S. ethane, propane, naphtha versus Brent crude oil prices

Dollars per gallon (2022\$)



sources: CME Group and API Team calculations

API economics resources available at www.api.org

The screenshot shows the API website homepage. At the top left is the API logo and the text "American Petroleum Institute". The navigation bar includes "Home", "About", "Membership", "API Careers", "Chief Economist" (circled in red with an arrow pointing to it), and "Contact". Below the navigation bar 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 a large heading "API's Economic Industry Outlook" and a sub-heading "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 this text is a "Downloads" section listing various reports with file sizes. On the left side of the page, there are several "Data Visualization" cards, each with a title, a brief description, and a link to "Explore Visualization". A red arrow points to the "U.S. Consumer Expenditure Burden By Income Level" card. At the bottom left, there is a vertical menu with categories: "Reports & Surveys", "Weekly Statistical Bulletin", "Monthly Statistical Report", "Economic Outlook" (highlighted in blue), and "Data Visualization".

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

Reports & Surveys

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