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December 2021

EXECUTIVE SUMMARY

U.S. petroleum demand of 21.1 million barrels per day (mb/d) in December ended 2021 strongly despite the pandemic – and likely in part due to it. There appeared to be more driving in lieu of flying. Supply chains needed more fuel for freight trucking and marine shipping. And the other oils – that is, intermediate products in refining and petrochemicals – which enable the manufacturing of medical plastics and sterile packaging rose in December to their highest level on record since 1965.

By contrast, U.S. crude oil and natural gas liquids production remained flat overall. U.S. crude oil inventories fell below their five-year range, and crude oil imports rose by 0.5 million barrels per day (mb/d) in December compared with a year ago. Consequently, the U.S. was a petroleum net importer in December and for 2021 overall. With the U.S. taking net barrels from global markets instead of contributing to them, oil, and therefore petroleum fuel prices, remained among their highest since 2014, despite a decrease with uncertainty over the Omicron variant in late December.

Refining activity rose for the month, but its throughput and capacity utilization rates were the second lowest for December in a decade or more. Meanwhile, U.S. refined product exports fell by 0.6 mb/d y/y in December to their lowest since 2015, despite global liquid fuels' demand that eclipsed 101 mb/d per the U.S. Energy Information Administration ([EIA](#)), exceeding its level from Dec. 2019. The lower U.S. refining activity and product exports also likely reflect the challenges to domestic crude oil production, which reduced the historic abundance and discount of U.S. crude oil versus global prices as the U.S. reverted to being a petroleum net importer – and is expected by [EIA](#) to be even more of one in 2022.

Leading economic indicators were mixed. API's Distillate Economic Indicator™ suggested continued growth of U.S. industrial production and broader economic activity (please see the following [chart](#) for details), but consumer angst and therefore spending uncertainty rose per the [University of Michigan's consumer sentiment index](#).

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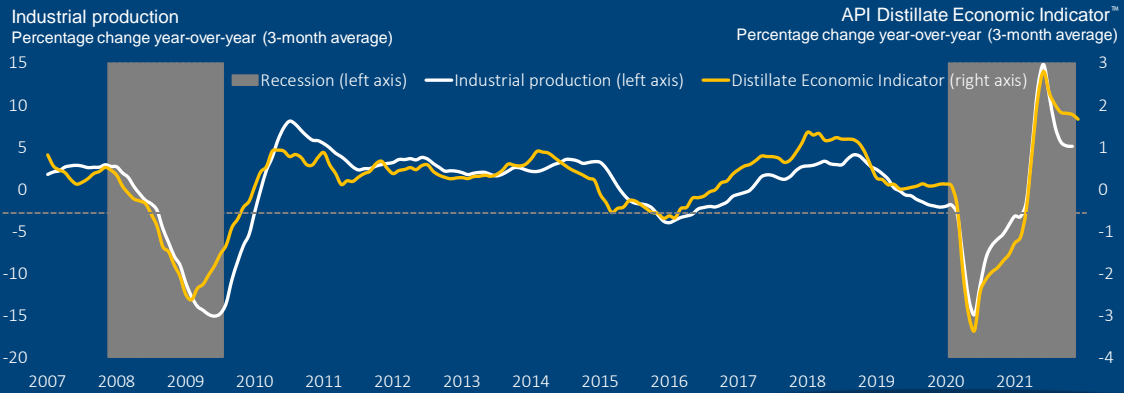
- **Refinery inputs and capacity utilization picked up in December but remained historically low.**

Inventories

- **Crude oil inventories fell below the 5-year range; key refined product inventories historically low.**

API's Distillate Economic Indicator™ - December 2021

The Distillate Economic Indicator™ value of +1.6 for December 2021 and three-month average of +1.7 signaled continued growth of U.S. industrial production and broader economic activity



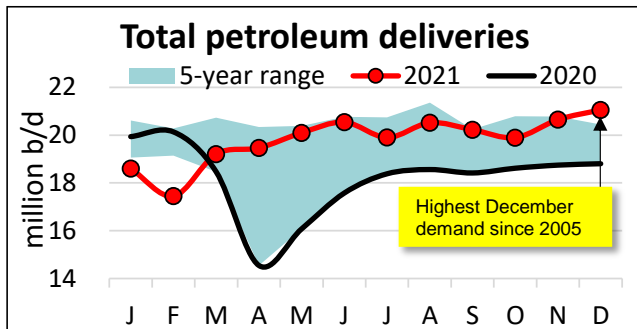
sources: API Monthly Statistical Report; EIA; CME Group; Moody's, Federal Reserve Board; API Team calculations



Details by section

Demand

Strongest U.S. petroleum for the month of December since 2005

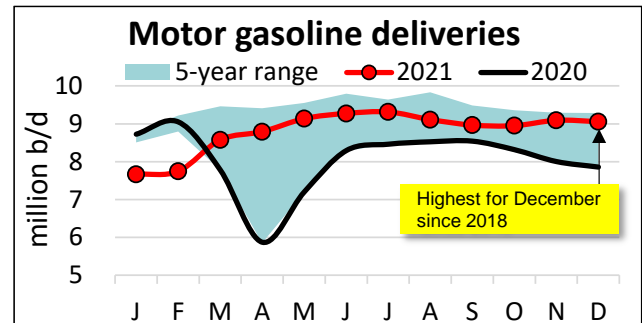


U.S. petroleum demand, as measured by total domestic petroleum deliveries, was 21.1 mb/d in December – the highest for the month since 2005. This reflected a 2.0% m/m increase from November and was 3.0% above that of Dec. 2019, which was largely before the pandemic. In fact, with the onset of the Omicron variant of COVID, December's increase in U.S. petroleum demand was mainly driven by "other oils" (that is, naphtha, gasoil, propane and propylene) which feed refinery and petrochemical operations. However, compared with Dec. 2019, demand also rose for every major refined product except kerosene-type jet fuel.

Gasoline

Motor gasoline demand in December was 1.0% above that of Dec. 2019.

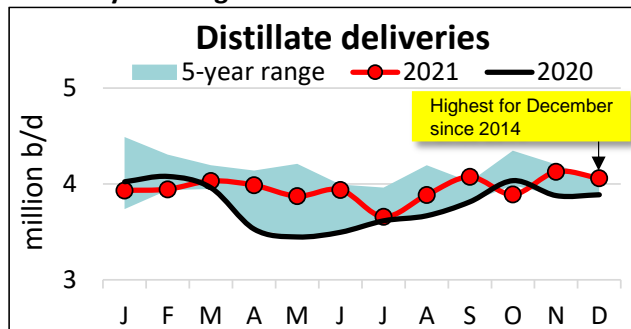
Consumer gasoline demand, measured by motor gasoline deliveries, was 9.1 mb/d in December. This was a 0.4% m/m decrease from November but 1.0% above that of Dec. 2019 – and the highest for the month of December since 2018.



Deliveries of reformulated-type gasoline (consumed primarily in urban areas) fell by 1.7% m/m to 2.9 mb/d, while those of conventional gasoline (mainly in rural areas) rose by 0.3% m/m to 6.1 mb/d. The divergent monthly changes could reflect relatively less urban commuting and more rural driving due to the holiday season as well as the pandemic. Notably, however the demand for both conventional and reformulated gasoline exceeded the respective levels in Dec. 2019 levels.

Distillate Fuel Oil

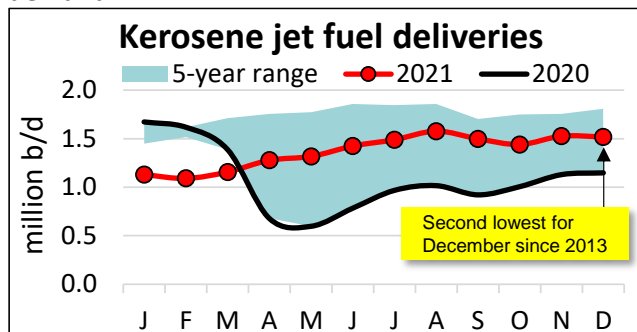
Strongest December distillate demand since 2014 driven by trucking



Distillate deliveries of 4.1 mb/d decreased by 1.7% from November but were the highest for the month of December since 2014 and thus 0.4% of the top of the five-year range. Consistent with demand data, [DAT iQ industry trendlines](#) suggested that spot freight truck posts fell by 10.5% m/m from November but rose by 6.9% y/y compared with Dec. 2020. With the rise in annual trucking demand and [scarcity](#) of drivers, shipping and logistics markets have remained historically [tight](#).

Kerosene Jet Fuel

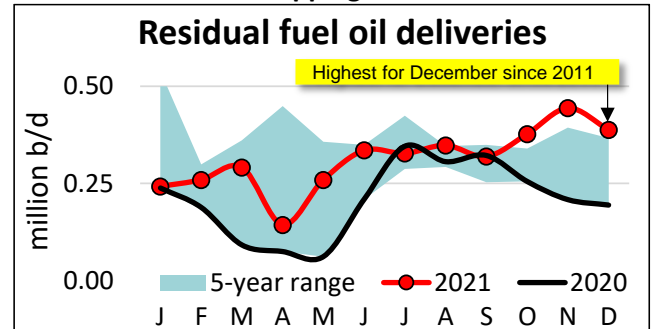
Omicron hit December air travel and jet fuel demand



Kerosene-type jet fuel deliveries fell by 0.5% m/m to 1.5 mb/d in December, and the differences versus 2019 levels increased as the Omicron variant of COVID adversely impacted air travel. In November, k/t jet fuel demand had climbed to within 11% of its 2019 level for the month, but this gap widened to 16% in December. The International Air Transport Association ([IATA](#)) noted the likely decrease in air travel due to the pandemic, and [Flightradar24](#) high-frequency data suggested that the numbers of tracked flights in December were only about 5% below their quantity in Dec. 2019, but over the last week of December there were 12% fewer flights compared with 2019.

Residual Fuel Oil

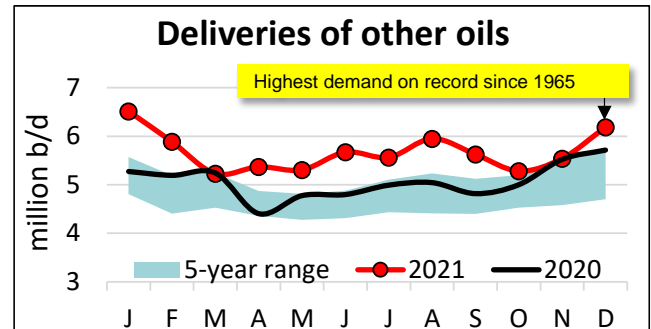
Strongest December residual fuel oil demand since 2011 due to marine shipping



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 0.4 mb/d in December, which reflected a decrease of 12.6% m/m from November but an increase of 36.6% compared with Dec. 2019. In fact, the December 2021 demand was its highest for the month since 2011 amid [resoundingly strong](#) marine shipping activities.

Other Oils – Naphtha, Gasoil, Propane & Propylene

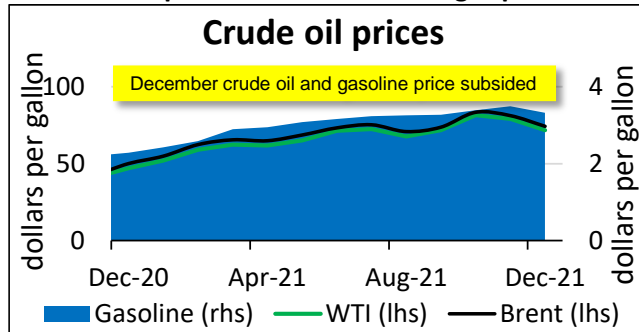
Other oils demand the highest on record since 1965



With the onset of the Omicron variant, petrochemical demand for medical plastics – from masks to home testing kits – and sterile packaging continued to boom. Consequently, deliveries of refinery and petrochemical liquid feedstocks – that is, naphtha, gasoil, and propane/propylene (“other oils”) – were a record high of 6.2 mb/d in December.

Prices

December reprieve for crude oil and gas prices



In December, West Texas Intermediate (WTI) crude oil prices decreased by 9.4% m/m to \$71.71 per barrel. Brent crude oil spot prices averaged \$74.17 per barrel and implied a Brent-WTI crude oil price differential of \$2.46 per barrel, which generally reflected transportation costs.

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 4.9% (\$0.17 per gallon) from November, according to [AAA](#).

Macroeconomy

Leading indicators suggest industrial growth, but weaker consumer spending

API’s Distillate Economic Indicator™, which is based primarily on diesel/distillate supply, demand, and inventories, had a reading of 1.6 in December and a three-month average of 1.7, suggesting that U.S. industrial production and broader economic activity have continued to grow.

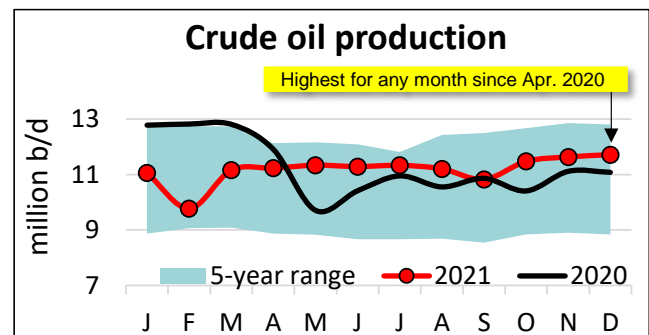
The Institute for Supply Management’s manufacturing Purchasing Managers Index ([PMI](#)) had a reading of 58.7 in December, a 2.4 percentage point decrease from November. Index values above 50.0 suggest an expansion in the overall economy, and the manufacturing PMI exceeded that threshold for a 19th consecutive month. Within the index, measures of employment, customers’ inventories, backlog of orders and imports increased, while those for new orders, production, supplier deliveries, manufacturers’ inventories, and new export orders decreased from November. Fifteen of the 16 manufacturing industries surveyed reported growth in December.

The [University of Michigan’s consumer sentiment index](#) decreased by 2.5% m/m to a reading of 68.8 in December, which was the survey’s second lowest level in a decade. The survey noted that the pandemic as well as increased consumer price inflation contributed to lower sentiment.

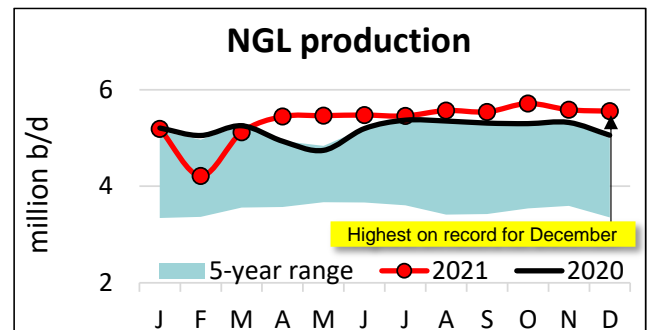
According to the [Bureau of Labor Statistics \(BLS\)](#), the unemployment rate fell by 0.3% to 3.9% in December – within 0.3% of where it stood in Dec. 2019. Non-farm payrolls increased by a preliminary estimate of 199,000 and contributed to an annual increase of million jobs (+4.5% y/y), which was the largest annual gain on record since 1939 and the largest percentage increase since 1978.

Supply

U.S. crude oil edged up, but was largely offset by lower NGL production



U.S. crude oil production of 11.7 mb/d in December increase of 0.1 m/m from November but was 1.2 mb/d below its level in Dec. 2019. [Baker Hughes](#) reported 476 active oil-directed rigs in December, a 3.5% m/m increase from November but 29.3% less than the 673 rigs that ran in December 2019.

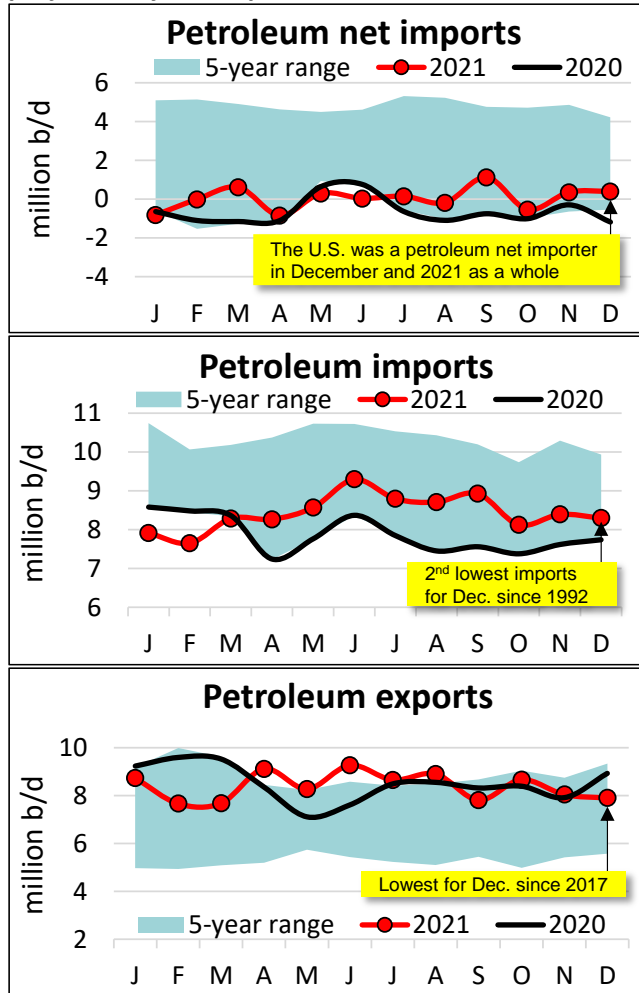


By contrast, natural gas-directed drilling rose by three (3.2% m/m) to 105 rigs in December despite natural gas spot prices at Henry Hub of \$3.76 per million Btu that fell by 25.5% m/m from November,

which was still the highest for December since 2018. The extraction of natural gas liquids (NGLs) generally depends to the relative values of ethane, propane and butane, which historically have tended to correspond with those of crude oil. As crude oil prices decreased in November, so did the extraction of NGLs to 5.6 mb/d in December down by 0.5% m/m from November.

International trade

U.S. petroleum net imports for Dec. and 2021; projected by EIA to persist in 2022



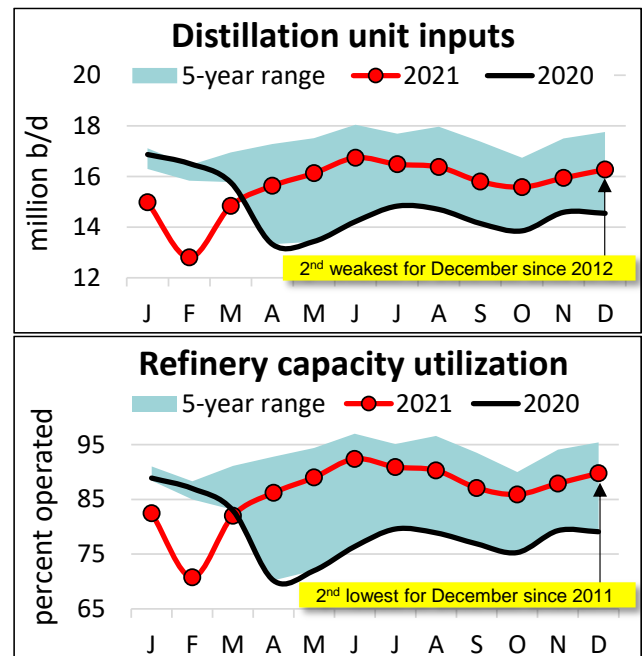
The U.S. was a petroleum net importer in December and for 2021 as a whole. This reversed the United States' position as a petroleum net exporter in 2020, a milestone the U.S. reached in 2020 for the first time since 1958. [EIA](#) projects the U.S. to be a petroleum net importer in 2022 and that U.S. crude oil net imports to grow by 1.1 mb/d or 33.2% y/y.

Within the total, U.S. total petroleum imports were historically low (e.g., second lowest since 1992) but increased by 0.6 mb/d y/y from December 2020. By contrast, U.S. total petroleum exports fell by 1.0 mb/d y/y in December to their lowest level since 2017.

This combination of higher petroleum net imports and lower exports fundamentally reflects the fall of domestic crude oil production.

Industry operations

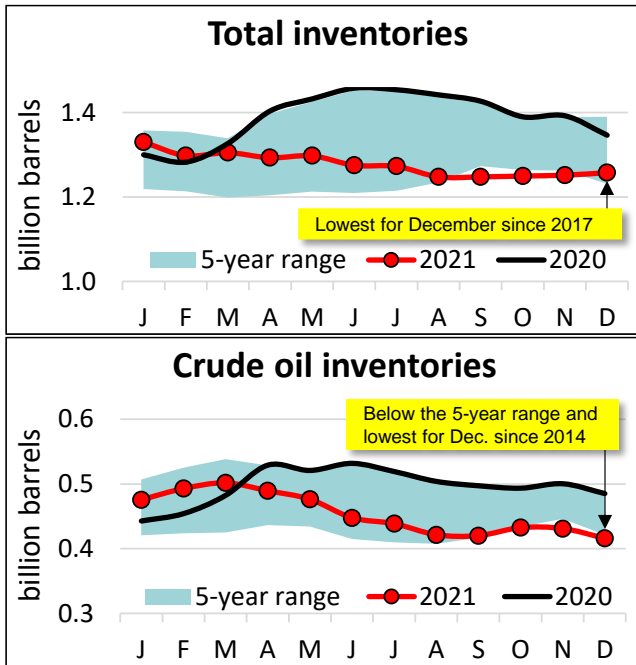
Refinery inputs and capacity utilization picked up in December but remained historically low



U.S. refinery throughput was 16.3 mb/d in December, which was a seasonal increase of 2.1% from November and implied a capacity utilization rate of 89.8%, up from 87.9% in November. Both refinery throughput and capacity utilization for December were among the weakest readings in nearly a decade.

Inventories

**Crude oil inventories fell below the 5-year range;
key refined product inventories historically low**



U.S. total petroleum inventories, including crude oil and refined products (but excluding the Strategic Petroleum Reserve) increased by 0.2% m/m in December to 1.26 billion barrels.

Within the total, U.S. crude oil inventories fell by 3.5% m/m to 416.3 million barrels. Crude oil inventories were at their lowest for the month since 2014.

Among the major refined products, the December inventories were the lowest for the month since 2013 for motor gasoline; 2004 for distillates; 1989 for k/t jet fuel; and, a record-low since 1993 for residual fuel oil.

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

Disposition and Supply	December			Year-to-Date		
	2021 ²	2020	% Change	2021 ³	2020	% Change
Disposition:						
Total motor gasoline.....	9,057	7,855	15.3	8,813	8,049	9.5
Finished reformulated.....	2,922	2,445	19.5	2,803	2,467	13.6
Finished conventional.....	6,135	5,410	13.4	6,009	5,582	7.6
Kerosene-jet.....	1,519	1,148	32.3	1,373	1,076	27.5
Distillate fuel oil.....	4,060	3,888	4.4	3,950	3,786	4.3
≤ 500 ppm sulfur.....	3,995	3,887	2.8	3,930	3,759	4.5
≤ 15 ppm sulfur.....	3,988	3,886	2.6	3,901	3,749	4.1
> 500 ppm sulfur.....	65	1	6,400.0	20	27	(25.9)
Residual fuel oil.....	388	194	100.0	311	208	49.5
All other oils (including crude losses).....	6,186	5,622	10.0	5,268	4,978	5.8
Reclassified ⁴	(159)	93	na	96	89	na
Total domestic product supplied.....	21,051	18,802	12.0	19,810	18,186	8.9
Exports.....	7,897	8,924	(11.5)	8,392	8,498	(1.2)
Total disposition.....	28,948	27,726	4.4	28,203	26,684	5.7
Supply:						
Domestic liquids production						
Crude oil (including condensate).....	11,715	11,084	5.7	11,179	11,283	(0.9)
Natural gas liquids.....	5,554	5,058	9.8	5,367	5,175	20.0
Other supply ⁵	1,112	1,093	1.8	1,113	1,025	8.6
Total domestic supply.....	18,381	17,234	6.7	17,659	17,482	1.0
Imports:						
Crude oil (excluding SPR imports).....	6,215	5,713	8.8	6,084	5,875	3.6
From Canada.....	3,734	3,818	(2.2)	3,705	3,596	3.0
All other.....	2,481	1,894	31.0	2,379	2,279	4.4
Products.....	2,083	2,026	2.8	2,356	1,988	18.5
Total motor gasoline (incl. blend.comp).....	559	587	(4.8)	808	585	38.1
All other.....	1,524	1,439	5.9	1,548	1,403	10.3
Total imports.....	8,298	7,738	7.2	8,440	7,863	7.3
Total supply.....	26,679	24,973	6.8	26,099	25,346	3.0
Stock change, all oils.....	(2,269)	(2,753)	na	(2,104)	(1,338)	na
Refinery Operations:						
Input to crude distillation units.....	16,275	14,539	11.9	15,650	14,723	6.3
Gasoline production.....	9,548	8,809	8.4	9,510	8,742	8.8
Kerosene-jet production.....	1,507	1,125	34.0	1,308	1,018	28.5
Distillate fuel production.....	4,826	4,633	4.2	4,646	4,738	(1.9)
Residual fuel production.....	229	146	56.8	211	188	12.2
Operable capacity.....	18,131	18,386	(1.4)	18,124	18,662	(2.9)
Refinery utilization ⁶	89.8%	79.1%	na	86.3%	78.9%	na
Crude oil runs.....	15,754	14,140	11.4	15,126	14,212	6.4

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 2021	November 2021	December 2020	% Change From	
				Month Ago	Year Ago
Stocks (at month-end, in millions of barrels):					
Crude oil (excluding lease & SPR stocks).....	416.3	431.3	485.5	(3.5)	(14.2)
Unfinished oils.....	83.5	88.8	77.6	(6.0)	7.6
Total motor gasoline.....	230.0	216.5	243.4	6.2	(5.5)
Finished reformulated.....	0.0	0.0	0.0	0.2	(60.4)
Finished conventional.....	17.1	18.5	25.4	(7.6)	(32.5)
Blending components.....	212.9	198.0	218.0	7.5	(2.3)
Kerosene-jet.....	35.3	37.0	38.6	(4.6)	(8.6)
Distillate fuel oil.....	127.0	124.5	161.2	2.0	(21.2)
≤ 500 ppm sulfur.....	119.4	116.4	153.1	2.6	(22.0)
≤ 15 ppm sulfur.....	117.0	113.5	149.7	3.0	(21.9)
> 500 ppm sulfur.....	7.6	8.1	8.1	(6.2)	(6.1)
Residual fuel oil.....	26.1	27.9	30.2	(6.5)	(13.5)
All other oils.....	339.5	329.5	309.9	3.1	9.6
Total all oils.....	1,257.7	1,255.5	1,346.4	0.2	(6.6)

