



Federal Reserve  
Bank of Dallas

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# Energy Update

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Federal Reserve Bank of Dallas – Houston Branch

October 2021

The views expressed in this presentation are strictly those of the presenter and do not necessarily reflect the positions of the Federal Reserve Bank of Dallas or the Federal Reserve System. Thank you to Kunal Patel, Dr. Mike Plante, and many others whose work contributed to the content of this presentation.

# We need your input!

*Be part of a survey  
that gauges regional  
business activity and  
informs monetary  
policy making.*



Texas **Manufacturing**  
Outlook Survey



Texas **Service Sector**  
Outlook Survey



Texas **Retail**  
Outlook Survey

# Economic Backdrop

- COVID-19: Delta's economic impact muted compared to prior waves. Vaccination, new treatments, and rising immunity adding confidence to improvement in 2022. *Still, a large source of uncertainty for projections.*
- Global GDP up 5.8% y/y in 2021, up 4.4% 2022. (August 2021 Consensus Economics forecast).
- U.S. Real GDP 5.1% in Q4/Q4 in 2021; slow to 3.3% Q4/Q4 in 2022 (October 2021 Blue Chip Consensus);
- Favorable oil and gas outlook in 2022 to be tempered by capital discipline, ESG, and rising costs.

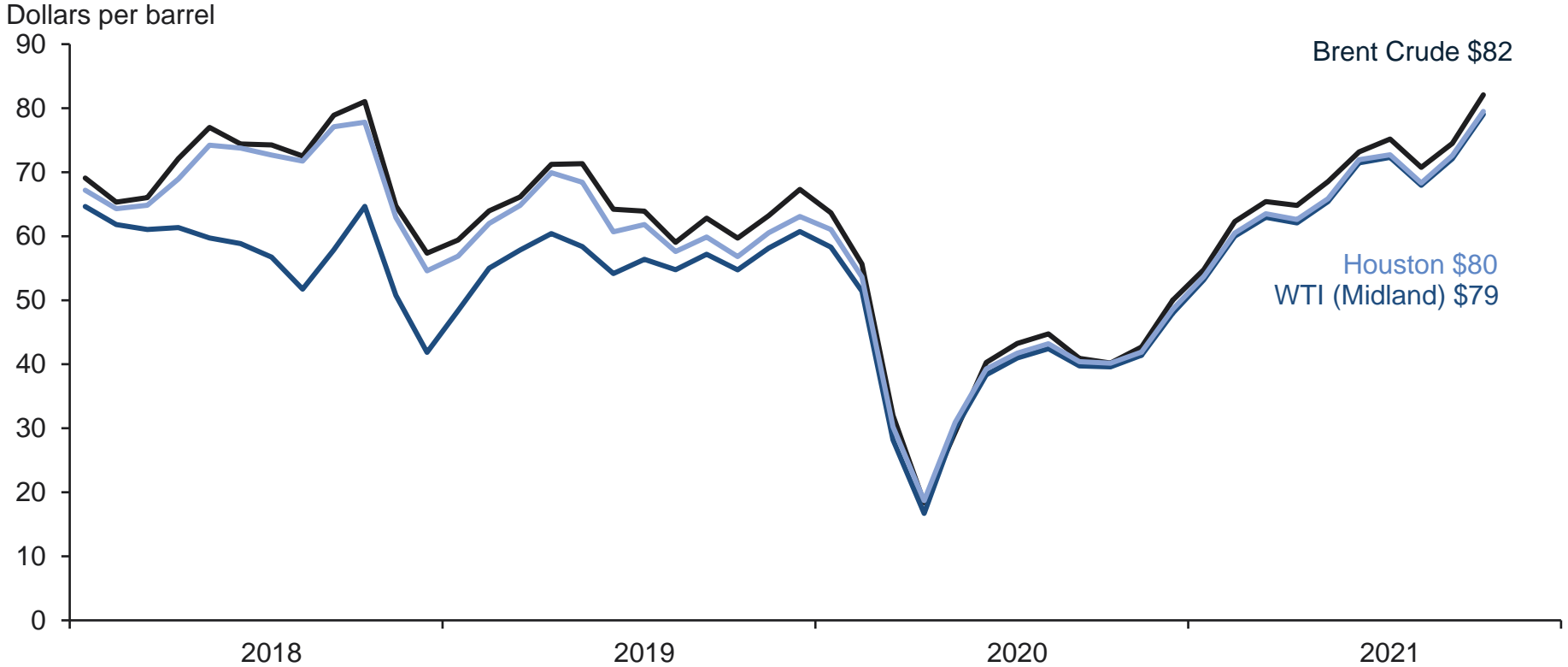
# Purchasing Managers Manufacturing Indexes



NOTE: Values above 50 indicate expanding economic activity, and vice versa. Houston Export Markets is the export-weighted average of Purchasing Managers Indexes for 14 of the top countries receiving goods from the Houston-Galveston customs district over the 12 months ending February 2020, and accounting for over 61 percent of the value of total exports over that time.

# Upstream

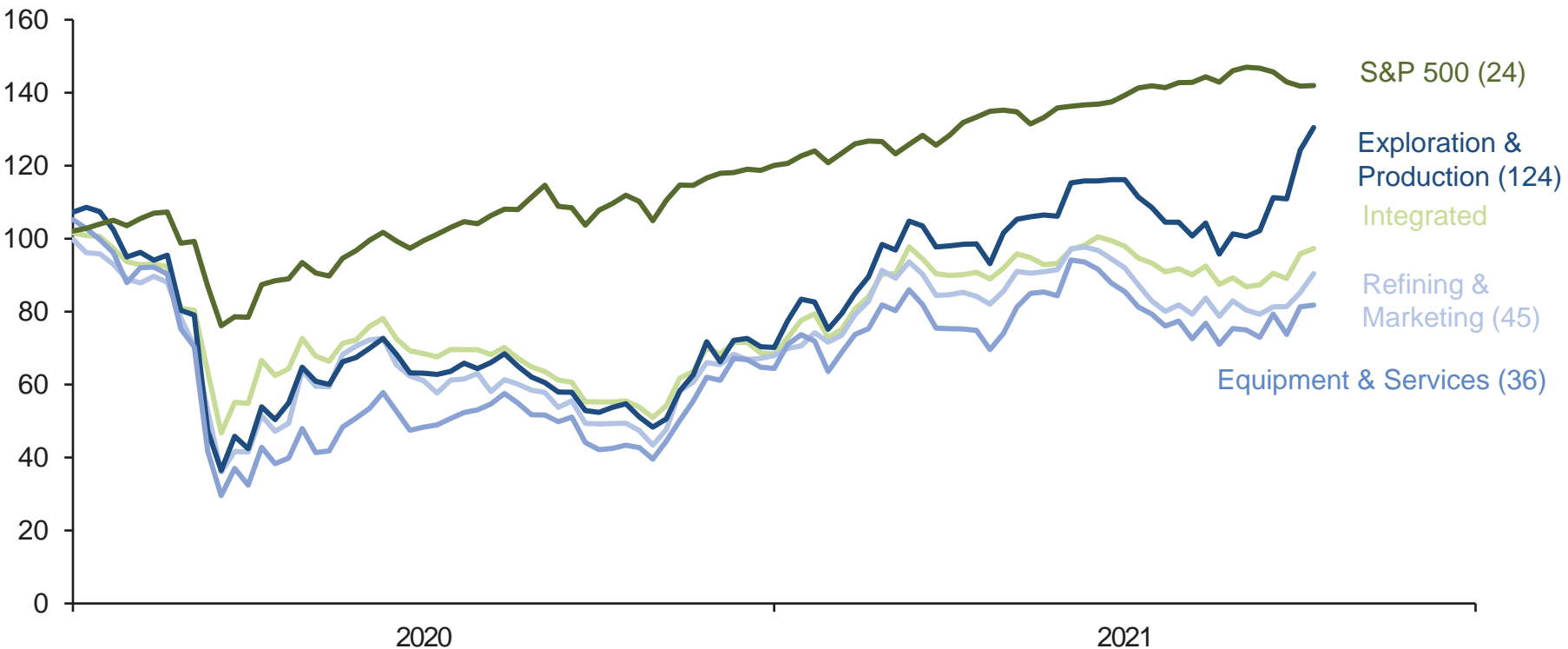
# Oil Prices: Oil prices in Texas highest since shale boom; Could Brent go higher?



NOTE: Prices in labels are the average of daily closing prices for Oct. 1 to 12, 2021. "Houston" is the Magellan East pipeline price.

# Total Returns in Energy vs the S&P 500: From worst performing sector to best.

Index December 2019 = 100



NOTE: Energy indices are from the S&P1500 total returns, which includes any reinvestment of dividends offered by firms. Data through the week ending October 6, 2021. Numbers in parentheses are the 2021 year-to-date annualized growth rates.

SOURCES: Standard and Poors

# Energy High Yield Debt Spread to Non-Energy High Yield Debt: after \$350 billion+ in bankruptcy: improved returns and a robust outlook bring HY energy spreads down to more normal levels.

Basis points



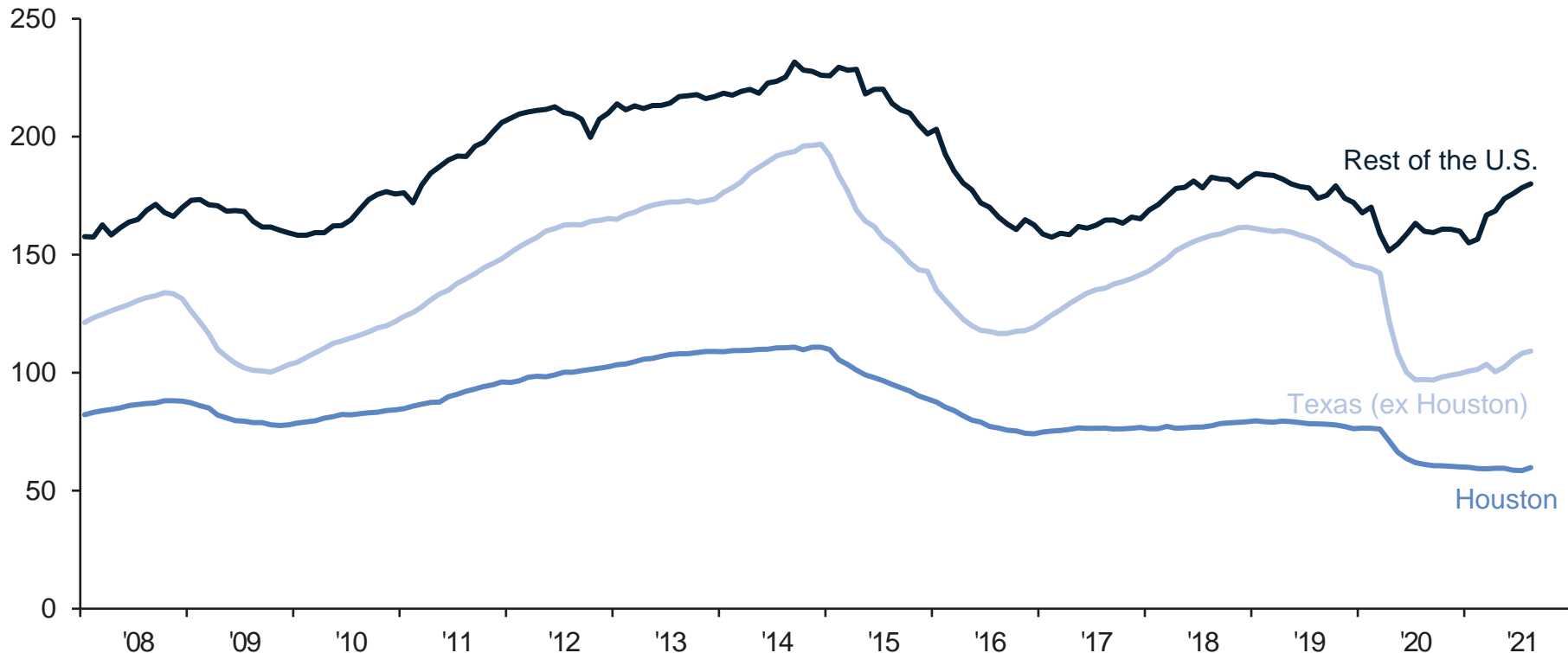
NOTE: Number in parentheses is the value for the week ending October 8, 2021.

SOURCES: Bloomberg; Barclays.



# U.S. Oil and Gas Jobs: jobs recovery limited to areas outside of Houston. U.S. numbers likely to be revised down substantially.

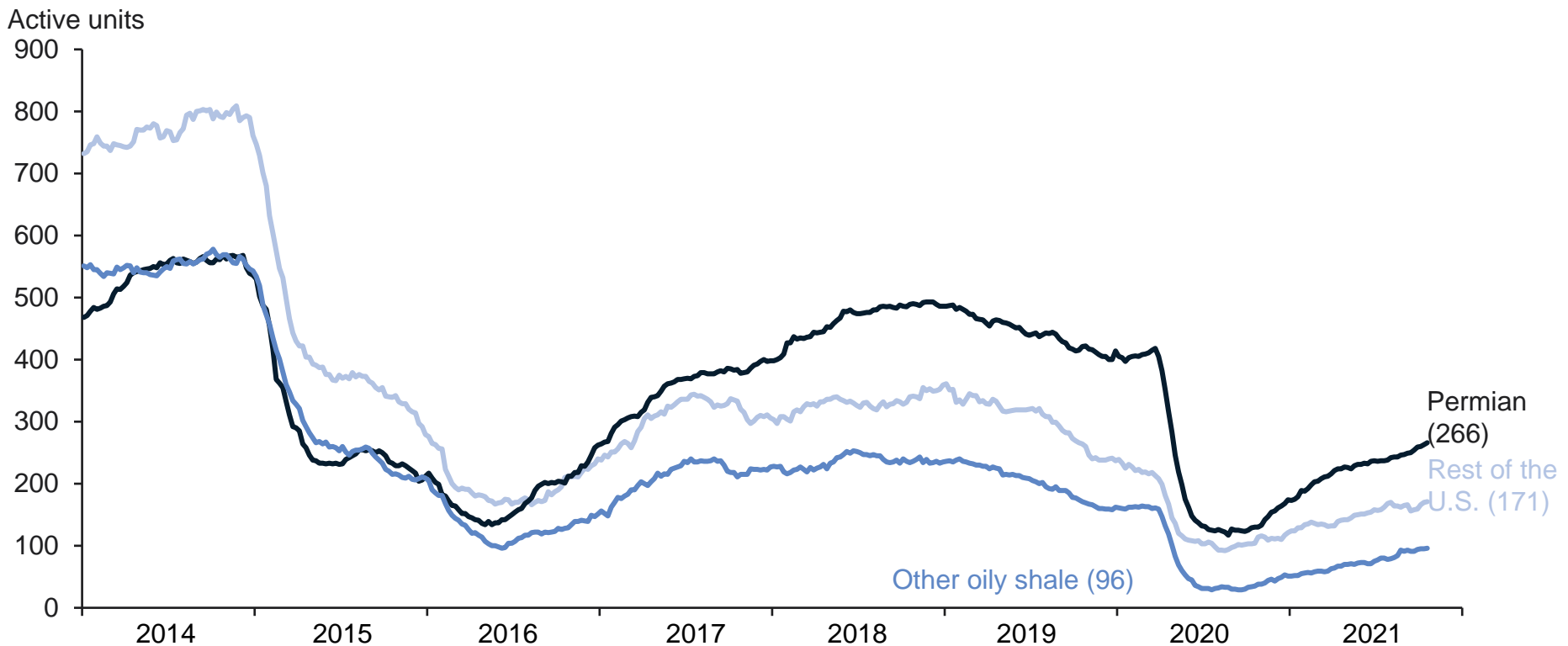
Thousands of Jobs



NOTE: Data are the sum of "oil and gas extraction" and "support activities for oil and gas operations". Data seasonally adjusted.

SOURCES: Bureau of Labor Statistics; adjustments by the Dallas Fed

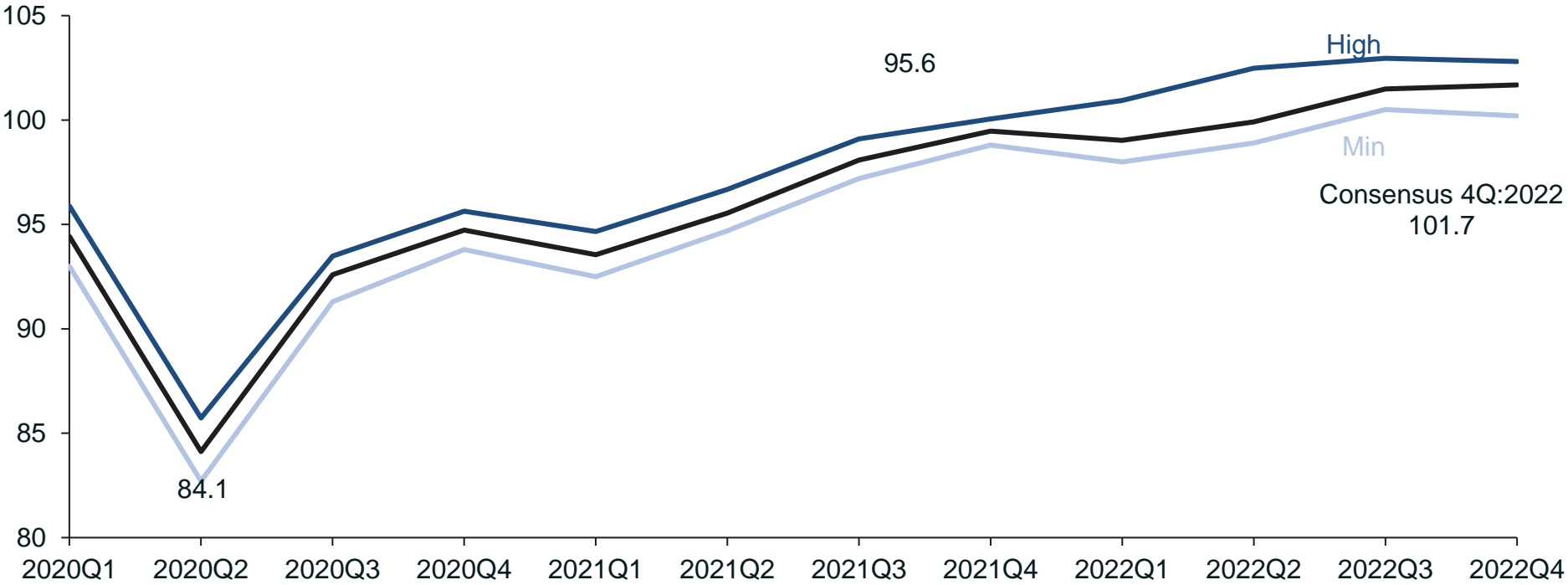
# Oilfield Activity: Total drilling activity driven by the Permian.



NOTE: "Other oil-rich shales" includes the Cana Woodford, DJ-Niobrara, Eagle Ford, Granite Wash, and Williston basins  
 SOURCES: Baker Hughes, Primary Vision.

# Global Liquids Consumption Projections: Consensus expects 2.2 mb/d of growth in 2022 after 3.9 mb/d of growth in 2021.

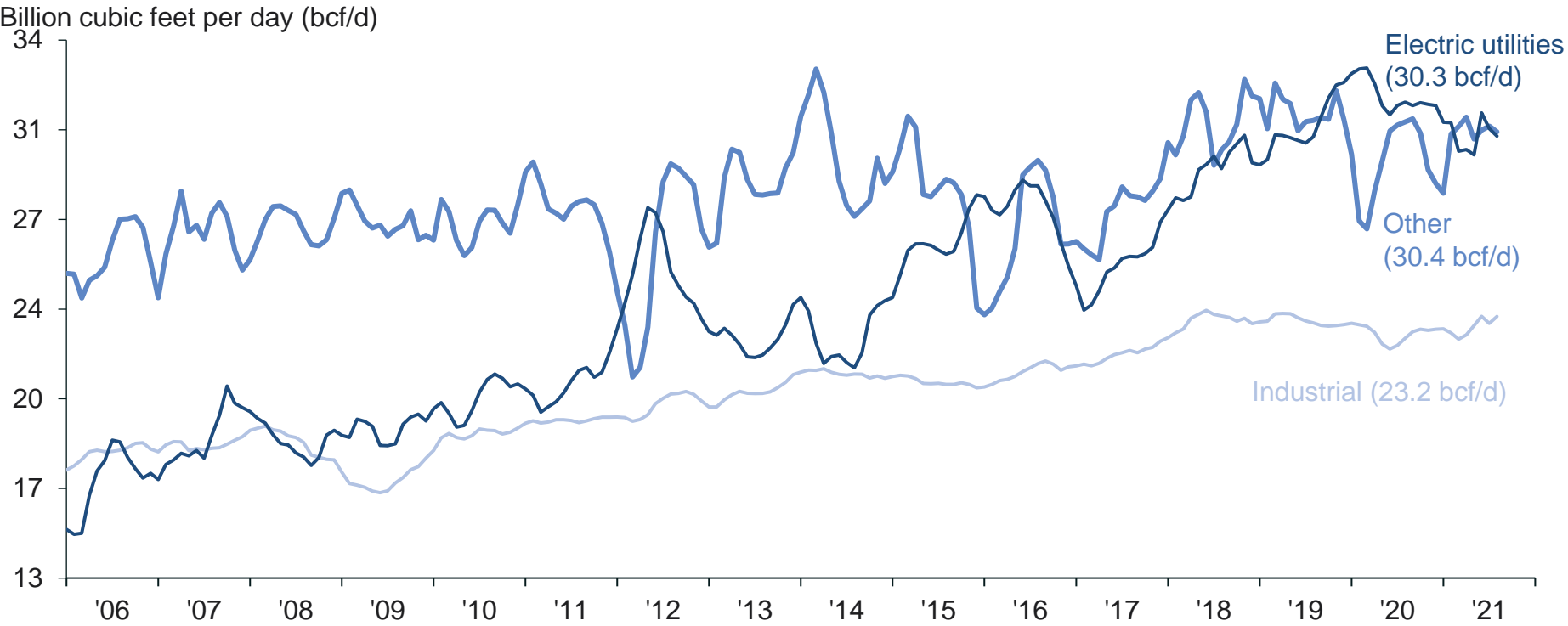
Million barrels per day



NOTE: Consensus is an average of forecasts from sources published over from July 8 to 22, 2021. Sample size drops for 2022 projections. High and low projections for each quarter are marked in blue.  
 SOURCE: International Energy Agency, Energy Information Administration, Organization of the Petroleum Exporting Countries, Barclays, Goldman

# Natural Gas

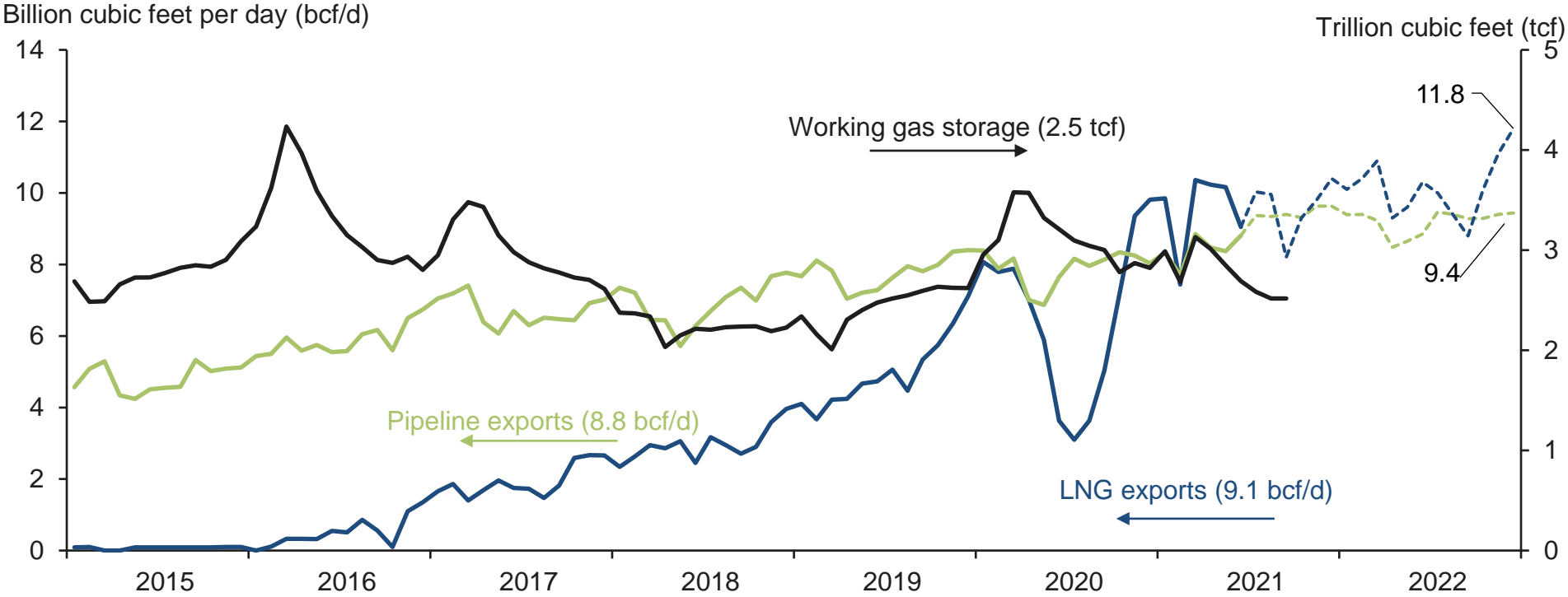
# U.S. Natural Gas Consumption: Low cost methane helped drive demand creation for industry and utilities.



NOTE: Data are seasonally adjusted three-month moving averages. Numbers in parentheses are consumption estimates for August 2021.

SOURCE: Energy Information Administration.

# U.S. Natural Gas Exports and Inventories

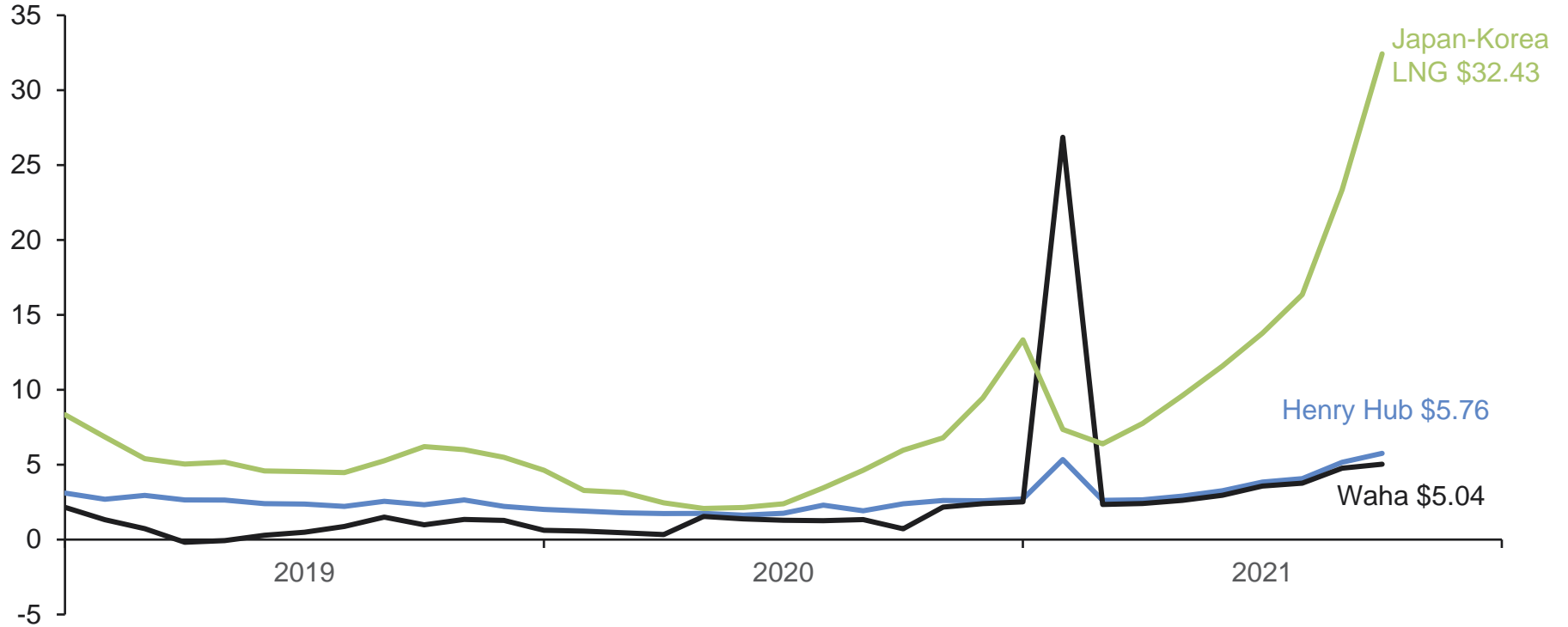


NOTE: Numbers in parentheses are for June 2021 exports and September 2021 working gas storage. Dashed lines denote projections from the September 2021 *Short-Term Energy Outlook*. Weekly working natural gas in storage for the lower 48 states is the seasonally adjusted month-end value. The September 2021 storage value is based on weekly seasonally adjusted data for Sept. 17.

SOURCE: Energy Information Administration.

## Natural Gas Prices: U.S. seeing highest prices in a decade as Global LNG prices soar.

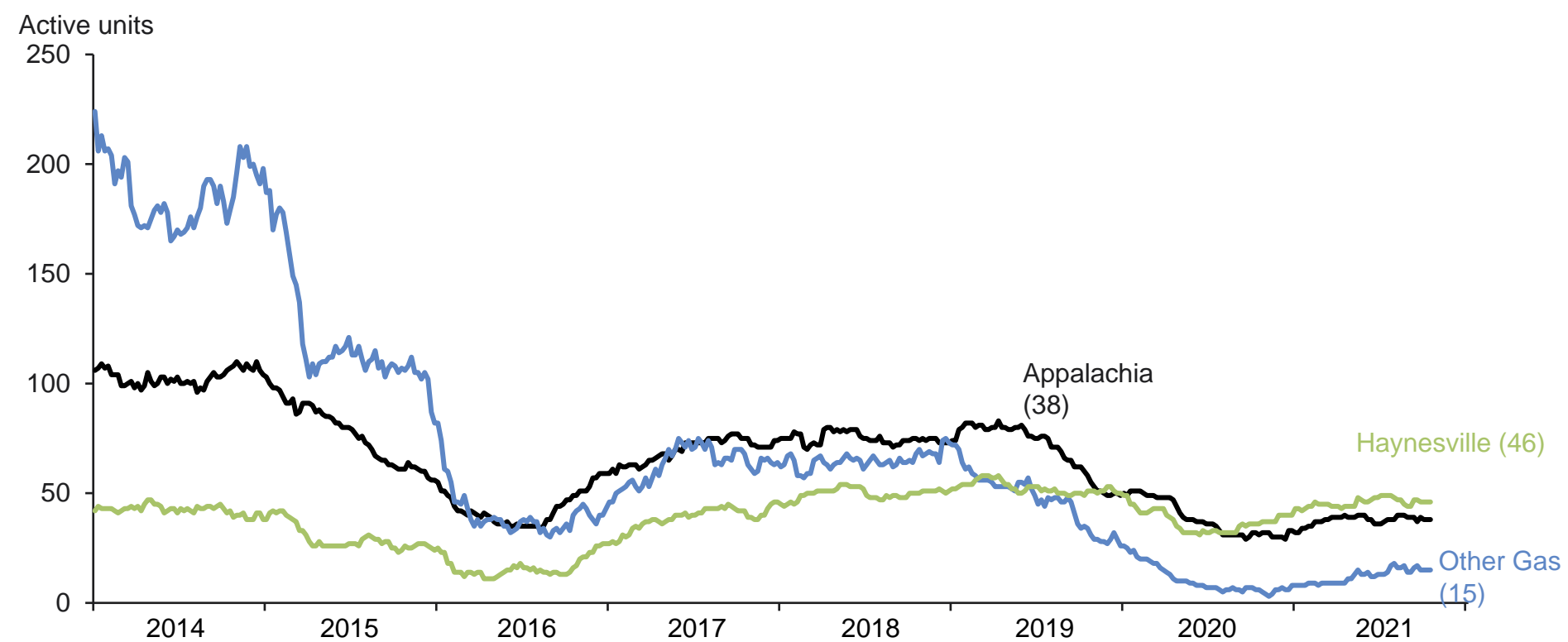
Dollars per mmbtu



NOTE: Prices in labels are the average of daily closing prices for Oct. 1 to 12, 2021.

SOURCES: Energy Information Administration; Bloomberg.

# U.S. Gas Drilling Activity: Activity has been muted due to low prices, pipeline constraints.



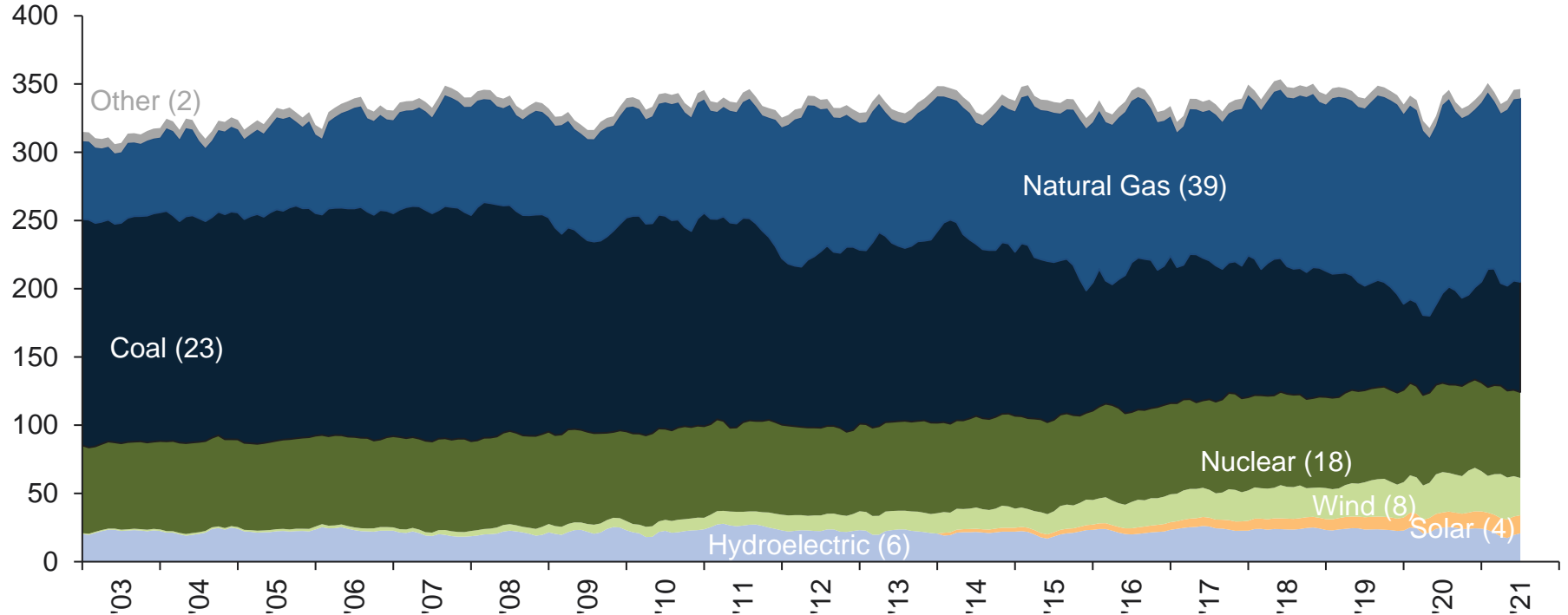
NOTE: "Other gas" includes all gas-directed wells outside of the Marcellus, Utica, and Haynesville shale basins.

SOURCES: Baker Hughes, Primary Vision.



# U.S. Electricity Generation by Energy Source: Natural gas largely displaced coal in power generation.

Billions of kwh



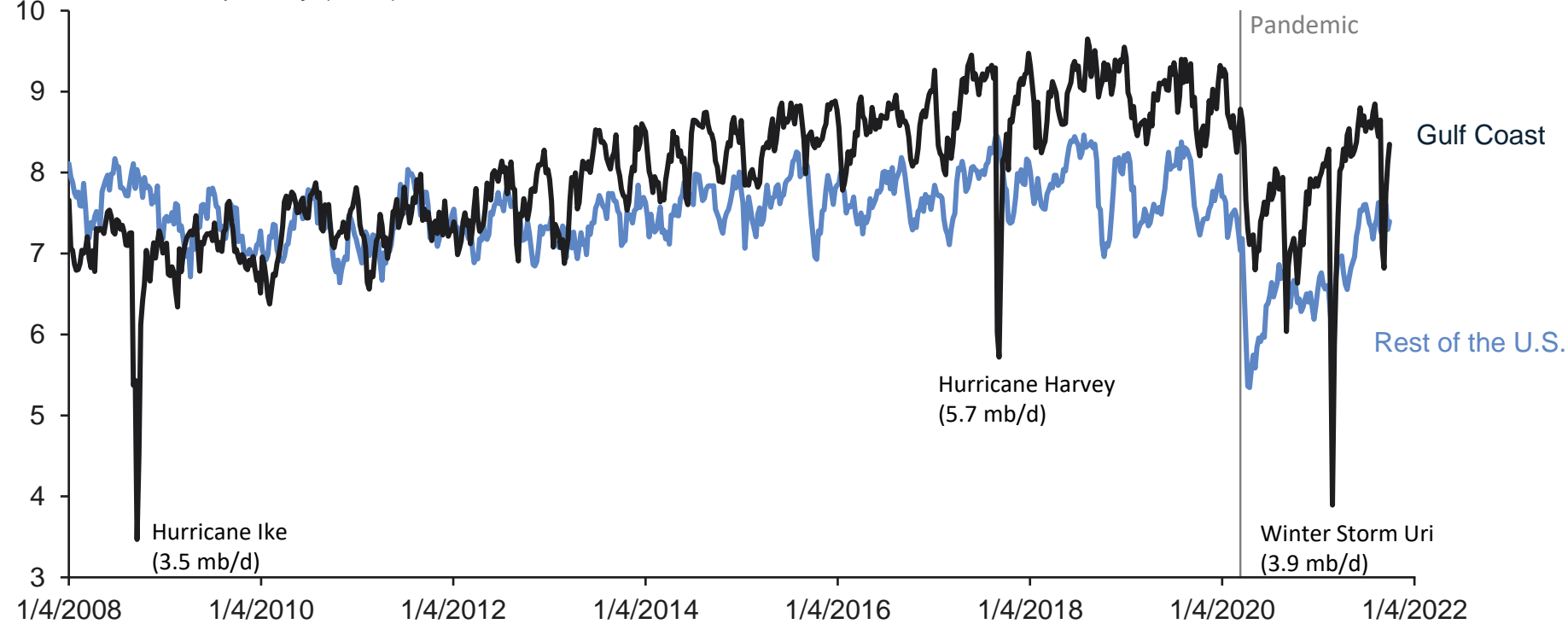
NOTE: Data are seasonally adjusted three-month moving averages. Numbers in parentheses are shares of total U.S. generation over the three months ending in July 2021, and may not sum to 100 due to rounding. Nuclear generation for the months of June and July 2021 are estimates.

SOURCE: Energy Information Administration.

# Downstream

# Refinery Crude Processing: Crude processing still below pre-pandemic levels, but largely recovered from extreme weather.

Millions of barrels per day (mb/d)

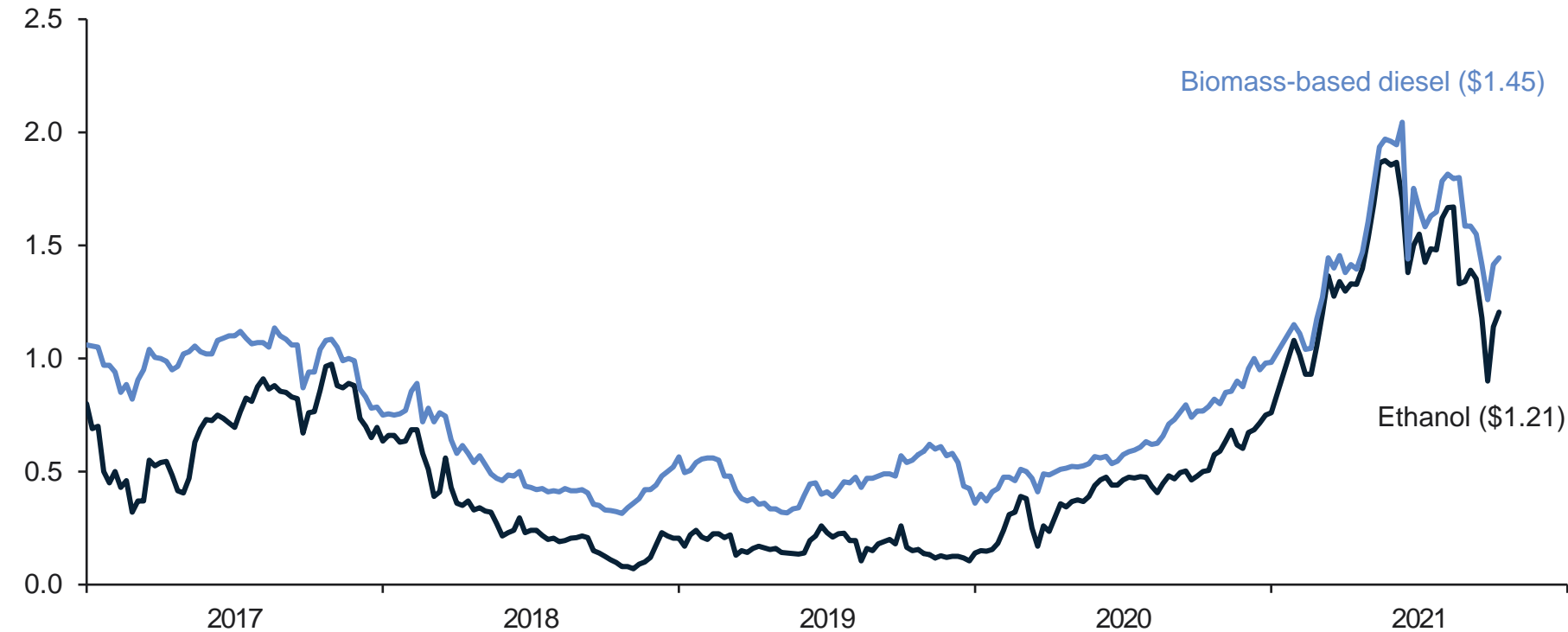


NOTE: Weekly data. Numbers in parentheses are lows driven by severe weather in the Gulf Coast.

SOURCE: Energy Information Administration.

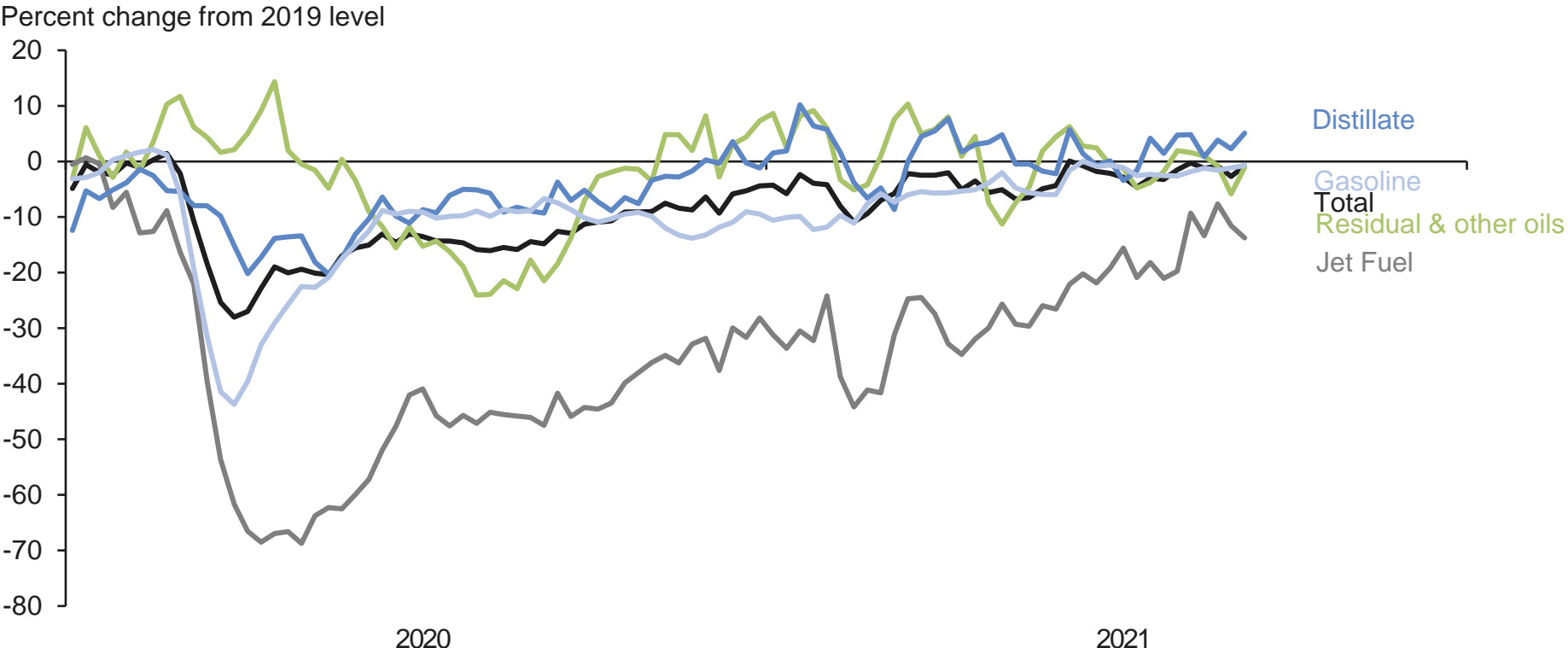
# U.S. Renewable Identification Number Costs: Cost of compliance with renewable fuel mandates easing.

Dollars per gallon



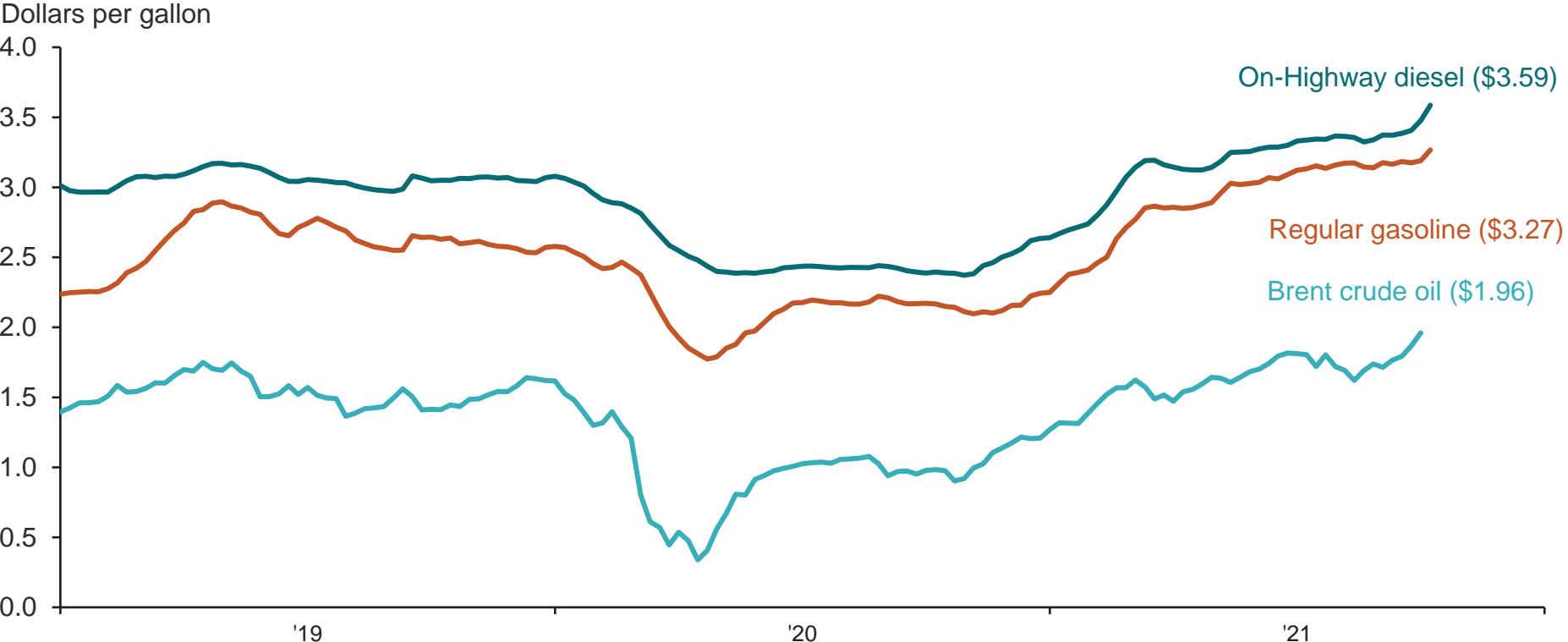
NOTE: Seven day rolling average of data.  
SOURCE: Bloomberg.

# Product Supplied: U.S. consumption near full recovery, but jet fuel consumption continues to lag behind.



NOTE: Chart shows the percent change from the same period in 2019. Data are four-week moving averages.  
SOURCES: Energy Information Administration.

# Weekly U.S. Retail Fuel Prices: Retail fuel prices trending up with crude.

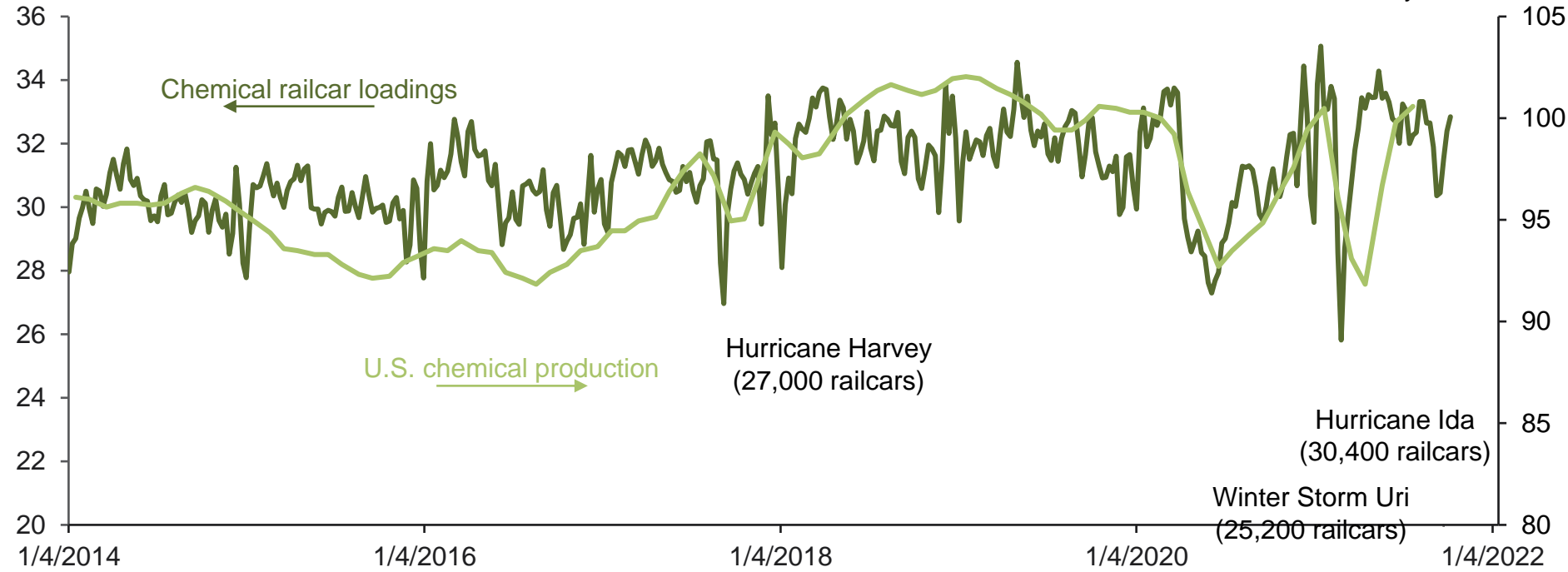


NOTE: Brent crude oil price depicted as dollars per gallon. Prices in parentheses are for the week of October 11, 2021.

SOURCE: Energy Information Administration.

# U.S. Chemical Railcar Loadings and Production: Production largely recovered, but shipping and supply chain challenges persist.

Thousands of railcars

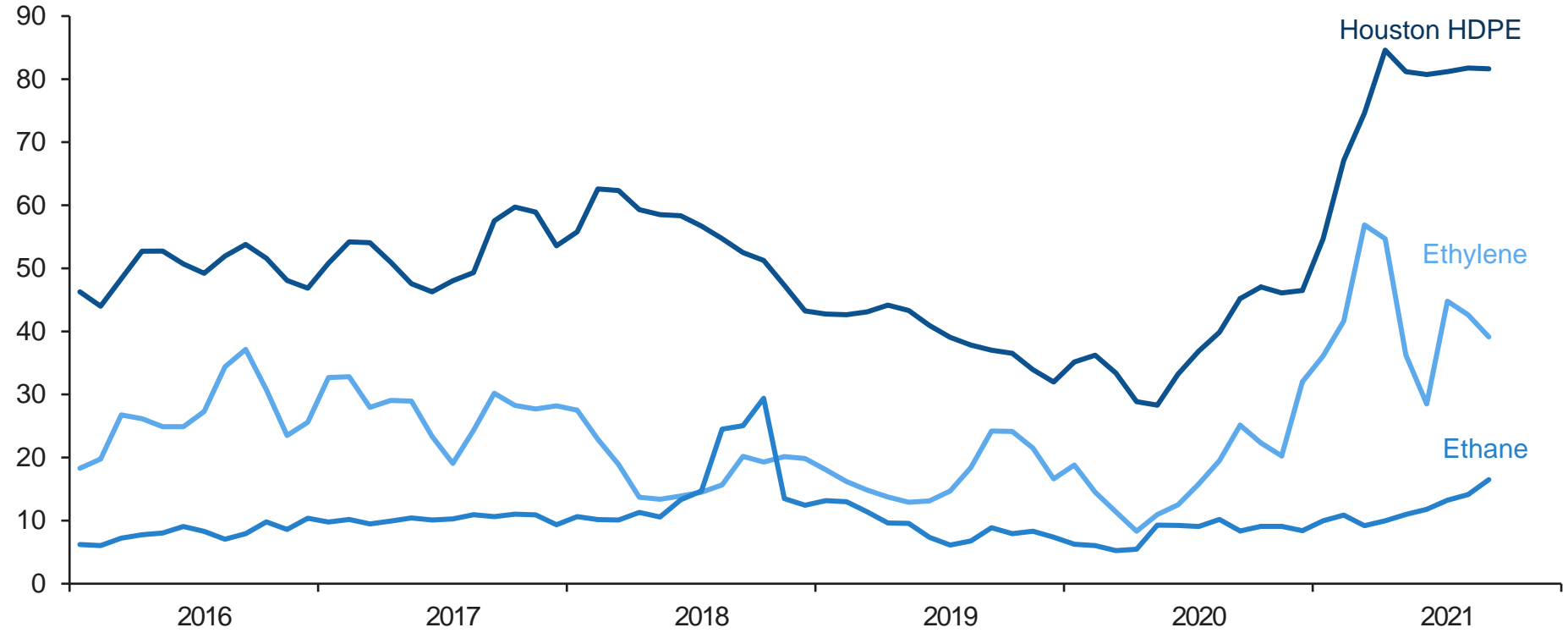


NOTE: Railcar data are two-week moving averages. Chemical production data are a three-month moving average. Numbers in parentheses are weekly railcar lows caused by severe weather on the Gulf Coast.

SOURCE: Association of American Railroads; American Chemistry Council.

# Gulf Coast Intermediate Chemical Prices: chain margins remain healthy despite rising gas prices.

Cents per pound



NOTES: Ethane price is the Mont Belveiu ethylene feedstock cost. HDPE is short for high density polyethylene. Ethylene and HDPE prices are Gulf Coast and Houston assesments, respectively.

SOURCES: Bloomberg; PolymerUpdate.com; Muse; Stancil & Co; authors' calculations.



# Conclusions

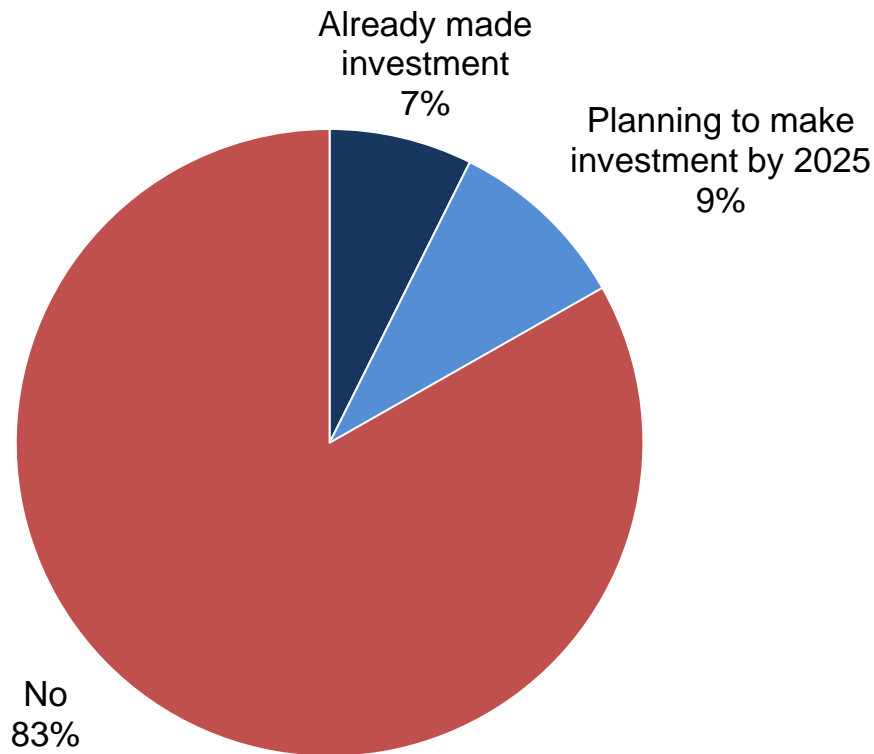
- COVID-19: Delta's economic impact muted compared to prior waves. Vaccination, new treatments, and rising immunity adding confidence to improvement in 2022. *Still, a large source of uncertainty for projections.*
- Global liquids are still expected to be balanced in 2022 as global growth slows.
- Commodity prices are likely to be constructive for U.S. producers, who are still expected to be disciplined in their allocation of capital while making progress on ESG goals, despite challenges.
- Winter heating prices likely to be elevated.

# Beyond 2022

# Decarbonizing Hydrocarbon

- No Routine Flaring
- Methane emissions
- CO2e emissions from operations
- Sustainable / Renewable Fuel Products
- Carbon Offsets
- CCUS: Carbon Capture and Utilization and Sequestration
- Inclusion of wind and solar power investments

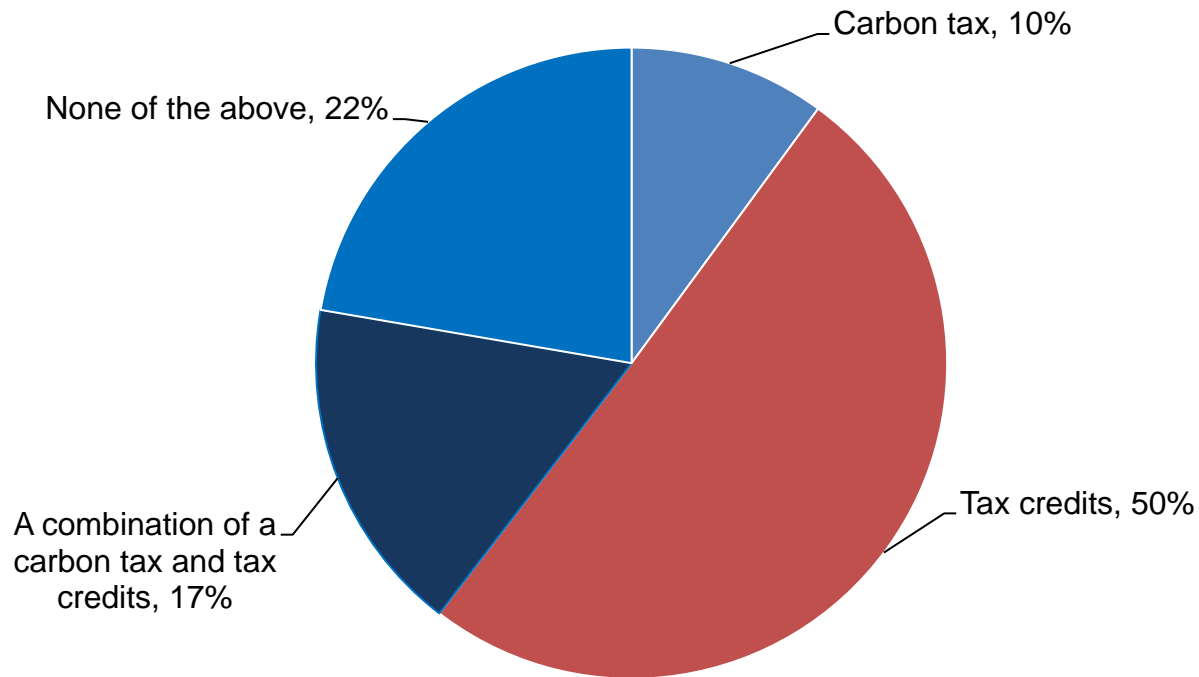
# Has your firm already made, or is it planning to make, investments in wind and/or solar?



NOTES: No executives are planning to invest in wind and/or solar after 2025. Executives from 149 oil and gas firms answered this question during the survey collection period, June 9–17, 2021.

SOURCE: Federal Reserve Bank of Dallas.

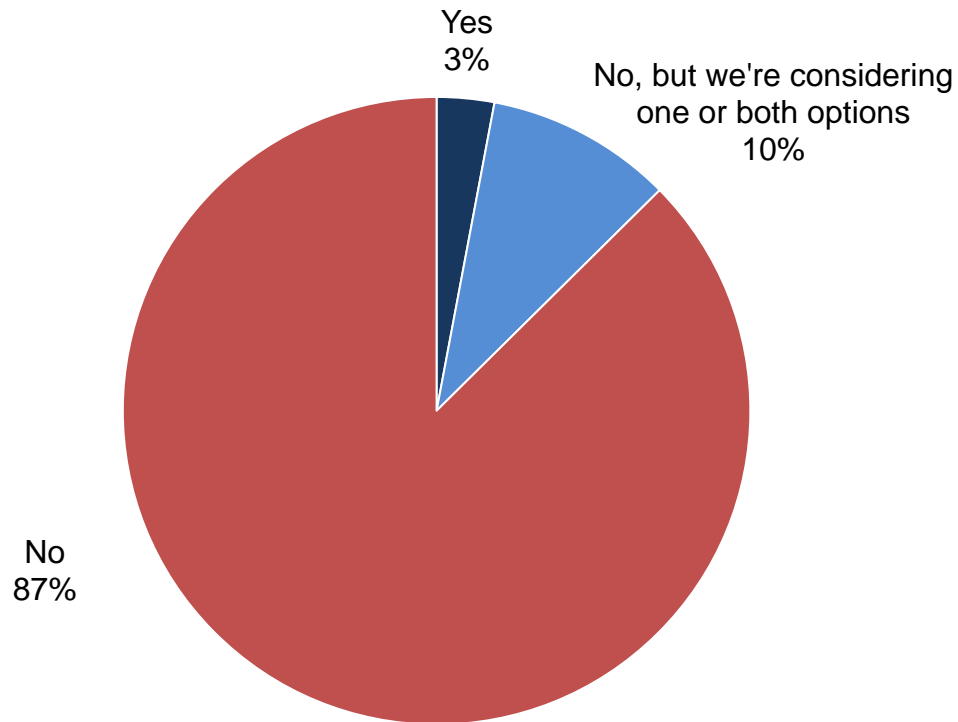
## Which do you believe will be more effective in reducing carbon emissions: a carbon tax or tax credits to fund investments in carbon capture?



NOTE: Executives from 139 oil and gas firms answered this question during the survey collection period, June 9–17, 2021.

SOURCE: Federal Reserve Bank of Dallas.

## Is your firm currently purchasing carbon credits and/or carbon offsets?



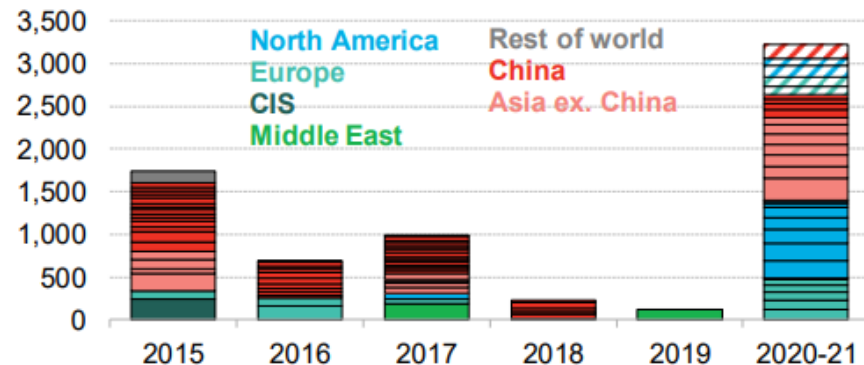
NOTES: Executives from 135 oil and gas firms answered this question during the survey collection period, Sept. 15–23, 2021.

SOURCE: Federal Reserve Bank of Dallas.

# Roughly half of North America refinery closures switching to biofuels

## Global refinery closures, 2015-2021

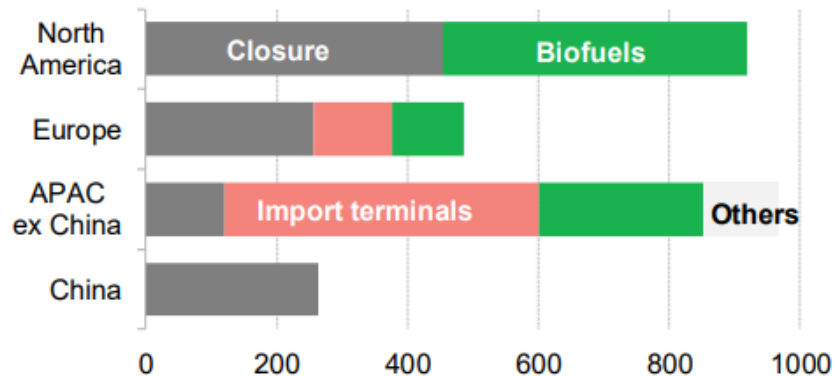
Thousand barrels per day



Source: BloombergNEF, CNPC ETRI, company announcements. Note: Diagonal marked segments are decisions to mothball or closure decisions that are not yet final. See attached database for more details.

## 2020-21 refinery closures by future options

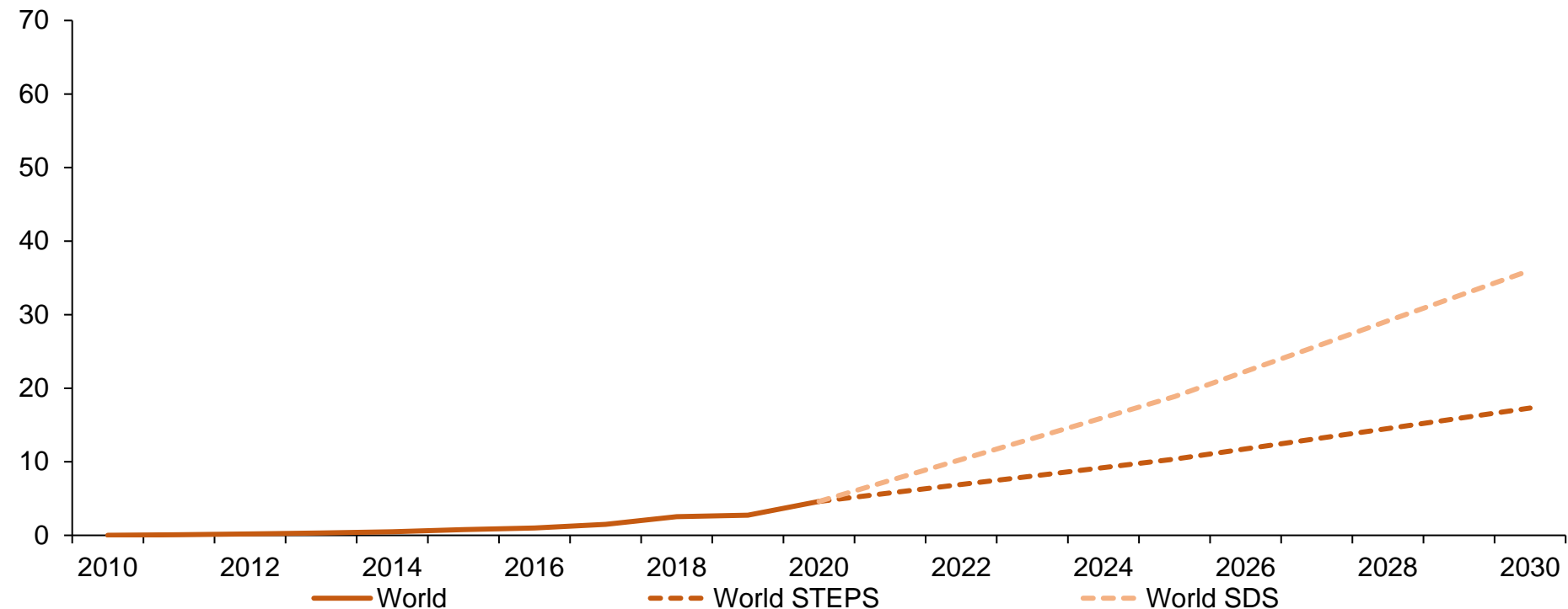
Thousand barrels per day



Source: BloombergNEF, company announcements. Note: Only includes final decisions to close or convert.

## Battery Electric Vehicles: More aggressive scenarios get BEV's to 36% of new vehicle sales by 2030.

Percent of vehicle sales

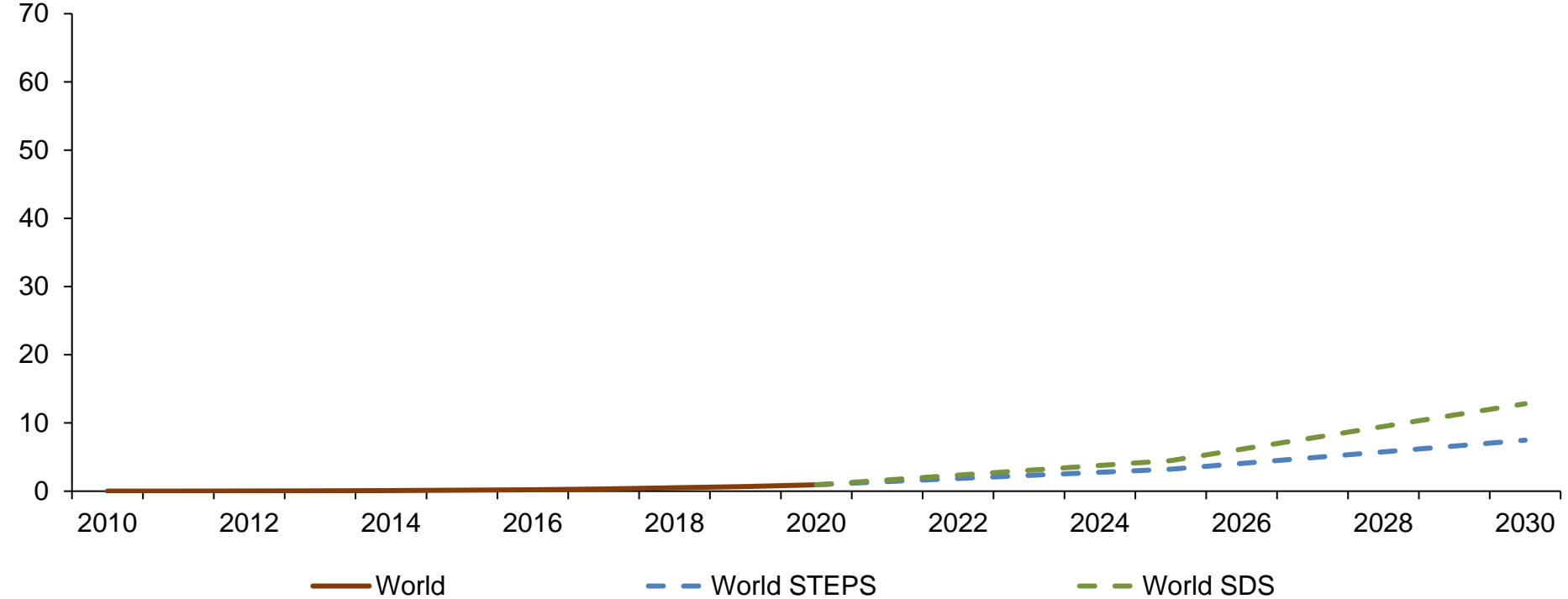


Note: STEPS stands for Stated Policies Scenario and SDS stands for sustainable development scenario. The STEPS is the baseline scenario.



# Battery Electric Vehicle Fleet Share through 2030

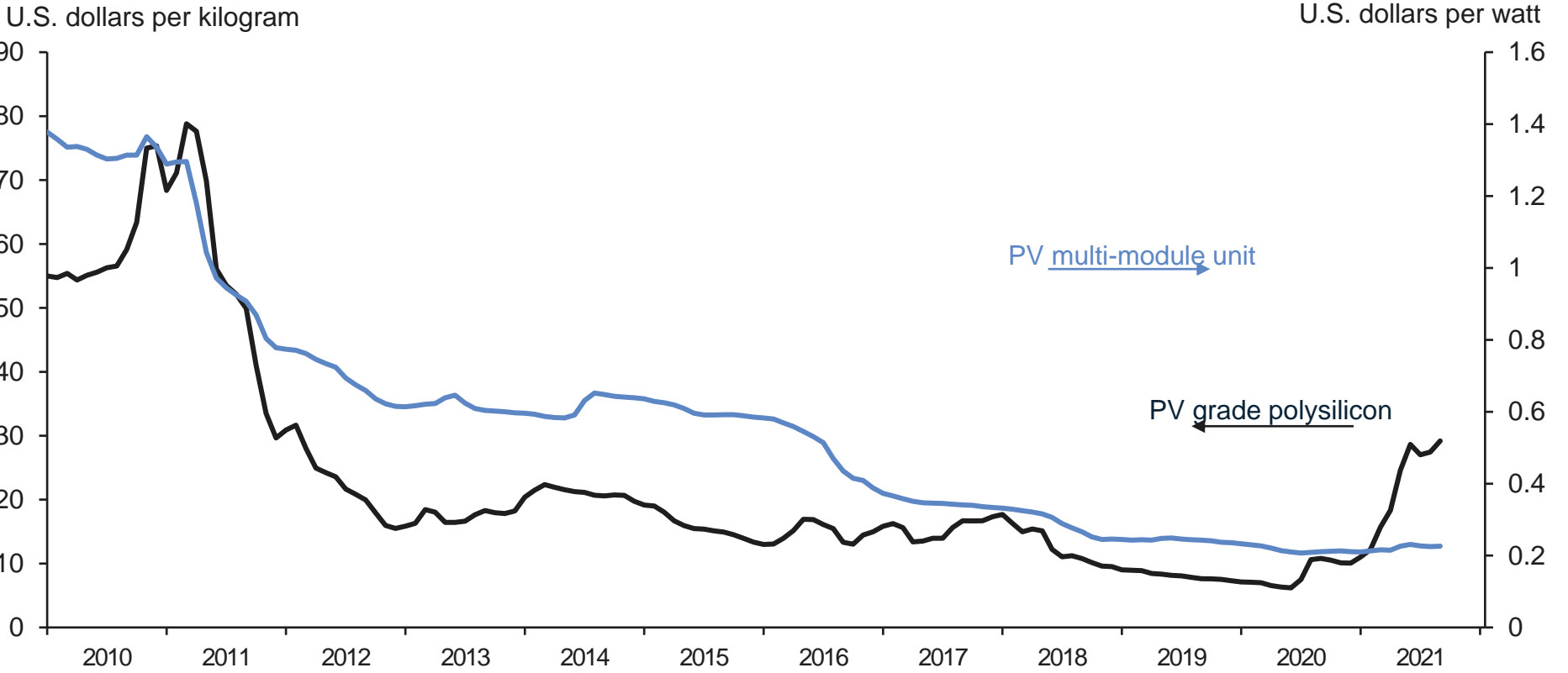
Percent of all cars in global fleet



Note: STEPS stands for Stated Policies Scenario and SDS stands for sustainable development scenario. The STEPS is the baseline scenario.

Source: IEA (Global EV Outlook 2021).

# Photovoltaic (PV) Module and Silicon Prices



NOTE: Weekly data through June 18, 2021.

SOURCE: PVInsights.

# Questions?

**We need your input!**





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# Energy Update

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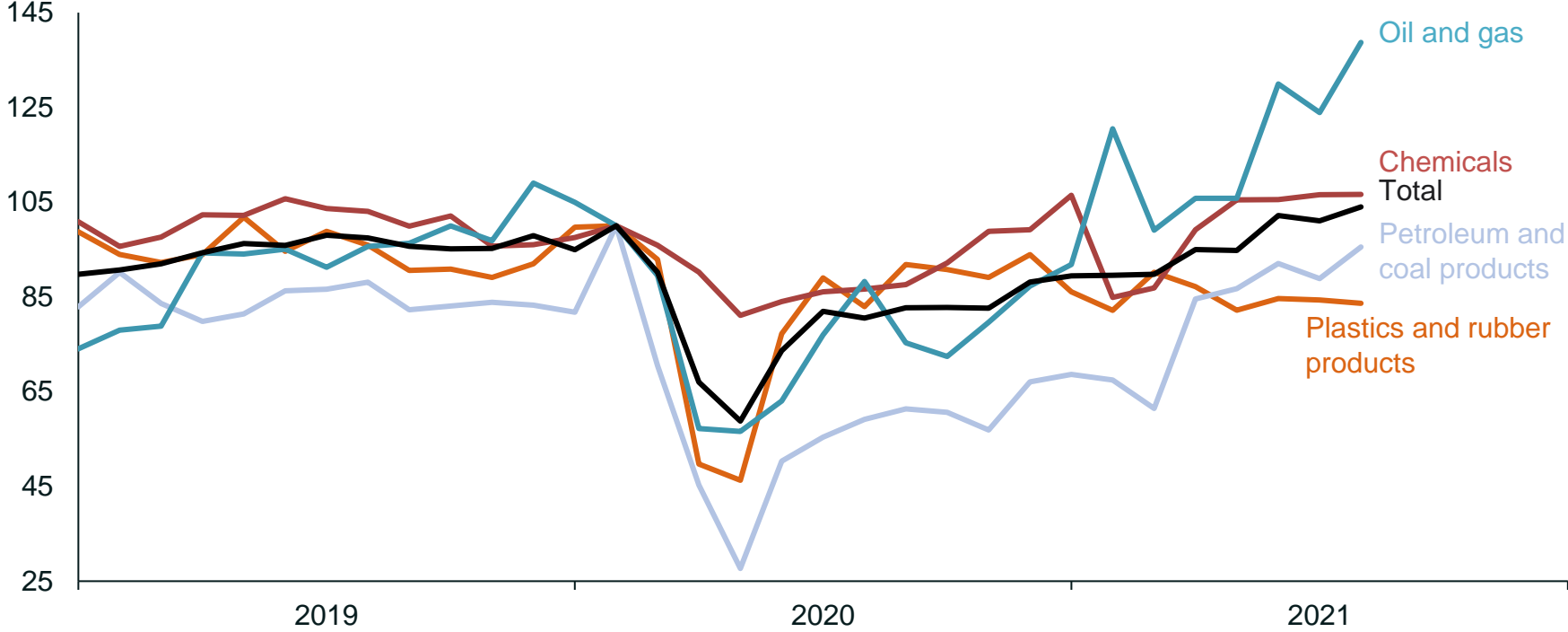
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# Other slides

# Real Texas Exports: Energy exports rising in 2021.

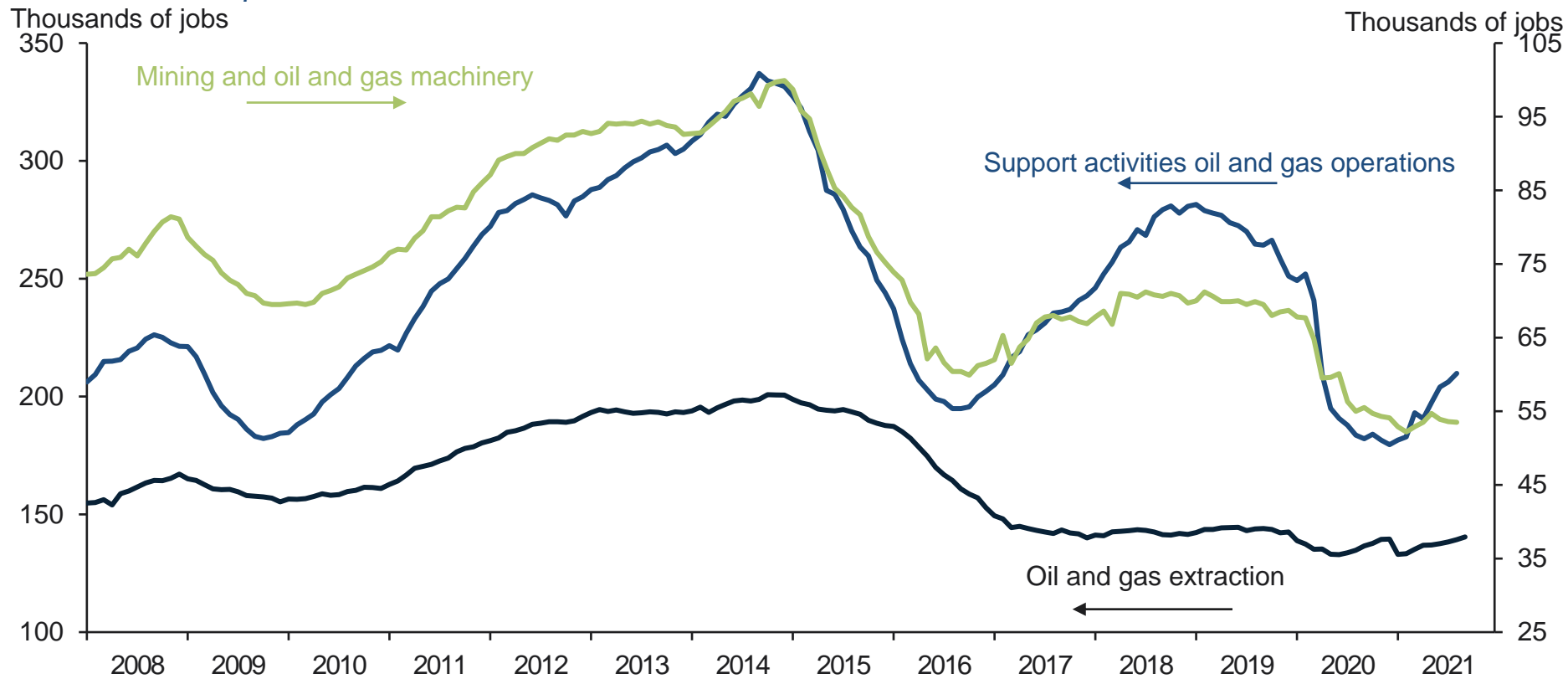
Index, Feb. 2020 = 100



NOTES: Data are seasonally adjusted.

SOURCES: U.S. Census.

# U.S. Oil and Gas Employment: oil and gas back to pre-shale levels of employment, oilfield hiring ramping up, but numbers subject to revision.

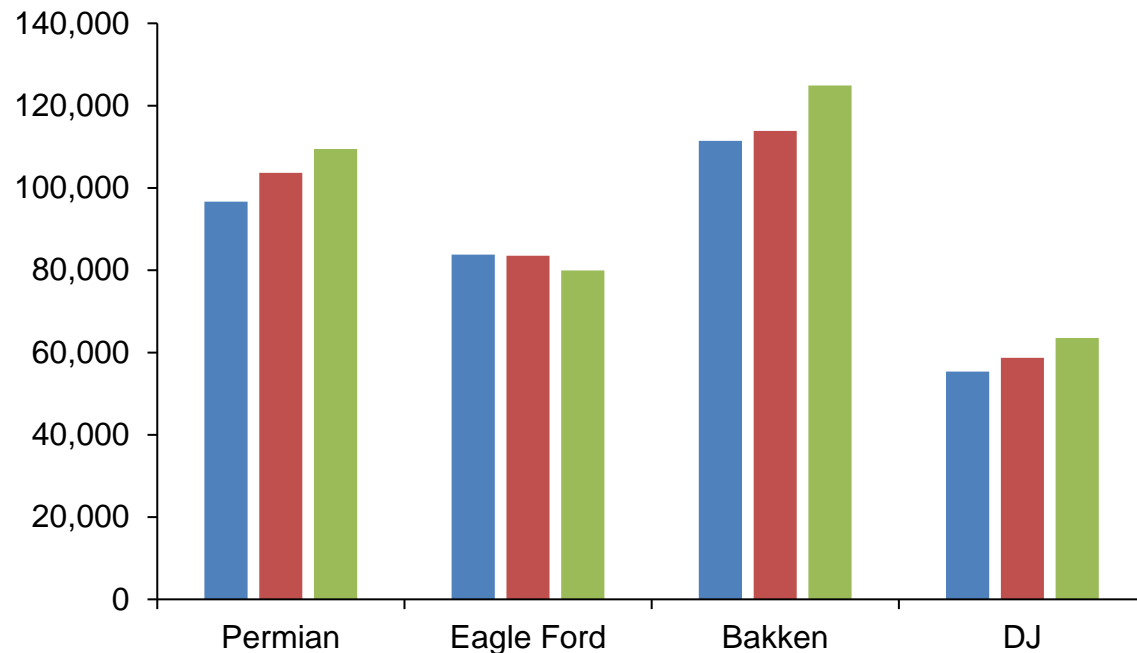


SOURCES: Bureau of Labor Statistics.

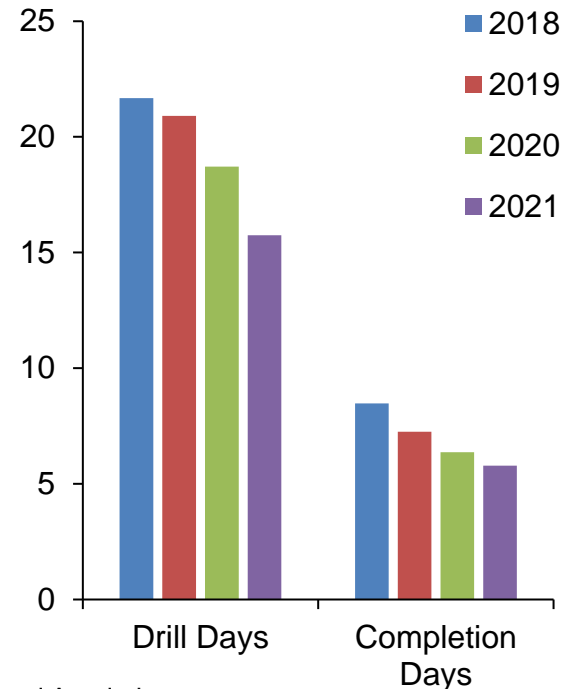


# Well Productivity: up in 2020; Less time needed to drill and complete in 2021

## 6-month cumulative oil production for new wells



## Number of days



NOTE: Drilling and completion days are weighted averages across Permian, Eagle Ford, Bakken, Niobrara, and Anadarko.

SOURCES: WellDatabase, Kayrros.