Demand indicators of transportation and broad manufacturing activity showed continued growth.

- EIA projects U.S. annual oil consumption growth of 0.9% y/y in 2023 and 1.6% y/y in 2024.
- Liquid fuel consumption is expected to be at or above pre-Covid 2019 levels.

**U.S. demand indicators, Q1 2023 vs. Q1 2019**

- Total flights: +8.6%
- Manufacturing: -0.8%
- Vehicle miles traveled: -0.1%
- DAT spot truck posts: -1.0%

**U.S. liquid fuel consumption by fuel**

- Motor gasoline
- Distillates/diesel fuel
- Jet fuel
- Other (naphtha/gasoil; HGLs)
- Residual fuel oil

Sources: EIA; API

*Sources: FlightRadar24; FRB; FHA; DAT Trendlines*
U.S. Natural gas consumption this summer to be the second most on record

- January and February 2023 were one of the warmest months on record, reducing residential and commercial demand.
- Natural gas power demand this summer is anticipated to be greater due to lower prices relative to 2022.
- Assuming normal weather, 2023 residential and commercial gas consumption to fall by 0.8 Bcf per day relative to 2022.

Monthly winter U.S. heating degree days

U.S. natural gas consumption and production by sector, Billion cubic feet per day

source: EIA STEO (May 2023)
U.S. oil production has sustained solid levels despite historically low drilling activity

- U.S. crude production in March 2023 remained 2.3% lower than its pre-pandemic peak level in November 2019.
- If NGLs are included (not illustrated), the U.S. has already exceeded all-time record highs in liquid production.
- EIA projects that by the end of 2024, U.S. crude oil production will be at all time highs, exceeding pre-Covid levels.

U.S. crude oil production

Million barrels per day

sources: EIA
Snapshot: US Drilling Activity

- U.S. oil drilling in March 2023 remained nearly 24% lower than its level at the same point in 2019.
- Drilled but uncompleted wells are showing signs of marginal decline along with slowness in drilling activities.

U.S. drilling activity and WTI crude oil prices, monthly

Sources: Baker Hughes; EIA
Estimated average breakeven prices have risen as operating costs have gone up

- Drilling productivity is higher than pre-Covid levels.
- 2021 level drilling rig productivity level occurred during extremely low rig counts.
- Occasionally, estimated breakeven prices exceeded recent market prices among some U.S. oil producing basins.

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

<table>
<thead>
<tr>
<th>Year</th>
<th>Bakken</th>
<th>Eagle Ford</th>
<th>DJ Niobrara</th>
<th>Permian</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>1.5</td>
<td>1.2</td>
<td>0.8</td>
<td>0.6</td>
</tr>
<tr>
<td>2017</td>
<td>2.0</td>
<td>1.8</td>
<td>1.0</td>
<td>1.3</td>
</tr>
<tr>
<td>2018</td>
<td>2.5</td>
<td>2.2</td>
<td>1.5</td>
<td>1.7</td>
</tr>
<tr>
<td>2019</td>
<td>3.0</td>
<td>2.8</td>
<td>2.0</td>
<td>2.2</td>
</tr>
<tr>
<td>2020</td>
<td>3.5</td>
<td>3.2</td>
<td>2.5</td>
<td>2.7</td>
</tr>
<tr>
<td>2021</td>
<td>4.0</td>
<td>3.5</td>
<td>3.0</td>
<td>3.2</td>
</tr>
<tr>
<td>2022</td>
<td>4.5</td>
<td>4.0</td>
<td>3.5</td>
<td>3.7</td>
</tr>
<tr>
<td>2023</td>
<td>5.0</td>
<td>4.5</td>
<td>4.0</td>
<td>4.2</td>
</tr>
</tbody>
</table>

**Oil estimated breakeven prices***

- Bakken: Mar. 2023
- Eagle Ford - Shale: Mar. 2022
- DJ Niobrara: Mar. 2023
- Permian - Delaware: Mar. 2023
- Permian - Midland: Mar. 2023

*Full cycle breakevens assuming 10% discount factor.  

*source: EIA Drilling Productivity Report

source: Rystad Energy

**Oil Prices (WTI):**

- Mar. 2023: $79.44
- Apr. 2023: $101.64
- Mar. 2022: $101.64
- Apr. 2022: $101.64
U.S. natural gas production is at all-time highs and projected to increase

- U.S. natural gas marketed production rose by 7.0% (7.2 bcf/d) y/y to 110.5 bcf/d in Q1 2023 and is expected by EIA to grow in 2023 and 2024 despite a slowing of drilling activity.

**U.S. natural gas production**

- Billion cubic feet per day

- Sources: EIA; Baker Hughes

- EIA estimates 2023-24

- Marcellus/Utica
- Permian
- Hayneville
- Other shale plays
- Other minor plays
U.S. Natural Gas Inventories are 19% greater than the 5-year average

- High storage levels should reduce summer injection demand relative to last year allowing for more supply for power generation.
- With ample storage levels and increased natural gas production, EIA projects relatively moderate prices through the end of 2024.

U.S. working gas in underground storage

- Source: EIA (May 2023)

EIA Henry Hub natural gas spot prices

- Source: EIA (May 2023)
Natural gas-dedicated drilling has sustained strong productivity

- Drilling rig productivity is above pre-Covid levels.
- Estimated natural gas breakeven prices remained above recent natural gas futures prices.
- Appalachia prices are approximately $1/MMBtu below Henry Hub prices.

Natural gas well productivity – production per rig

- Million cubic feet per day

source: EIA Drilling Productivity Report

Natural gas estimated breakeven prices

- Dollars per million Btu (MMBtu)
- Henry Hub prompt month: $2.20 per MMBtu, April 2023
- Haynesville
  - April 2023
  - April 2022
- Appalachia - Marcellus
  - Henry Hub prompt month: $1.24 per MMBtu, April 2023

*Full cycle breakevens assuming 10% discount factor and play-specific costs sources: Rystad Energy
Snapshot: U.S. Crude and Transportation Prices

The price decline of oil and the benchmark crude, West Texas Intermediate, is driving down diesel prices and holding gas prices stable as the summer driving season begins.

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

Dollars per gallon (2023$)

sources: EIA; AAA; API Team analysis
U.S. Inventories of motor gasoline and distillates have been below or near historic 5-year lows

Inventories of motor gasoline and distillates have been the main point of concern, and nationwide days of supply – currently 29.0 days as of May.

Motor gasoline inventories

- December 2022 inventory levels are below the 5-year range.

Distillates inventories

- December 2022 distillates inventory levels are below the 5-year range.

U.S. commercial crude oil inventories

- December 2022 commercial crude oil inventories are below the 5-year range.

sources: EIA; API MSR™
Global demand is expected to be at all time highs in 2023 (101.0 Mb/d) and 2024 (102.7 Mb/d), despite a protraction in global economic growth.

*Market exchange rate basis
sources: EIA; IMF; API Team calculations
Global GDP growth expectations at 2.8% y/y for 2023, as the global economy continues to recover from the global pandemic and China’s economic reopening.

A contraction in growth in 2023 is expected largely due to elevated inflation, tighter monetary policies, high sovereign debt levels, geoeconomic trade shifts due to Russia’s war in Ukraine.

U.S. GDP growth of 1.6% y/y is below its 20-year average for 2023 and next year is expected to grow slower than this year.

Chinese growth, while high, is significantly below its 20-year average.

Source: IMF
EIA expects global oil production to sustain record high levels over 101 mb/d beginning in 2023, rising as high as 103 mb/d in 2024.

- The supply projections by EIA should be interpreted as amounts needed to balance global markets in their view.
- With production cuts from Russia and OPEC, the world is to add 0.7 Mb/d in 2023, per EIA.

EIA global oil supply/demand annual changes

<table>
<thead>
<tr>
<th></th>
<th>Global Demand</th>
<th>Global</th>
<th>U.S.</th>
<th>Non-OPEC*</th>
<th>OPEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>2.3</td>
<td>4.2</td>
<td>0.6</td>
<td>1.7</td>
<td>2.5</td>
</tr>
<tr>
<td>2023</td>
<td>1.6 (1.5)</td>
<td>0.7</td>
<td>1.9</td>
<td>(0.4)</td>
<td></td>
</tr>
<tr>
<td>2024</td>
<td>1.7</td>
<td>1.7</td>
<td>0.2</td>
<td>1.0</td>
<td>0.7</td>
</tr>
</tbody>
</table>

*Non-OPEC growth includes Guyana, Brazil, Norway, Canada

Source: EIA STEO (May. 2023)
Crude and petroleum product exports ended the 1st quarter at record level

- The global response to Russia’s war on Ukraine increased the demand for U.S. petroleum net exports a record 3.4 mb/d in March 2023 per EIA – the largest exported volume for any month since 1997.
- Exports in the 1st quarter of 2023 rose 9.8% y/y and exceeded all volumes of the same period in the previous 5 years.

### U.S crude oil production and net imports (exports)

- Million barrels per day

![Graph showing U.S. crude oil production and net imports (exports)](image)

### U.S. crude and product export destinations

- Million barrels per day

![Graph showing U.S. crude and product export destinations](image)

Sources: EIA
EIA projects U.S. LNG export volumes in 2023 to grow 1.5 Bcf/d y/y and 0.7 Bcf/d in 2024.
Natural gas net exports to increase 25.5% (2.7 Bcf/d) y/y in 2023 and by 11.0% (1.5 Bcf/d) in 2024.

U.S. pipeline nat. gas exports
U.S. LNG exports
U.S pipeline nat. gas imports
Net exports
U.S. LNG imports

EIA estimates

source: EIA
EU gas stocks are close to a seasonal record high at 2,284 bcf - the second-highest on record for the time of year - and 934.9 (+63%) above the 10-year average.

Global natural gas prices have receded from their 2022 highs.

Asia and European natural gas prices are still significantly greater than Henry Hub prices.

European gas in underground storage
Billion cubic feet

Global natural gas prices
$2023 per mmBtu, monthly
Most U.S. LNG Exports went to Europe in 2022 and so far in 2023. In 2023 – EIA projects that the U.S. will be the largest global LNG exporter.