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December 2022

EXECUTIVE SUMMARY

API's industry data for December showed petroleum demand that outpaced supply. U.S. petroleum exports remained near their record levels, and crude oil inventories remained historically low. Yet, the prices of oil and motor fuels fell as markets grappled with diminished expectations for economic growth. Highlights:

- **Solid U.S. petroleum demand of 20.5 million barrels per day (mb/d) in December was in the 90th percentile of December readings in the past five years as well as versus December in all years on record since 1963.**
- **Domestic liquids production of crude oil (12.0 mb/d) and NGLs (6.0 mb/d) rose by 0.6 mb/d y/y versus December 2021.**
- **U.S. petroleum exports (10.2 mb/d) and net exports (1.9 mb/d) were the second highest for any month since 1947.**
- **U.S. crude oil stocks (combined commercial and strategic reserves) fell to their lowest level since January 1986.**
- **Distillate stocks increased for a third straight month.**
- **Gasoline prices decreased along with crude oil prices in December.**

U.S. petroleum demand of 20.5 mb/d in December was marked by weaker monthly demand for motor gasoline, distillates, and residual fuel oil, which were largely offset by higher industrial use of "other oils" (that is, naphtha, gasoil, propane, and propylene) and kerosene-type jet fuel.

U.S. production of crude oil and natural gas liquids edged down in December but exceeded its level of a year ago. The difference was evident in lower overall crude oil inventories. However, the prices of crude oil and gasoline fell in December for a second consecutive month and were down by 9.4% m/m and 12.5% m/m, respectively. U.S. refining activities were adversely impacted by freezing weather in late December, but the inventories of motor gasoline, distillates, and residual fuel oil increased during the month.

API's **Distillate Economic Indicator™** had a reading of +0.7 in December – down from +1.0 in November – and a three-month average of +0.9, which showed slowed but continued growth of U.S. industrial production and broader economic activity. (Please see the following [chart](#) for details).

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 - Motor gasoline demand (8.5 mb/d) was at its second lowest for December since 2012.
 - Distillate demand (3.6 mb/d) was at its lowest for December since 2012.
 - Jet fuel demand (1.6 mb/d) was at its highest for December since 2019.
 - Lowest residual fuel oil demand since April 2021.
 - Highest other oils demand for December on record since 1965.

Prices & Macroeconomy

- **Gasoline prices fell along with crude oil prices in December.**
- **December consumer sentiment weak but improved; industrial growth indicators diverged.**

Supply

- **U.S. liquids production (crude oil and NGLs) rose by 0.6 mb/d y/y in December.**

International trade

- **U.S. petroleum exports set new records in 2022.**

Industry operations

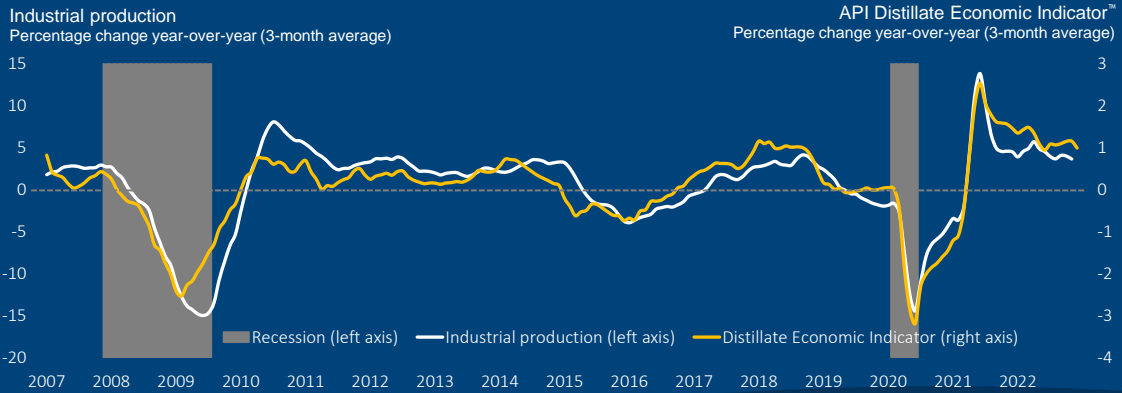
- **Refining throughput and capacity utilization rates decelerated in December.**

Inventories

- **U.S. ending stocks of crude oil at their lowest level since January 1986. Distillate inventories rose.**

API's Distillate Economic Indicator™ - December 2022

The Distillate Economic Indicator™ value of +0.7 for December 2022 fell from a reading of +1.0 in November but resulted in a three-month average of +0.9, which showed continued growth of U.S. industrial production and broader economic activity



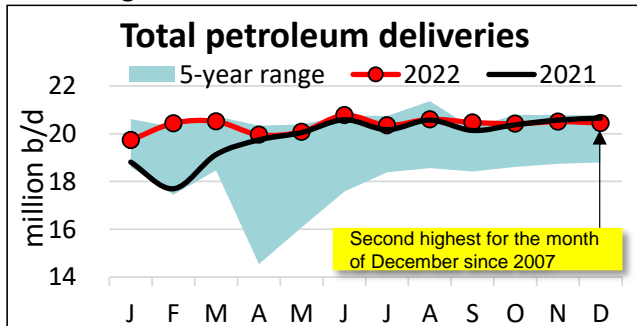
sources: API Monthly Statistical Report; EIA; CME Group; Moody's, Federal Reserve Board; API Team calculations



Details by section

Demand

U.S. petroleum demand (20.5 mb/d) was its second highest for December since 2007

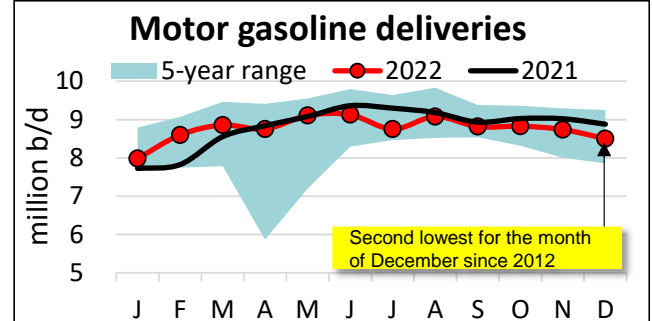


U.S. petroleum demand, as measured by total domestic petroleum deliveries, was 20.5 mb/d in December. This reflected decreases of 0.3% from November and 1.0% y/y compared with December 2021. Notably, however, the 20.5 mb/d was the second highest reading for the month of December since 2007 and above the 90th percentile of the five-year range as well for December back to 1963.

For 2022 as a whole, U.S. petroleum demand grew by 2.3% y/y and showed year-on-year increases in all but the last two months of the year.

Gasoline

Motor gasoline demand (8.5 mb/d) was at its second lowest for December since 2012

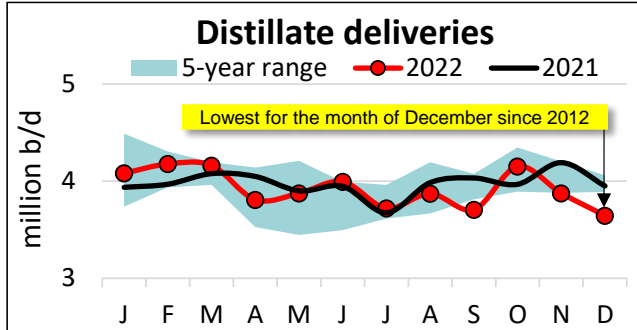


Consumer gasoline demand, measured by motor gasoline deliveries, was 8.5 mb/d in December. This reflected decreases of 2.7% from November and 4.3% y/y compared with December 2021, resulting in the second lowest reading for the month of December since 2013. Holiday travel across much of the U.S. was adversely impacted by [winter storms](#).

Deliveries of reformulated-type gasoline (consumed primarily in urban areas) rose by 5.0% y/y to 2.9 mb/d. By contrast, conventional gasoline (consumed mainly in rural areas) deliveries decreased by 8.5% y/y to 5.6 mb/d, likely reflecting less driving over the holidays.

Distillate Fuel Oil

Distillate demand (3.6 mb/d) was at its lowest for December since 2012



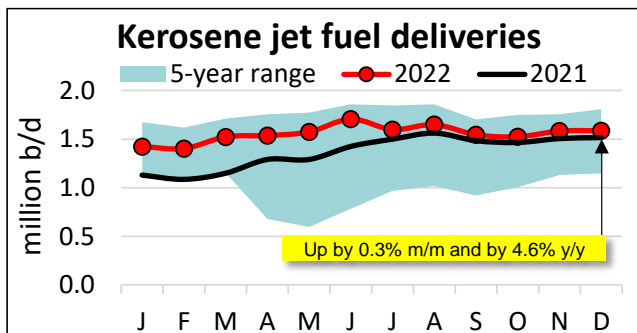
Distillate deliveries of 3.6 mb/d in December fell by 6.0% m/m from November and by 7.7% y/y compared with December 2021.

[DAT iQ industry trendlines](#) showed that the quantity of spot trucks increased by 13.0% y/y, while the number of spot load posts fell by 57.3% y/y, which together showed more trucks than loads. However, trucking industry analysts [characterized](#) this weakness as “normalizing” seasonally following a post-pandemic surge in 2021.

For 2022 as a whole, distillate deliveries averaged 4.0 mb/d, which was above the 50th percentile for the annual average compared with its historical five-year range.

Kerosene Jet Fuel

Kerosene-type jet fuel demand (1.6 mb/d) was at its highest for December since 2019



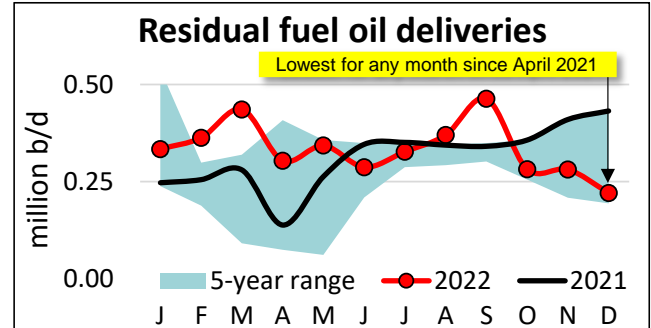
Kerosene-type jet fuel deliveries of 1.6 mb/d in December rose by 0.3% m/m from November and by 4.6% y/y versus December 2021 to their highest for the month since 2019.

High-frequency data from [Flightradar24](#) and [TSA](#) showed that the total numbers of flights and air

passengers increased by 1.2% y/y and 11.6% y/y, respectively. Reports by the International Air Transport Association (IATA) showed a continued [recovery](#) in air passenger traffic, but a [softening](#) of air cargo.

Residual Fuel Oil

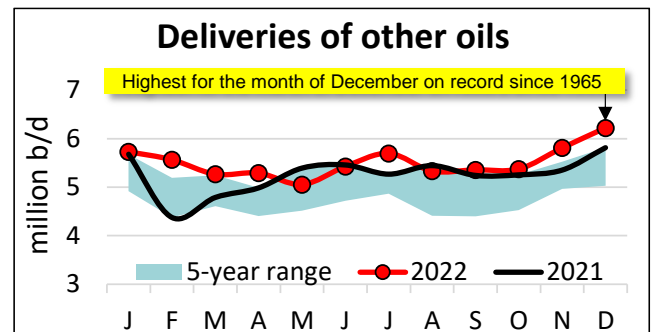
Lowest residual fuel oil demand since April 2021



Deliveries of residual fuel oil, which is used as a marine bunker fuel and internationally in electric power production, space heating, and industrial applications, were 0.2 mb/d in December, which reflected decreases of 21.4% m/m from November and 48.8% y/y versus December 2021 to the lowest level since April 2021. The demand for residual fuel oil as a marine bunker fuel apparently decreased with the continued drop in [container shipping](#) activities, which also corresponded with the Baltic Dry shipping rate index having fallen by 7.7% m/m in December.

Other Oils – Naphtha, Gasoil, Propane & Propylene

Highest other oils demand for December on record since 1965

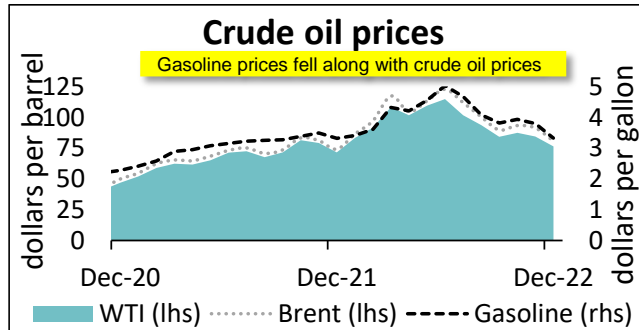


Deliveries of refinery and petrochemical liquid feedstocks – that is, naphtha, gasoil, and propane/propylene (“other oils”) – were 6.2 mb/d in December, the highest reading for the month of December on record since 1965. This reflected increases of 7.1% m/m and 7.0% y/y. This category

has historically been subject to year-end revisions but nevertheless reinforces that U.S. petrochemical manufacturing grew by 3.5% y/y per the [U.S. Federal Reserve](#) estimates for plastics and rubber manufacturing in 2022. U.S. petrochemicals also remained [globally competitive](#) amid the relatively higher energy and feedstock costs in many other economies.

Prices

Gasoline prices fell along with crude oil prices in December



In December, West Texas Intermediate (WTI) crude oil prices decreased by 9.4% m/m to \$76.44 per barrel. Brent crude oil spot prices decreased by 11.5% m/m to \$80.92 per barrel, which implied a Brent-WTI crude oil price differential of \$4.48 per barrel in December, down from \$7.05 per barrel in November.

Crude oil remained the top input cost in making gasoline per [EIA](#). The U.S. average conventional gasoline price was \$3.32 per gallon in December, down by 12.5% m/m from November per [EIA](#).

Macroeconomy

December consumer sentiment weak but improved; industrial growth indicators diverged

API's Distillate Economic Indicator™, which is based primarily on diesel/distillate supply, demand, and inventories, had a reading of +0.7 in December – down from +1.0 in November – and a three-month average of +0.9, which showed slowed but continued growth of U.S. industrial production and broader economic activity.

The Institute for Supply Management's manufacturing Purchasing Managers Index ([PMI](#)) had a reading of 48.4 in December – 0.6 percentage points lower than in November. Index values below

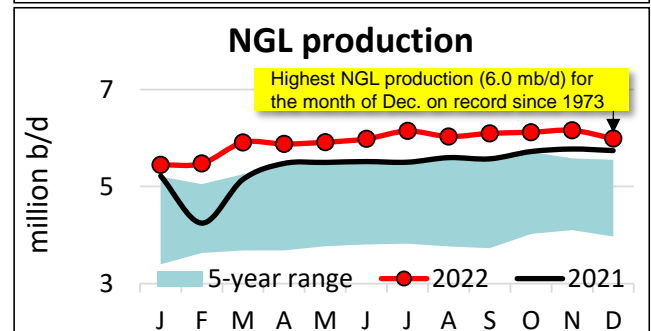
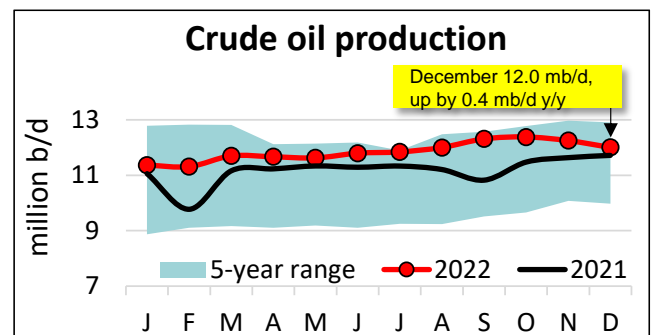
50.0 suggest a contraction in the overall economy, and the manufacturing PMI fell below that threshold in December for the first time in 30 months. Within the index, there were monthly increases in the index's measures of employment, inventories, and backlog of orders. And there were monthly decreases in the index's measures of supplier deliveries, customers' inventories, new export orders, new orders, production, prices, and imports. Two manufacturing industries surveyed reported growth in December, while 13 industries reported contractions in December compared with November.

The [University of Michigan's consumer sentiment index](#) showed a reading of 59.7 in December, up from 56.8 in November. The survey noted that, although the index remained low relative to its historical values, consumers assessments of their personal finances rose in December to their highest reading in eight months.

According to the [Bureau of Labor Statistics \(BLS\)](#), the unemployment rate fell to 3.5% in December from 3.6% in November. Non-farm payrolls rose by a preliminary estimate of 223,000 m/m, the weakest monthly gain for any month since April 2020.

Supply

U.S. liquids production (crude oil and NGLs) rose by 0.6 mb/d y/y in December



U.S. crude oil production of 12.0 mb/d in December decreased by 2.0% m/m (0.2 mb/d) from November but was up by 3.2% y/y (0.4 mb/d) compared with December 2021.

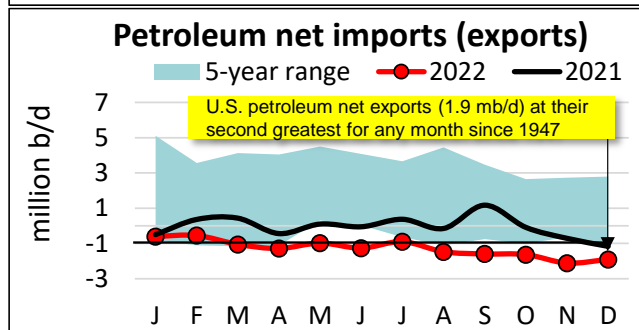
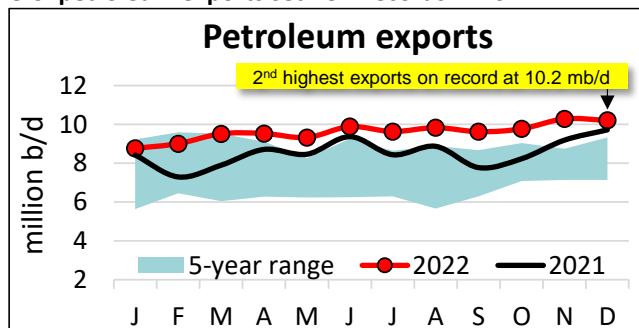
Crude oil production of 12.0 mb/d in December remained 1.0 mb/d below the U.S. record high of 13.0 mb/d in December 2019. For 2022 overall, U.S. crude oil production averaged 11.9 mb/d and rose by 0.6 mb/d y/y from 2021.

[Baker Hughes](#) reported 622 active oil-directed rigs in December, a 0.1% m/m (1 rigs) decrease from November and remained 7.5% (51 rigs) fewer than the 673 rigs that ran in December 2019.

Natural gas-directed drilling of 154 rigs in December fell by 0.7% m/m (2 rigs) from November. The extraction of natural gas liquids (NGLs) depends on the relative values of ethane, propane, and butane, which historically have tended to correspond with those of crude oil. NGL production of 6.0 mb/d in December – its highest for the month on record since 1973 – but decreased by 2.7% m/m from 6.2 mb/d in November, which was the highest production on record for any month since 1973.

International trade

U.S. petroleum exports set new records in 2022

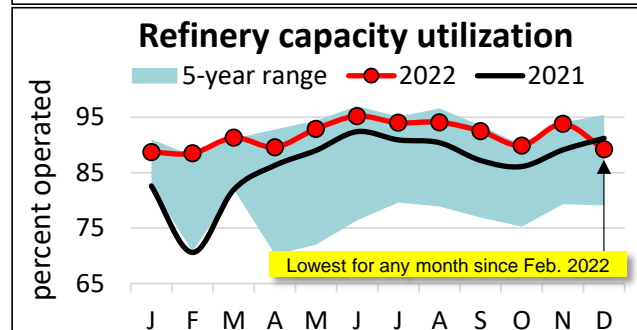
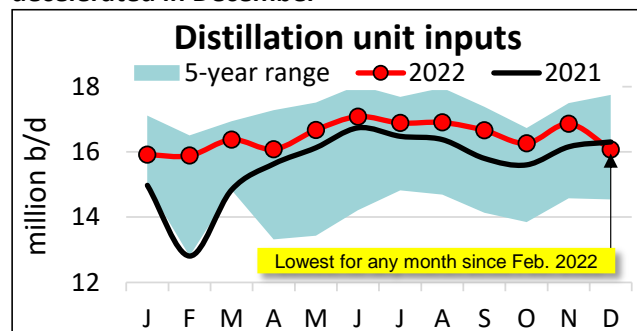


U.S. petroleum exports of 10.2 mb/d, including 4.0 mb/d of crude oil 6.2 mb/d of refined products, in

December slipped by 0.1 mb/d in November but remained at their second highest level on record for any month since 1947. Total exports in December were 5.1% (0.5 mb/d) y/y higher than those in December 2021. At the same time, U.S. petroleum imports fell by 2.9% (0.2 mb/d) y/y in December, which contributed to the U.S. being a petroleum net exporter of 1.9 mb/d for the month – the second highest U.S. petroleum net exports for any month on record since 1947. For 2022 overall, the U.S. was a petroleum net exporter of 1.3 mb/d, which was an annual record for U.S. petroleum net exports on record since 1947.

Industry operations

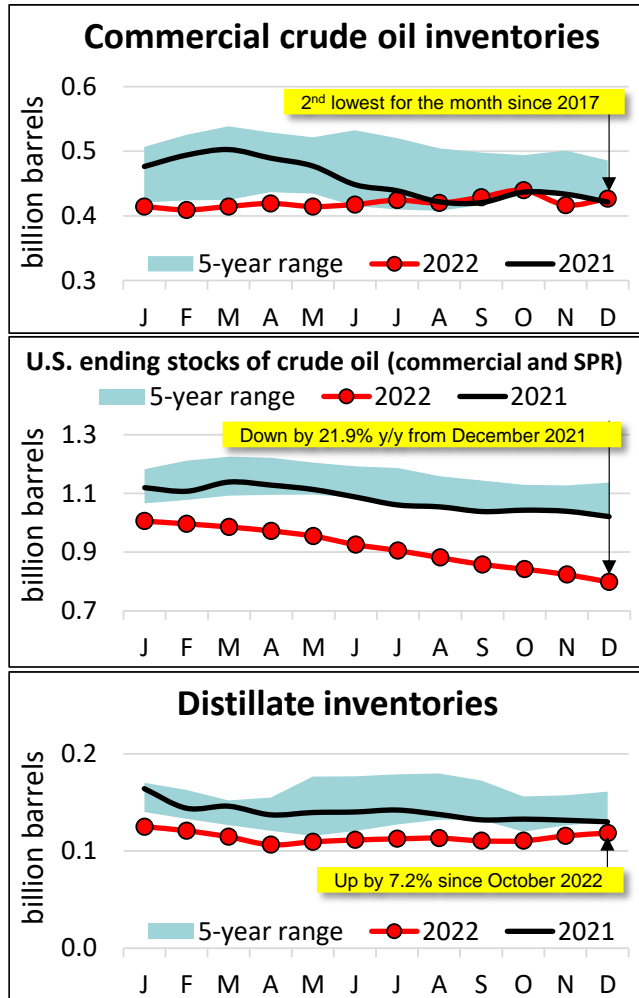
Refining throughput and capacity utilization rates decelerated in December



In December, U.S. refinery throughput, measured by gross inputs into crude distillation units, was 16.1 mb/d and implied a capacity utilization rate of 89.1%. The throughput fell by 4.8% m/m (0.8 mb/d) and by 1.5% y/y (0.2 mb/d) – to its lowest level since February 2022. It was only the second time since 2011 that the refinery capacity utilization rate fell in December relative to November, apparently due to unplanned outages with freezing weather in many parts of the United States that took more than 2.0 mb/d of crude distillation capacity offline during the last week of December, according to data from Bloomberg.

Inventories

U.S. ending stocks of crude oil at their lowest level since January 1986. Distillate inventories rose



U.S. crude oil inventories 426.4 million barrels in December grew by 2.4% m/m (9.8 million barrels) from November and by 1.2% y/y (5.2 million barrels) versus December 2021.

Crude oil inventories in the U.S. Strategic Petroleum Reserve (SPR) historically have never fallen by more than 6.4% y/y in any given month on record from 1982 to 2021. In 2022, however, SPR crude oil inventories as of December were drawn down by 36.5% y/y to their lowest level since 1983. Consequently, U.S. ending stocks of crude oil (including commercial and SPR) decreased by 21.9% y/y in December to 793.0 million barrels, their lowest level since January 1986.

Distillate inventories have been closely monitored amid a [global shortage](#). Although U.S. distillate

inventories remained below their historical five-year range in December, they rose for a third straight month and by 7.2% compared with October, despite the unplanned refinery outages in late December. In terms of days of supply, distillate inventories rose to 32.9 days of supply at the end of December from 25.9 days of supply as of October 21, per [EIA](#).

ESTIMATED UNITED STATES PETROLEUM BALANCE¹
(Daily average in thousands of 42 gallon barrels)

Disposition and Supply	December			Year-to-Date		
	2022 ²	2021	% Change	2022 ³	2021	% Change
Disposition:						
Total motor gasoline.....	8,501	8,879	(4.3)	8,762	8,816	(0.6)
Finished reformulated.....	2,916	2,778	5.0	2,815	2,779	1.3
Finished conventional.....	5,585	6,101	(8.5)	5,946	6,037	(1.5)
Kerosene-jet.....	1,587	1,517	4.6	1,555	1,370	13.5
Distillate fuel oil.....	3,644	3,950	(7.7)	3,941	3,972	(0.8)
≤ 500 ppm sulfur.....	3,626	3,922	(7.5)	3,923	3,962	(1.0)
≤ 15 ppm sulfur.....	3,613	3,917	(7.8)	3,913	3,932	(0.5)
> 500 ppm sulfur.....	18	28	(35.7)	18	10	80.0
Residual fuel oil.....	221	432	(48.8)	334	314	6.4
All other oils (including crude losses)	6,222	5,814	7.0	5,510	5,262	4.7
Reclassified ⁴	273	64	na	252	156	na
Total domestic product supplied.....	20,448	20,657	(1.0)	20,354	19,890	2.3
Exports.....	10,214	9,714	5.1	9,614	8,536	12.6
Total disposition.....	30,662	30,371	1.0	29,968	28,426	5.4
Supply:						
Domestic liquids production						
Crude oil (including condensate).....	12,007	11,634	3.2	11,859	11,254	5.4
Natural gas liquids.....	5,990	5,741	4.3	5,931	5,425	20.0
Other supply ⁵	1,146	1,283	(10.7)	1,201	1,152	4.2
Total domestic supply.....	19,143	18,658	2.6	18,991	17,831	6.5
Imports:						
Crude oil (excluding SPR imports).....	6,099	6,429	(5.1)	6,276	6,114	2.7
From Canada.....	3,478	4,092	(15.0)	3,762	3,760	0.1
All other.....	2,621	2,337	12.2	2,514	2,354	6.8
Products.....	2,205	2,125	3.8	2,054	2,360	(13.0)
Total motor gasoline (incl. blend.comp).....	621	605	2.6	641	805	(20.4)
All other.....	1,584	1,520	4.2	1,413	1,555	(9.1)
Total imports.....	8,304	8,553	(2.9)	8,331	8,474	(1.7)
Total supply.....	27,447	27,212	0.9	27,322	26,305	3.9
Stock change, all oils.....	(3,215)	(3,159)	na	(2,646)	(2,121)	na
Refinery Operations:						
Input to crude distillation units.....	16,074	16,309	(1.4)	16,475	15,674	5.1
Gasoline production.....	9,363	9,666	(3.1)	9,563	9,529	0.4
Kerosene-jet production.....	1,581	1,512	4.6	1,615	1,311	23.2
Distillate fuel production.....	4,930	4,926	0.1	4,999	4,668	7.1
Residual fuel production.....	255	210	21.4	249	213	17.0
Operable capacity.....	18,020	17,877	0.8	17,968	18,108	(0.8)
Refinery utilization ⁶	89.2%	91.2%	na	91.7%	86.6%	na
Crude oil runs.....	15,597	15,757	(1.0)	15,949	15,147	5.3

1. Total supply, i.e., production plus imports adjusted for net stock change is equal to total disposition from primary storage. Total disposition from primary storage less exports equals total domestic products supplied. Information contained in this report is derived from information published in the API *Weekly Statistical Bulletin* and is based on historical analysis of the industry. All data reflect the most current information available to the API and include all previously published revisions.

2. Based on API estimated data converted to a monthly basis.

3. Data for most current two months are API estimates. Other data come from U.S. Energy Information Administration (including any adjustments).

4. An adjustment to avoid double counting resulting from differences in product classifications among different refineries and blenders.

5. Includes unaccounted-for crude oil, withdrawals from the SPR when they occur, processing gain, field production of other hydrocarbons and alcohol, and downstream blending of ethanol.

6. Represents "Input to crude oil distillation units" as a percent of "Operable capacity".

R: Revised. na: Not available.

ESTIMATED UNITED STATES PETROLEUM BALANCE¹
(Daily average in thousands of 42 gallon barrels)

	December	November	December	% Change From	
	2022	2022	2021	Month Ago	Year Ago
Stocks (at month-end, in millions of barrels):					
Crude oil (excluding lease & SPR stocks).....	426.4	416.6	421.2	2.4	1.2
Unfinished oils.....	82.2	83.3	79.7	(1.3)	3.1
Total motor gasoline.....	225.6	217.2	232.2	3.9	(2.8)
Finished reformulated.....	0.0	0.0	0.0	0.2	36.8
Finished conventional.....	16.2	16.0	17.8	1.3	(9.0)
Blending components.....	209.4	201.2	214.4	4.1	(2.3)
Kerosene-jet.....	35.0	37.2	35.8	(5.9)	(2.2)
Distillate fuel oil.....	118.5	115.5	130.0	2.6	(8.9)
≤ 500 ppm sulfur.....	110.9	107.3	123.0	3.4	(9.8)
≤ 15 ppm sulfur.....	108.2	104.6	120.2	3.5	(10.0)
> 500 ppm sulfur.....	7.6	8.2	7.1	(7.3)	7.7
Residual fuel oil.....	30.7	29.9	25.8	2.7	19.1
All other oils.....	318.6	334.1 R	273.9	(4.6)	16.3
Total all oils.....	1,237.0	1,233.8 R	1,198.6	0.3	3.2