Key points

- **Strong global economic rebound broadly expected this year and in 2022**
  - Led by emerging markets, 3rd party consensus estimates for global real GDP growth have risen to 4.7% y/y in 2021 and 4.0% y/y in 2022

- **Record global oil demand growth could stretch supply** – EIA projects record two-year demand growth of +5.3 mb/d in 2021 and +3.8 mb/d in 2022 – and new global highs by Q4 2022
  - OPEC & Russia could redeploy 4.6 mb/d of capacity by Q4 2022 per EIA
  - The U.S. could add 3.0 mb/d of liquids production for a record-high of 20.8 mb/d by Q4 2022 per EIA

- **Natural gas** – Strong productivity helped sustain production despite historically low drilling activity
  - U.S. solid (regionally disparate) winter demand; record natural gas exports
  - Natural gas remains integral to planned U.S. power generation capacity additions, but global coal-fired power additions could outpace it

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**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
Industry capital expenditures remained historically low in Q4 2020, and the backlog of U.S. projects under construction has fallen by $50 billion y/y

- The industry invested $42.1 billion in Q4 2020, compared with $70.5 billion in the same quarter one year ago
- Across the energy value chain, API is monitoring 77 oil & gas-related projects currently under construction worth $194 billion

**Capital expenditures by industry segment**

<table>
<thead>
<tr>
<th>Billion dollars (2021$)</th>
<th>Downstream and Petrochemical</th>
<th>Equipment &amp; Services</th>
<th>Midstream</th>
<th>Global integrated</th>
<th>Upstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
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<td>2011</td>
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<td>2020</td>
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</tbody>
</table>

- All other oil & gas industry companies

**$194 billion in current U.S. energy infrastructure investments**

- 7 LNG expansions
  - $84 B
- 23 PetChem expansions
  - $69 B
- 17 Refinery expansions
  - $18 B
- 21 Pipelines
  - $23 B
- 9 Gas storage
  - $119 M

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

*All other oil & gas industry companies

sources: Bloomberg; publicly-available company reports; BLS
Global real GDP outlook

Led by emerging markets, 3rd party consensus estimates are for global real GDP growth of 4.7% y/y in 2021 and 4.0% y/y in 2022.

Every region is expected to grow in 2021 and 2022, but China and the rest of Developing Asia Pacific economies have remained on a greater scale with relatively mild 2020 recessions and strong resumed growth.

China could overtake the U.S. as the world’s largest economy by 2028 per Bloomberg.

Sources: IMF, Bloomberg * Market exchange rate basis
Global oil prices have historically been inversely correlated with the U.S. dollar’s broad foreign exchange value.

Three quarters after the onset of the Great Financial Crisis in 2008, the U.S. dollar appreciated, and oil prices fell. By contrast with the 2020 COVID-19 recession, the U.S. dollar depreciated, and oil prices rose.

Recent U.S. dollar depreciation has correlated with increased oil prices.

Two perspectives on Brent crude oil spot prices and the U.S. dollar’s foreign exchange value:

- **FRB broad nominal dollar index**
- **Real Brent crude oil spot price**

Sources: Federal Reserve Board; Bloomberg; U.S. Bureau of Labor Statistics.
What we’re watching now

Although uncertainties on the path of global recovery remain, natural gas and oil demand is generally expected to be led by emerging markets. Central Bank Digital Currencies may present a credible thread to the U.S. dollar’s global status.

Policy Support and Vaccines Expected to Lift Activity

- **A stronger starting point** for the 2021-2022 forecast with vaccinations and adapted activities
- Softening in early 2021 is expected to give way to **rising momentum beginning in Q2 2021**
- **Fiscal policy support** set to boost activity in some countries, but most are expected to experience lower deficits in 2021
- **Supportive financial conditions.** Major central banks are assumed to maintain their current policy rate settings throughout the forecast horizon to the end of 2022

**International Monetary Fund**, January 2021

Ready, steady, go? Results of the 3rd BIS survey on central bank digital currency

- The Bahamas launched the first “live” CBDC in Q1 2021, and central banks collectively representing a fifth of the world’s population are likely to issue a central bank digital currency (CBDC) in the next three years --- a transparent and stable version of blockchain-based cryptocurrency
- In emerging market and developing economies, financial inclusion and payments efficiency objectives motivate the shift towards CBDCs

C. Boar and A. Wehrli, **Bank of International Settlements**, Jan. 2021

Oil Market Report, February 2021

- IEA expects world oil demand growth of **5.4 mb/d** in 2021 with a more favorable economic outlook and stronger oil demand in the second half of the year
- Global oil supply rose by 0.6 mb/d in January and was set to fall in February as Saudi Arabia cut
- Global implied stock draws rose 2.24 mb/d in 4Q20 from 1.56 mb/d in 3Q20, and IEA expects higher stock draws over the second half of 2021

**International Energy Agency**, February 2021

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**C. Boar and A. Wehrli, Bank of International Settlements, Jan. 2021**
Global oil demand recovery in 2021 and 2022 could become the largest two-year increase on record since 1950

- EIA projects global oil demand was 96.7 mb/d in February - within 1.0% of its February 2020 level of 97.7 mb/d – and could rise by a total of 9.1 mb/d this and next year (5.3 mb/d in 2021 and 3.8 mb/d in 2022)

Global oil demand
Million barrels per day

- Great Financial Crisis (2008-2009)
- COVID-19 recession

*Market exchange rate basis sources: IEA; EIA; Bloomberg

Real GDP (Trillion 2010$)

EIA estimates

2020
2021
2022
Global oil demand could set a new record-high by the end of 2022 per EIA

- EIA projects global oil demand of 102.4 mb/d in Q4 2022, with similar increases (Q1 2021 to Q4 2022) by developed (+3.4 mb/d) and emerging economies (+3.9 mb/d)
- For global supply by Q4 2022, EIA projects OPEC and Russian & Caspian producers to redeploy 4.7 mb/d of spare capacity, while U.S. production could rise by 1.7 mb/d by Q4 2021 and add another 1.4 mb/d to reach a new high for U.S. liquids production of 20.8 mb/d in Q4 2022

**EIA estimates**

**Global oil demand**
- Million barrels per day

**Global oil supply**
- Million barrels per day

Source: EIA STEO (March 2021)
Strong sustained U.S. oil well productivity has kept downward pressure on estimated breakeven prices

- EIA reported solid well productivity even as companies have begun to re-deploy rigs and crews that were idled
- BTU Analytics estimated breakeven prices were below recent market prices among major U.S. oil producing basins

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

![Graph showing U.S. oil well productivity over time](source: EIA Drilling Productivity Report)

**Oil estimated breakeven prices***

- Bakken
  - Feb. 2021: 30
  - Feb. 2020: 40

- Eagle Ford - West
  - Feb. 2021: 25
  - Feb. 2020: 30

- Eagle Ford - East
  - Feb. 2021: 20
  - Feb. 2020: 25

- DJ Niobrara
  - Feb. 2021: 25
  - Feb. 2020: 30

- Permian - Delaware
  - Feb. 2021: 30
  - Feb. 2020: 35

- Permian - Midland
  - Feb. 2021: 30
  - Feb. 2020: 35

*Half cycle breakevens assuming 10% discount factor. Sources: BTU Analytics; CME Group
EIA projects U.S. liquid fuels consumption could return to its 2019 levels by the second half of 2021

- Indicators of industrial and chemical production, daily flights and mobility statistics, and vehicle miles traveled tracking show broad recovery from Q2 2020 lows, but ongoing year-on-year declines as of Q1 2021
- EIA projects Q2 2021 total consumption for refined products to reach that of pre-COVID levels, with the strongest recoveries in motor and jet fuels

Refined product key U.S. demand indicators, As of March 2021 YoY

- Passenger VMT: -10%
- Truck VMT: +6%
- Total Flights: -13%
- Manufacturing: +20%
- Apple Mobility: +5%
- DAT Spot Loads: +72%
- TSA Passengers: -56%
- Chemicals: +3%

U.S. liquid fuel consumption by fuel

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>Million barrels per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jet fuel</td>
<td>2016: 3.5, 2018: 3.0, 2020: 3.1, 2022: 3.5</td>
</tr>
<tr>
<td>Other (naphtha/gasoil; HGLs)</td>
<td>2016: 0.5, 2018: 0.3, 2020: 0.4, 2022: 0.5</td>
</tr>
</tbody>
</table>

U.S. Federal Highway Administration; FlightRadar24; ISM PMI; ACC; TSA; Apple; DAT.
U.S. refinery capacity utilization could recover gradually, but U.S. crude oil trade is projected to revert to net imports in Q2 2021 per EIA.

- EIA expects refinery capacity, domestic demand and refined product exports to re-strengthen over the next year, but lower U.S. drilling and production could set back U.S. crude oil exports.

**U.S. liquid fuel consumption and refinery throughput**

- U.S. liquid fuel consumption over time.
- Refinery crude distillation unit capacity utilization rate.
- EIA estimates.

**U.S. petroleum net trade**

- Million barrels per day.
- Refined products.
- Total petroleum.
- Crude oil.
- Net exports.
- Net imports.

*Sources: EIA; API MSR.*
Natural Gas
Natural gas market recovery in Asia Pacific and Europe has keyed record trade and U.S. liquefied natural gas (LNG) exports

- Asia and Europe have consistently led in LNG imports, while the U.S. has emerged as an exporter with new infrastructure
- Following weakness in mid-2020, robust global growth LNG trade and record U.S. exports appeared in Q1 2021

Regional gas hub pricing
$2021 per mmBtu, monthly

- UK Benchmark (NBP)
- Dutch Benchmark (TTF)
- Asian Benchmark (JKM)
- Henry Hub

Global LNG trade by region
Billion cubic meters

- Asia Pacific
- Europe
- North Am
- Latin Am
- Middle East

Q1 Asian cold snap

Sources: Bloomberg; Quandl; EIA
Recent natural gas futures prices have exceeded estimated breakeven prices among top producing regions

- Dedicated drilling for dry gas sustained solid productivity gains per EIA
- Estimated natural gas breakeven prices moved in different directions by producing region but generally remained below recent natural gas futures prices

**Natural gas well productivity – production per rig**

- Million cubic feet per day nat. gas-equivalent

**Natural gas estimated breakeven prices**

- Dollars per million Btu (mmBtu)

- Haynesville
  - Feb 2021
  - Feb. 2020

- Appalachia - Northeast PA

- Appalachia - Southwest PA

- Appalachia - Ohio

*Half cycle breakevens assuming 10% discount factor and play-specific costs sources: BTU Analytics; CME Group
U.S. natural gas exports could grow while supply and demand recede from 2019 highs per EIA, despite cold winter seasonality

- Q1 2021 brought a polar vortex and polarizing effects on gas demand for power by region, with large gains/losses as power competed with other fuels.
- COVID-driven 2020 declines in demand and dry gas production could be extend into 2021 before broadly recovering per EIA.

U.S. power sector gas consumption

Year-to-date through March 1st, y/y%

U.S. natural gas consumption and production by sector, Trillion cubic feet

Net Exports
Electric Power
Industrial
Res / Comm

2020
2021
2022
2023
2024

sources: EIA Hourly Grid Monitor; FERC
While the U.S. is poised to add 190 GW of gas and renewable power through 2024, global coal capacity is expected to increase by over 200 GW.

- Natural gas has remained competitive in the mix of U.S. electricity capacity additions with a 30% share through 2024.
- By comparison, 209 GW of added coal capacity could come online by 2024 in emerging per the Global Energy Monitor estimates.

Global coal capacity additions vs. U.S. net generation capacity changes

Gigawatts

- Additions
- Retirements

2020 2021 2022 2023 2024

- Coal
- Natural Gas
- Wind & Solar
- Other

Indonesia
Other
India
China

Global coal additions by 2024
+209 GW

U.S. natural gas and renewables
+190 GW

Sources: Global Energy Monitor; IEA WEO 2020; EIA AEO 2021
Projects listed as under construction or permitted.
API economics resources available at www.api.org

API's Economic Industry Outlook

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.