Rice Center for Energy Studies Webinar: Is Oil Demand Doomed With or Without Climate Policy?

R. Dean Foreman, Ph.D.

June 18, 2021

American Petroleum Institute

Rühl and Erker (May 2021) conclusions

1. Oil intensity of the global economy has historically followed a linear trend, generally with regional convergence (not always smooth)
2. Oil price sensitivity has diminished over time
   - ✓ For forecasting, oil intensity appears to offer a sound basis
   - ✓ For policy, subsidies and regulation per se not will not be insufficient to decarbonize -- need a carbon price

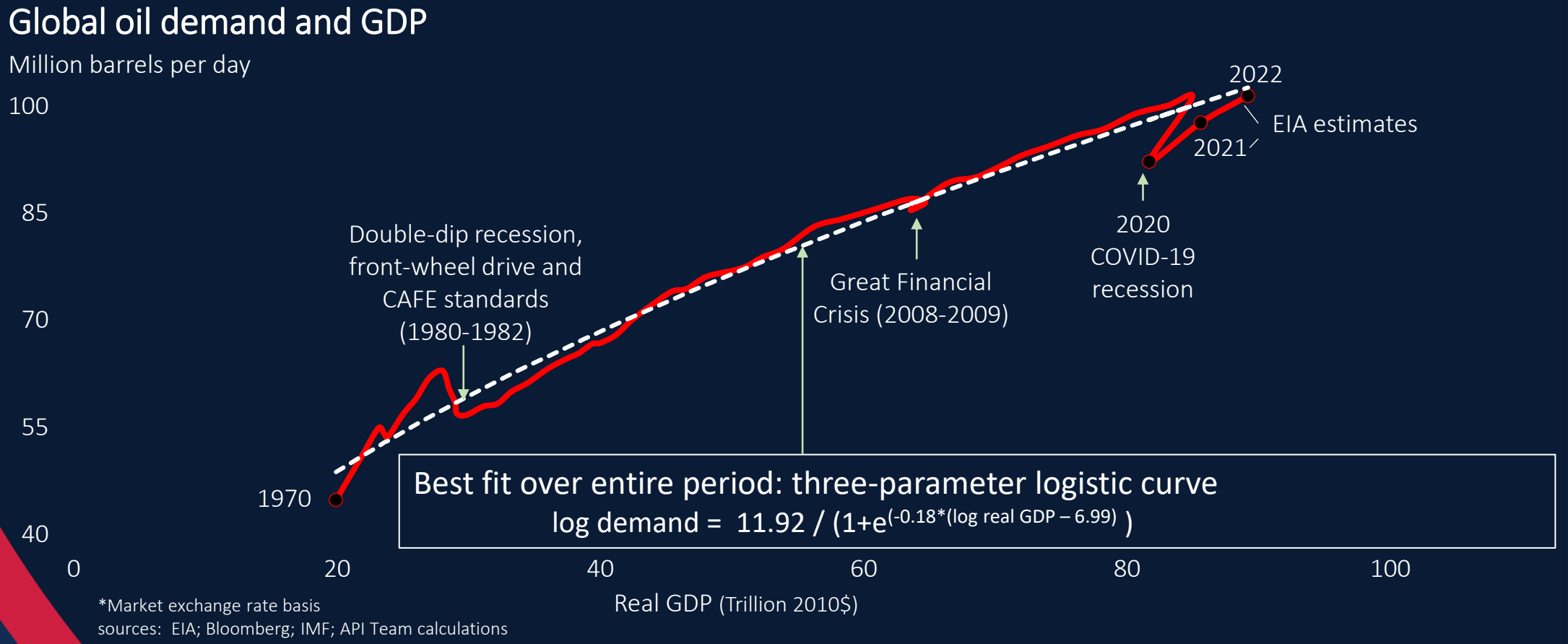
For discussion…

Technicalities: 1) linearity & regional convergence (GDP basis; time);
2) attribution analysis (GDP vs. consumption)
3) End-use sector considerations; 4) Forecasting or "rule-of-thumb" sensitivity tool?

Policy: Paper emphasizes oil intensity, but policy focuses on consumption and emissions
Paper employs PPP GDP but doesn't discuss affordability or household income by region

Global oil demand has continued to rebound along with real GDP and could reach new highs in late 2022

- Oil intensity of the economy has diminished over time, as Christof and Erker (2021) observe, but historically at a diminishing rate best parameterized since 1970 by a three-parameter logistic curve



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

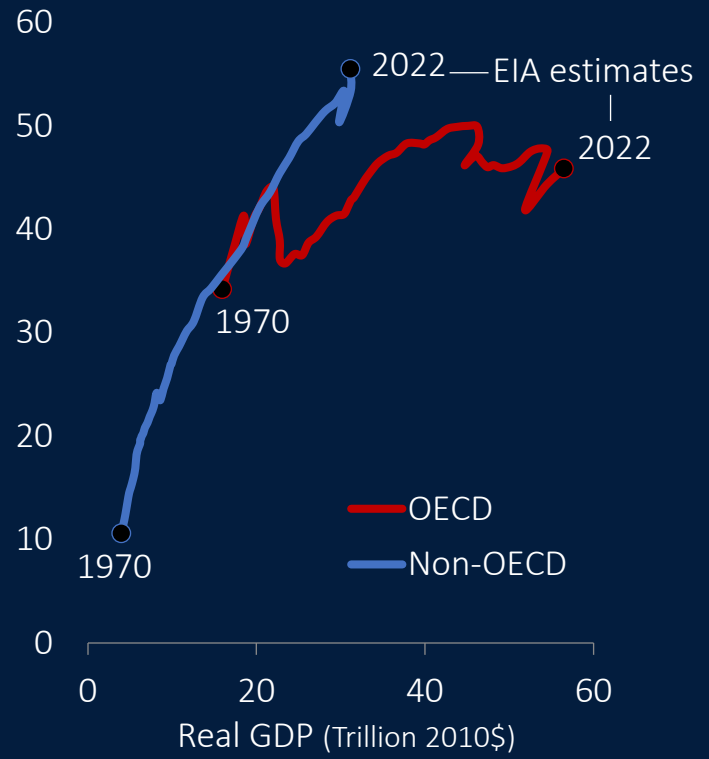
American Petroleum Institute

Data methodology and inputs can influence the extent of linearity and regional convergence in global oil demand intensities

- IEA energy data methodology (estimation) can contribute to the smoothness of non-OECD demand data
- GDP adjustments for purchasing power can influence the extent to which oil-to-GDP ratios have decreased and converged among regions

Global oil demand versus GDP

Million barrels per day

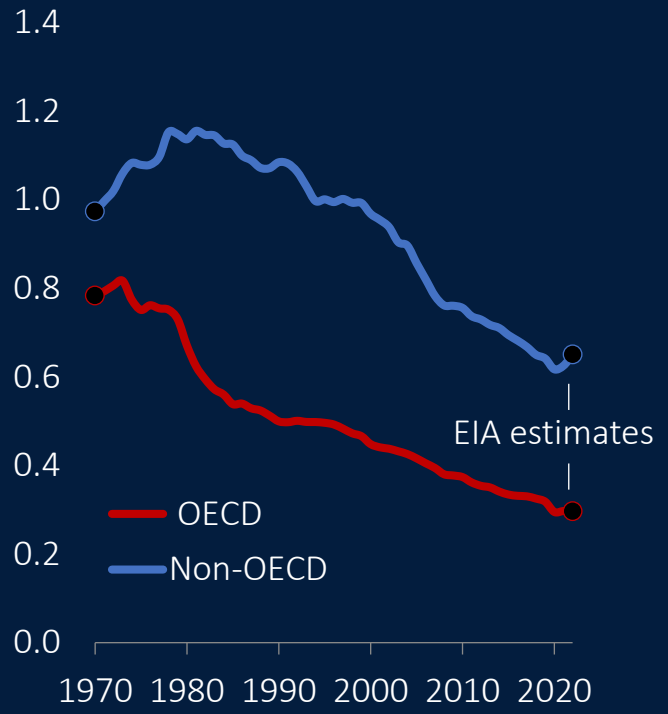


*Market exchange rate basis

sources: EIA; Bloomberg; IMF; API Team calculations

Oil-to-GDP Ratio

Barrels per thousand dollars GDP



Oil-to-GDP ratio average annual changes by region and GDP basis (1990-2019)

	MER GDP	PPP GDP
OECD	(1.54)	(1.56)
Non-OECD	(1.80)	(1.93)

Implications

- While oil demand and emissions are the same under either GDP assumption, PPP GDP gives the appearance of faster improvement – esp. for emerging economies
- Energy model elasticities cannot simply be taken from the economic literature and instead must be calibrated to the specific energy and GDP series

Foreman (Oct. 2018), "Criticality of GDP measurement in energy modelling." U.S. Association for Energy Economics online proceedings.

American Petroleum Institute

API Industry Outlook – Q2 2021 key points

- **Economy on track -** Consensus expectations for the strongest two-year economic growth since 1972-1973

- **Global oil market recovery in progress**
  - **U.S. petroleum demand of 19.6 mb/d in April 2021 climbed to within 3.5% of its Q2 2019 level, which was its highest for the month in 11 years.**
  - **Record growth.** EIA projects growth of +5.4 million barrels per day (mb/d) in 2021 and +3.7 mb/d in 2022 – record 2-year gains and new highs by Q4 2022
  - **Who gains?** Every producing region could participate in the recovery, but U.S. production recovery remains a question

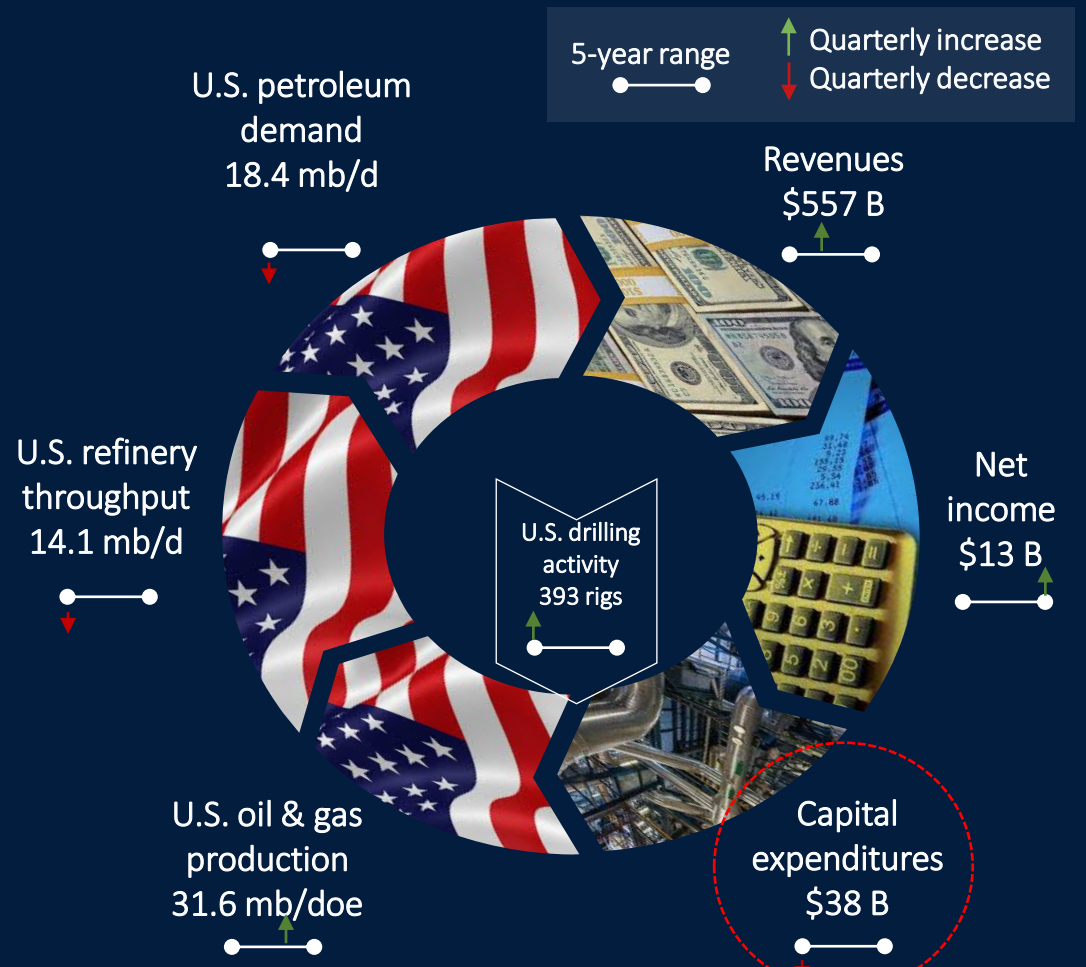
- **Natural gas –** Solid overall natural gas demand recovery and pull for record U.S. natural gas exports

- **The crux: Robust economic and energy market recovery contrasts with historically low capital investment and drilling activity. Global liquids spare capacity could become tight in 2022**

First quarter 2021 by the numbers

Benchmark price averages

Brent crude oil: $60.69 per barrel
WTI crude oil: $58.13 per barrel
NGL composite: $6.70 per mmBtu
Natural gas (Henry Hub): $3.37 per mmBtu



- Financial compilation based on *API 200* companies with shares listed on U.S. stock exchanges.

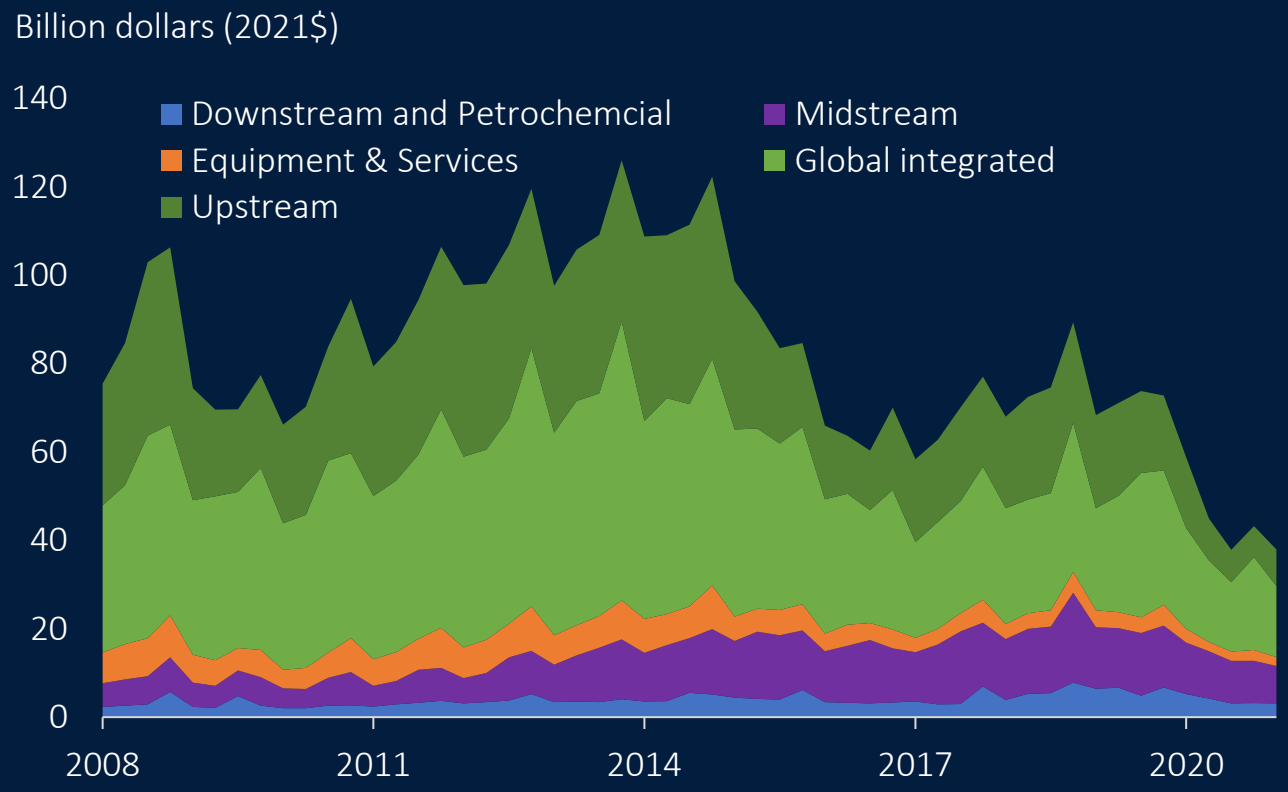
sources: EIA; API Monthly Statistical Report; Bloomberg and company reports; Baker Hughes; API Team analysis

American Petroleum Institute

Industry capital expenditures fell to $38 billion – lowest on record for any quarter since 2008, and the backlog of U.S. projects under construction shrank to $174 billion

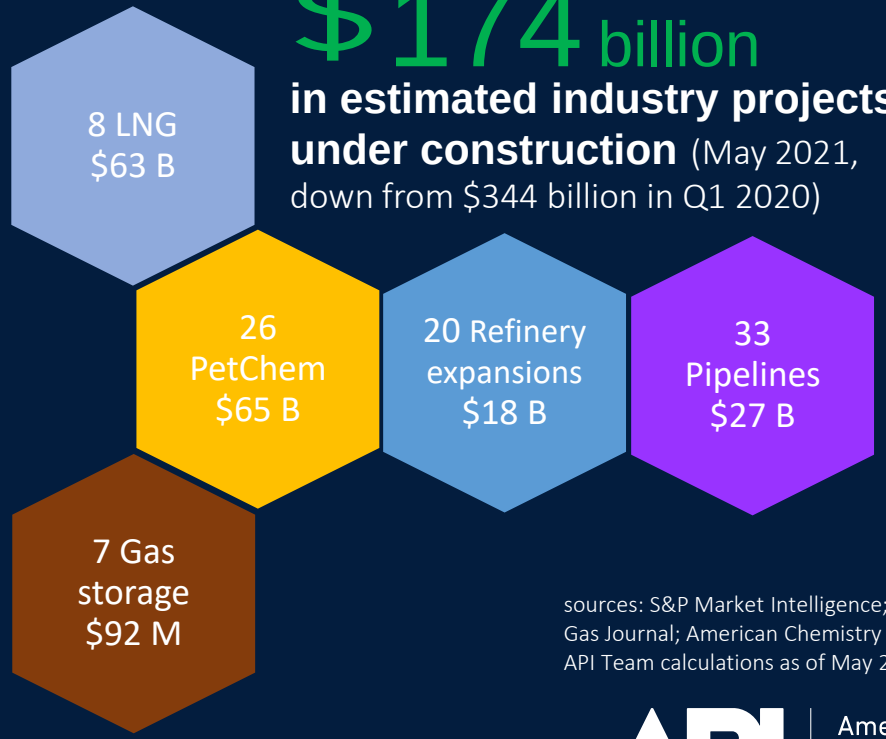
- The industry invested $37.8 billion in Q1 2021, compared with $65.5 billion in the same quarter of 2019
- Across the energy value chain, API is monitoring 94 oil & gas-related projects currently under construction worth $174 billion

Capital expenditures by industry segment



* All other oil & gas industry companies
sources: Bloomberg; publicly-available company reports; BLS

$174 billion in current U.S. energy infrastructure investments



$174 billion
in estimated industry projects under construction (May 2021, down from $344 billion in Q1 2020)

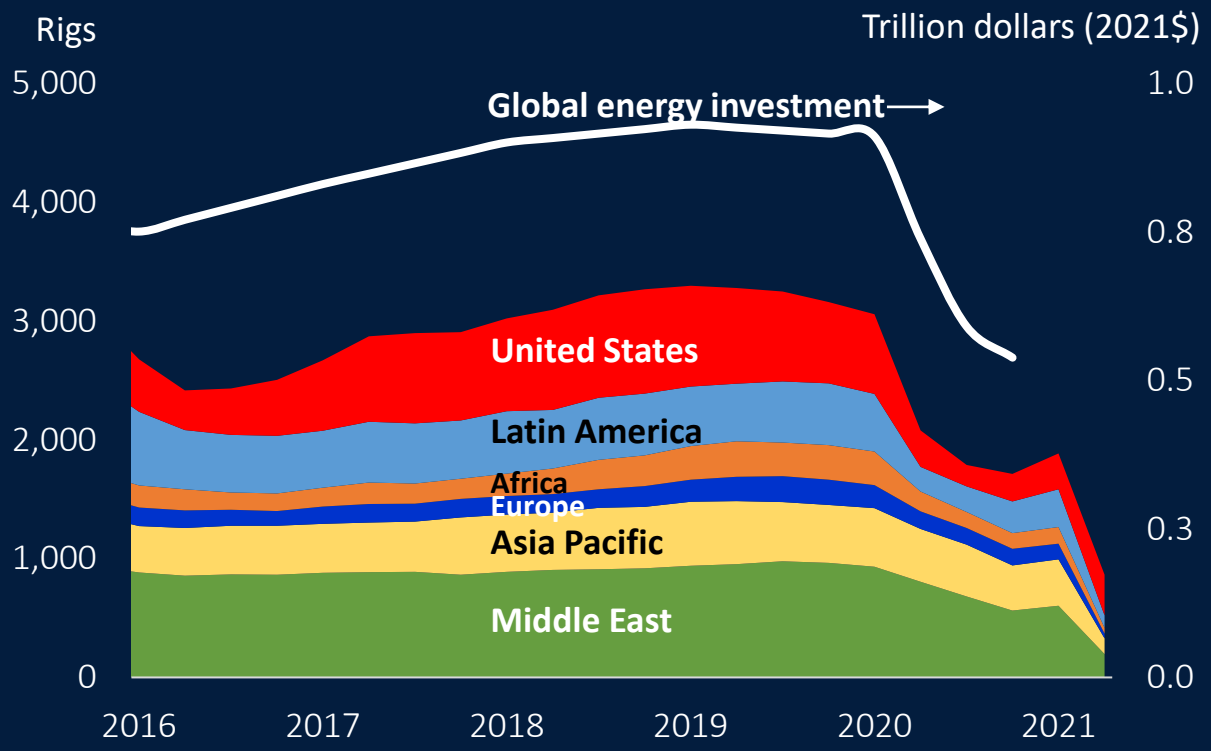
sources: S&P Market Intelligence; Oil & Gas Journal; American Chemistry Council; API Team calculations as of May 2021

American Petroleum Institute

Global oil drilling and investment decreased in level and in relation to other energy sources, even in the most consistent region

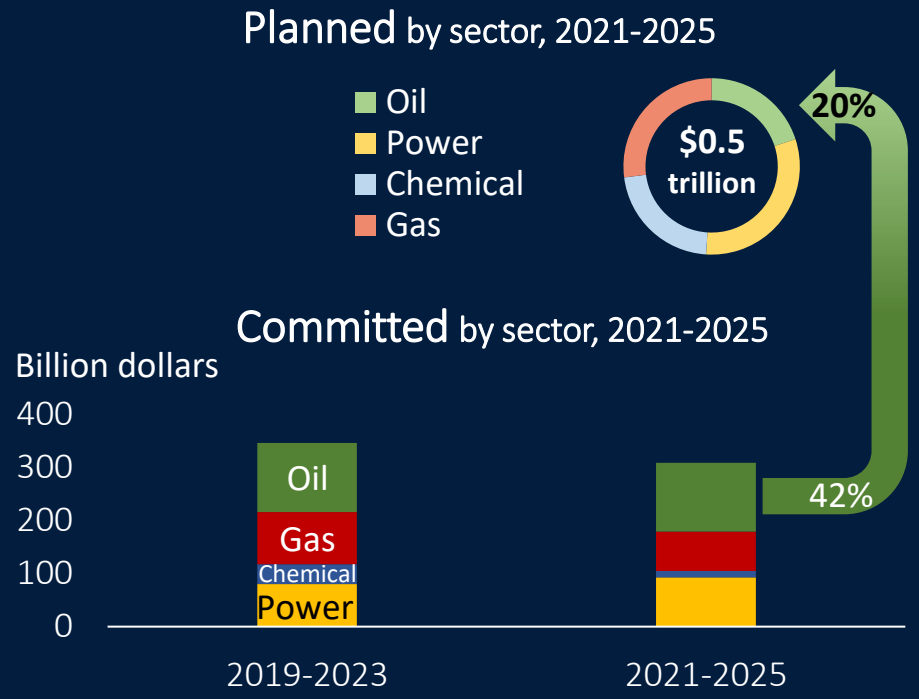
- Middle East & North Africa (MENA) drilling and investment historically have been the most consistent but dropped in 2020
- MENA planned oil investments (2021-2025) decreased and lost share among total energy investments per APICORP

Global oil drilling activity and capital investment, quarterly



sources: Baker Hughes; IEA; Bloomberg; API Team analysis

MENA energy investment outlook



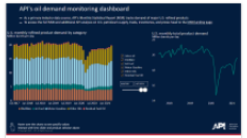
source: Arab Petroleum Investments Corporation

American Petroleum Institute

API economics resources available at www.api.org

Data Visualization

Explore API's Interactive Data Visualizations.



Tracking U.S. Oil Demand

Primary monthly API data tracking refined product consumption

Explore Visualization

U.S. Consumer Expenditure Summary

Summarizing leading U.S. consumer expenditure categories over time

Explore Visualization

API's Distillate Economic Indicator ™

API's proprietary Distillate Economic Indicator™ leverages refined product demand estimates to broadly track economic activity

Explore Visualization

U.S. Consumer Expenditure Flows By Income Level

Mapping U.S. consumer expenditure flows by income level and spending category

Explore Visualization

U.S. Consumer Expenditure Burden By Income Level

Measuring U.S. consumer expenditure burden by spending category and income level

Explore Visualization

American Petroleum Institute

Home | About | Membership | API Careers | Chief Economist | Contact

Natural Gas & Oil | Products & Services | Policy & Issues | Climate Action | Blog, News & Media

Home / Products & Services / Statistics Reports & Surveys / API's Economic Industry Outlook

API's Economic Industry Outlook

- Reports & Surveys
- Weekly Statistical Bulletin
- Monthly Statistical Report
- Economic Outlook
- Data Visualization

The API Industry Outlook, developed by API's Dean Foreman, is a quarterly report that provi natural gas and oil industry as it relates to the economies.

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)

American Petroleum Institute