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December 2018

EXECUTIVE SUMMARY

The U.S. natural gas and oil industry established multiple records in December:

- Annual gasoline demand (9.3 mb/d, tie with 2016 and 2017);
- Refinery and petrochemical feedstock demand for December (5.5 mb/d);
- U.S. production of crude oil (11.7 mb/d) and natural gas liquids (NGLs) (4.8 mb/d);
- Crude oil exports (2.4 mb/d, tie with Nov. 2018);
- Refinery throughput for the month of December (17.7 mb/d) and year (17.3 mb/d); and,
- Refinery capacity utilization for the month of December (95.0 percent) and year (93.0 percent, tie with 2004).

These strong developments were underpinned by solid economic growth, but weaknesses also emerged in December with decreases in demand for gasoline, jet fuel, high sulfur distillate and the prices for oil and natural gas liquids. Total petroleum inventories also built to within 2.6 percent of their 5-year maximum.

To assess the overall story, here's something new to start 2019: API's Distillate Economic and Financial Indicator (DEFI). We leveraged API's Monthly Statistical Report (MSR) to derive a useful indicator of changes in total U.S. industrial production and GDP. DEFI components include:

- **Industry fundamentals** (distillate demand and inventories, refinery throughput, and capacity utilization);
- **Oil prices** (WTI spot and futures prices up to 12 months); and,
- **Interest rates** (Fed Funds and its difference from investment grade (Baa) corporate bonds).

Distillates – especially diesel fuel – tend to correlate highly with industrial and freight shipping activities that speak to broader economic activity. Historically, oil prices and interest rates also can influence investment and therefore industrial and economic activity. Based on data through December, DEFI's growth year-over-year slowed by 0.3 percentage points in December, following a decline of 0.4 percentage points in November. Please see the [following chart](#) for comparisons with U.S. total industrial production.

DECEMBER HIGHLIGHTS (Click hyperlinks to advance to any section)

Demand

- **U.S. petroleum demand 20.7 mb/d in December and strongest year (20.5 mb/d) since 2007.**
 - Record-tying gasoline demand in 2018 (9.3 mb/d), supported by urban growth.
 - Strongest annual distillate demand since 2007 (4.1 mb/d).
 - Jet fuel near record annual demand (1.7 mb/d) but weakest December since 2015.
 - Residual fuel oil demand seasonally high in December but weakest for a year since 2015.
 - Record refinery and petrochemical feedstock demand for December.

Prices & Macroeconomy

- **Largest 2-month crude oil price drop since Q4 2008.**
- **U.S. leading economic indicators suggest a weakened outlook.**

Supply

- **Record U.S. oil (11.7 mb/d) and NGL production (4.8 mb/d).**

International trade

- **Record crude oil exports (2.4 mb/d) and petroleum net imports below 2.0 mb/d.**

Industry operations

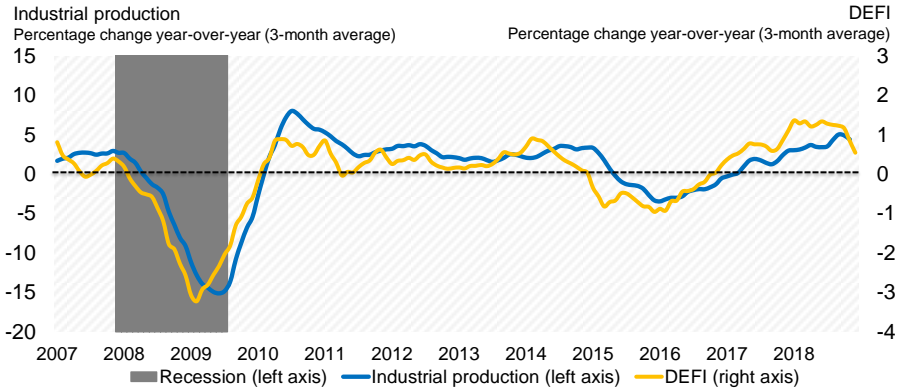
- **Record refinery throughput and capacity utilization for Dec. (17.7 mb/d, 95 percent) and year (17.3 mb/d, 93 percent).**

Inventories

- **Total petroleum inventories near the top of the 5-year range.**

API Distillate Economic and Financial Indicator (DEFI) – December 2018

- The DEFI value of 0.4 for December and three-month average of 0.5 suggests a slowing of industrial production from relatively strong levels



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



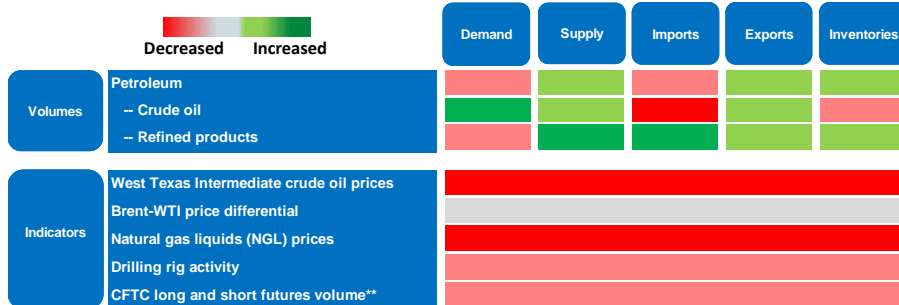
American Petroleum Institute

Monthly Statistical Report heat map – December 2018

Highlights for December 2018, compared with November 2018

- Prices of crude oil and refined products fell as supply (with record production) exceeded demand and petroleum inventories increased to within 2.6 percent of the maximum over the past 5 years
- Drilling activity fell slightly but a record backlog of drilled but uncompleted wells per EIA should support supply in 2019

Heat map of monthly percentage changes – December 2018 compared with November 2018*



* Boldest colored increases and decreases reflect changes vs. prior month that are in the top or bottom quartile for the past five years

** CFTC long/short open interest comparisons based on month versus same month in prior year

sources: API Monthly Statistical Report, EIA, CFTC, Baker Hughes

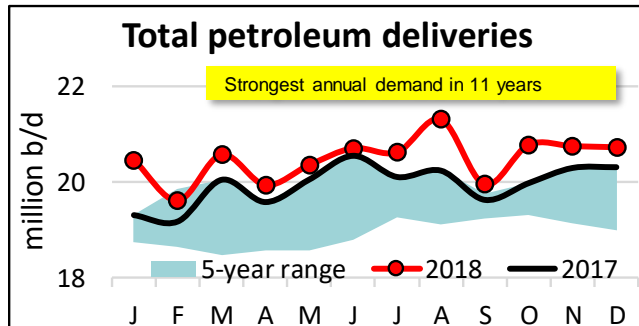


American Petroleum Institute

Details by section

Demand

U.S. petroleum demand 20.7 mb/d in December and strongest year (20.5 mb/d) since 2007

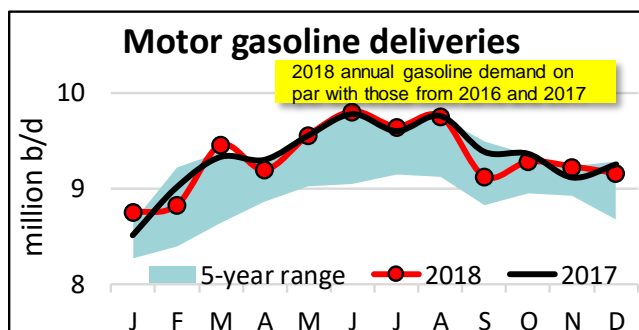


U.S. petroleum demand, as measured by total domestic petroleum deliveries, was 20.7 mb/d in December, which was down 0.1 percent from November but up 2.0 percent compared with December 2017.

For 2018 overall, petroleum demand remained at its strongest since 2007, averaging 20.5 mb/d and up more than 0.5 mb/d or 2.6 percent from 2017. This growth exceeded [EIA](#) expectations for the year and was remarkable given oil prices rose each quarter through Q3 2018.

Gasoline

Record-tying gasoline demand in 2018 (9.3 mb/d), supported by urban growth



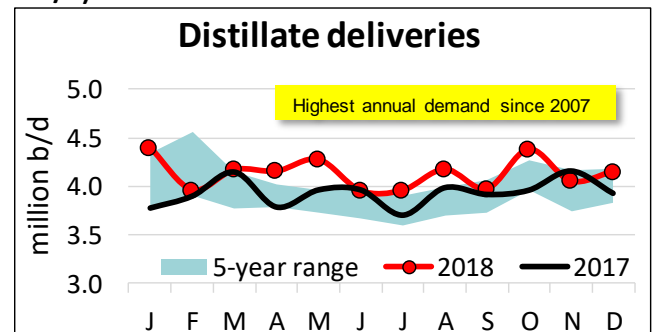
Consumer gasoline demand, measured by total motor gasoline deliveries, was 9.2 mb/d in December. This represented a decrease of 0.8 percent from November and 1.0 percent compared with December 2017. For 2018, gasoline demand

averaged 9.3 mb/d, on par with that in 2016 and 2017.

A regional dichotomy was reinforced for the year. Specifically, demand for reformulated-type gasoline, which is consumed primarily in urban areas, increased by 1.1 percent y/y to 3.1 mb/d in 2018 and has grown for five consecutive years. By contrast, conventional gasoline is used more in rural areas and decreased 0.7 percent y/y to 6.2 mb/d; this was its second consecutive annual decline.

Distillate Fuel Oil

Strongest annual distillate demand since 2007 (4.1 mb/d)



In December, distillate deliveries of 4.2 mb/d increased by 2.4 percent from November and 4.4 percent compared with December 2017. For 2018, distillate demand of 4.1 mb/d was the highest since 2007.

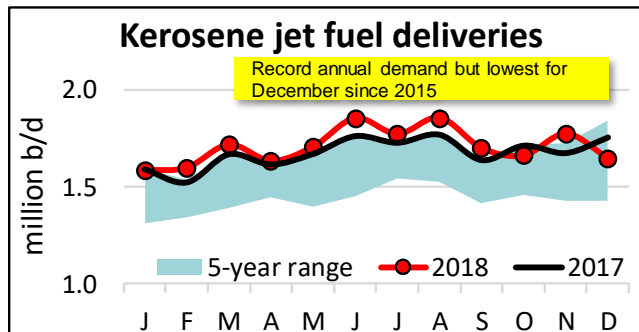
About 95.0 percent of distillate demand in December was for ultra-low sulfur distillate (ULSD), which is driven by road freight transportation activity. The Bureau of Labor Statistics' (BLS) Producer Price Index for freight trucking increased by 8.0 percent y/y in December as strong activity and an [ongoing shortage](#) of truckers raised prices despite low fuel costs.

The remaining 5.0 percent of distillate demand was high sulfur distillate fuel (HSD), which is a heating fuel in the residential and commercial sectors and a marine fuel when blended to upgrade heavy fuel oil. In December, HSD deliveries rose by 56.6 percent from November but were 3.8 percent below those of December 2017.

Kerosene Jet Fuel

Jet fuel record annual demand (1.7 mb/d) but weakest December since 2015.

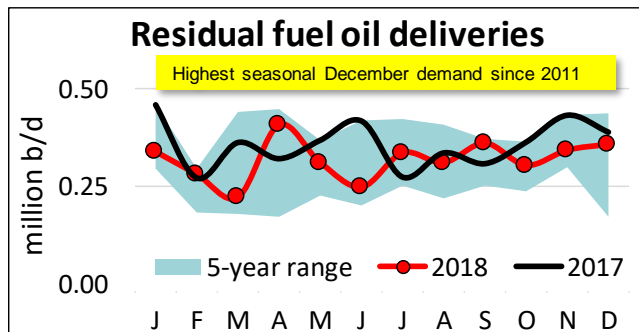
In December, kerosene jet fuel deliveries of 1.6 mb/d decreased by 7.2 percent compared with November and 6.2 percent versus December 2017. For 2018, it was the second highest annual jet fuel demand on record, but the weakest December monthly demand since 2015.



In its latest report, the [International Air Transport Association \(IATA\)](#) reported U.S. domestic air passenger kilometers increased by 4.9 percent in November compared with November 2017. They noted that “traffic is solid. But there are clear signs that growth is moderating in line with the slowing global economy.”

Residual Fuel Oil

Residual fuel oil demand seasonally high in December, but weakest for a year since 2015.



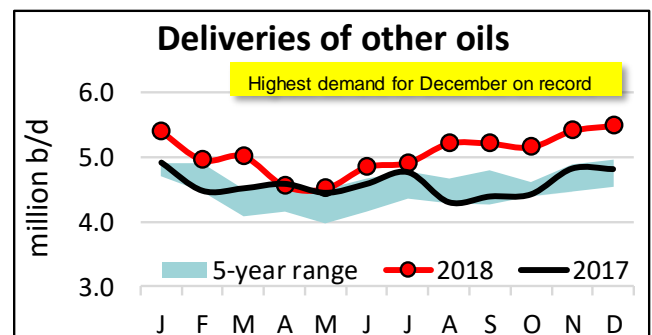
Residual fuel oil is used in electric power production, space heating, marine vessel bunkering and other industrial applications. Residual fuel oil demand was 359 thousand barrels per day (kb/d) in December, an increase of 4.4 percent from November and 14.3 percent versus December 2017.

December demand was seasonally strong with [EIA](#) reporting U.S. average heating degree days increased by more than 20 percent versus November. Marine shipping activity also accelerated, as the Baltic Dry Index rose 12.0 percent between November and December.

For the year, however, residual fuel oil demand fell by 7.3 percent to its lowest annual level since 2015 and may fall in 2019 with more stringent marine fuel specifications taking effect in January 2020.

Other Oils

Record refinery and petrochemical feedstock demand for December

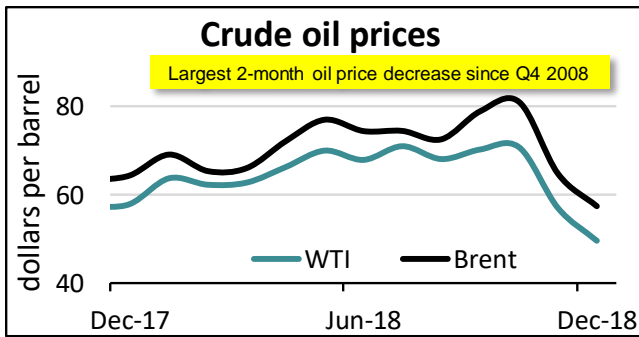


Refining and petrochemical demand for liquid feedstocks, naphtha, and gasoil (“other oils”) was 5.5 mb/d in December, an increase of 1.5 percent from November and 9.8 percent — nearly 0.5 mb/d— above December 2017. For the year, other oils demand of 5.0 mb/d was the highest since 2004 and second highest on record. These trends reflected solid refining and petrochemical demand, reinforcing the December [record refinery throughput](#).

Prices

Largest 2-month crude oil price drop since Q4 2008

Domestic WTI crude oil prices averaged \$49.52 per barrel in December, a decrease of 13.1 percent (\$7.44 per barrel) from November and 30.0 percent (\$21.23 per barrel) from October. Similarly, international Brent crude oil prices averaged \$57.36 per barrel, down 11.4 percent (\$7.39 per barrel) from November. These were the most pronounced 2-month declines since the 2008-2009 Financial Crisis.

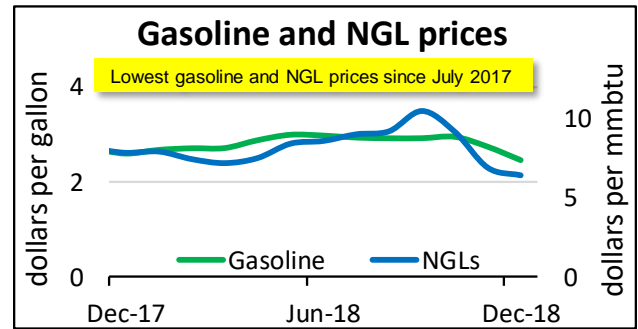


The difference between Brent and WTI crude oil prices remained around \$7.80 per barrel in November and December, even as prices fell. The price differential largely reflected marginal transportation costs due to pipeline egress constraints in the Permian basin and Bakken formation.

With U.S. production gains and prices falling, [EIA](#) projections are currently for a sustained global oil market surplus in 2019 and 2020. Despite an [agreement](#) between OPEC and Russia to cut 1.2 mb/d of output, [EIA](#) and [OPEC](#) both project Russia's output to rise over the course of 2019. In the EIA's

view, this strong supply should keep oil prices in check.

According to [EIA](#), crude oil has remained the top input cost to produce gasoline. As WTI crude oil prices fell, the average U.S. gasoline price decreased to \$2.46 per gallon from \$2.74 per gallon in November, according to [AAA](#) reports.

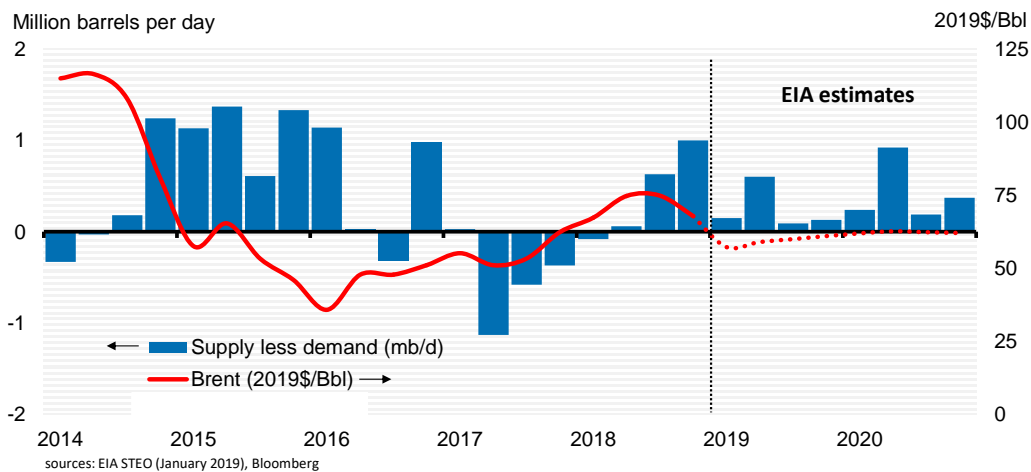


Natural gas liquids (NGL) prices averaged \$6.40 per million Btu (MMBtu) in December, which was a decrease of 7.0 percent from November. According to Bloomberg, each of the constituent NGL prices – ethane, propane, butane and field natural gasoline – decreased in December from November.

EIA suggests the global oil market should maintain a surplus

➤ EIA estimates global oil demand growth to slow in 2019 and be met almost entirely by the U.S.

EIA global supply/demand estimates as of January 2019



Macroeconomy

U.S. leading economic indicators suggest a weakened outlook

The December decrease in oil prices was propelled by [concerns for slowing economic growth](#). The [IMF expects](#) global annual GDP growth to slow to around 3.0 percent in 2019 on a purchasing power parity basis. It's a reversal of their optimism one year ago and, although multiple factors enter in calling a global recession, growth of 3.0 percent historically has been a threshold below which one or more major economies struggle. For the U.S., the IMF's projection is on par with the Bloomberg consensus, which anticipates GDP growth to slow to 2.5 percent y/y in 2019 from 2.9 percent y/y in 2018. This level of growth should feel slower than 2018 but would be relatively insulated from global concerns.

The [University of Michigan's consumer sentiment index](#) dropped to a reading of 90.7 as of early January from 98.3 in December. The levels are still relatively favorable, but the survey reported that the year-ahead outlook was its worst since mid-2014 due to a host of issues, including the partial government shutdown, impact of tariffs, financial market volatility, global slowdown, and uncertainty about monetary policies. The survey anticipates the decline could translate into lower spending, as consumers increase their precautionary savings, which is typically done by cutting their discretionary spending. This increases the importance of job and wage prospects to extend the current expansion.

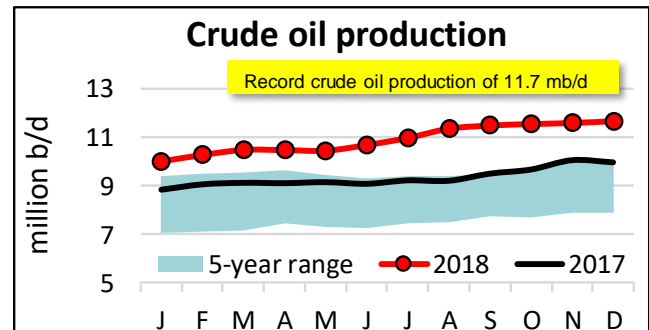
The [Institute for Supply Management's Purchasing Managers Index \(PMI\)](#) also dropped but remained at relatively favorable levels. The Index registered 54.1 in December, which was a decrease of 5.2 percentage points from a reading of 59.3 in November. Any value above 50.0 suggests an expansion. New orders and inputs weakened. Growth occurred in 11 of the 18 manufacturing sectors surveyed (two fewer than in November).

Labor markets remained relatively tight even though the unemployment rate increased to 3.9 percent in December from 3.7 percent in November, according to the [Bureau of Labor](#)

[Statistics \(BLS\)](#). Although U.S. non-farm payrolls grew by 312,000 in December, this [exceeded](#) consensus expectations.

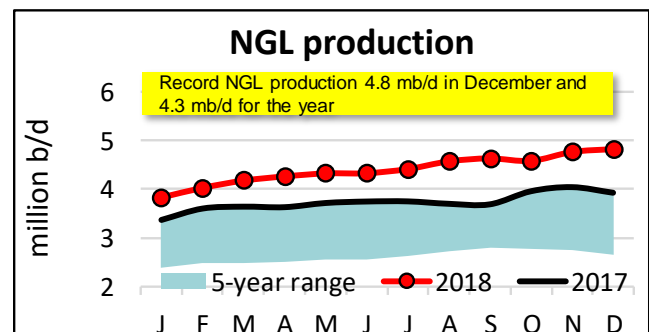
Supply

Record U.S. oil (11.7 mb/d) and NGL production (4.8 mb/d)



U.S. crude oil production of 11.7 mb/d in December – #1 in the world – marked the highest monthly output on record and fifth consecutive month above 11.0 mb/d.

U.S. production has risen along with increased drilling, which Baker Hughes reported an average of 878 oil-targeted rigs in Q4 2018, up from 863 oil rigs in Q3 2018. With the recent oil price decrease, however, the number of oil-targeted drill rigs fell by 33 rigs or 3.7 percent through the first three weeks of January. However, [EIA](#) reports the backlog of drilled but uncompleted wells (DUCs) also reached a record high exceeding 8,700 wells in December, which equates to nearly 7 months of completions at current rates.

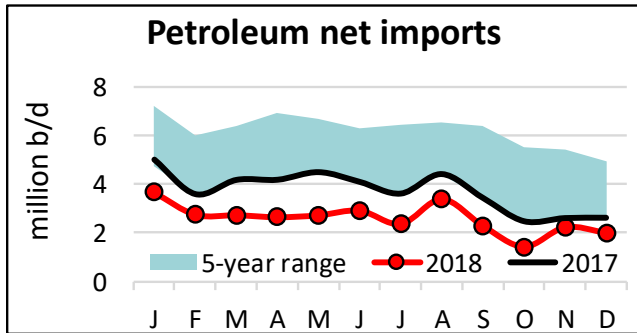
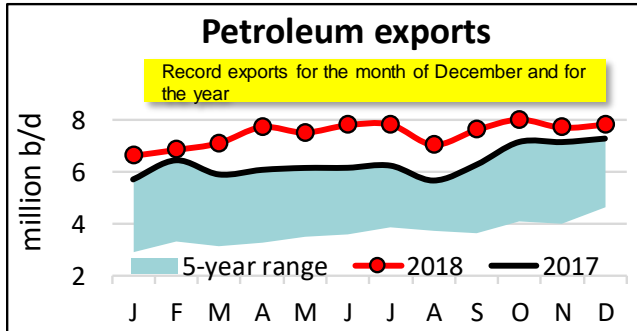


Natural gas liquids (NGL) production, a co-product of natural gas production, eclipsed 4.8 mb/d in December, which also was the highest on record for any month. For the year, NGL averaged 4.3 mb/d, which also was a record.

International trade

Record crude oil exports (2.4 mb/d) and petroleum net imports below 2.0 mb/d

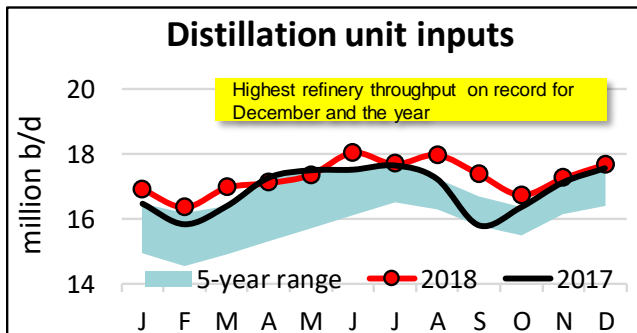
As U.S. crude oil exports sustained a record 2.4 mb/d in December, total U.S. petroleum exports climbed to 7.8 mb/d, a new record.



Consequently, the U.S. petroleum net trade balance fell below 2.0 mb/d in December.

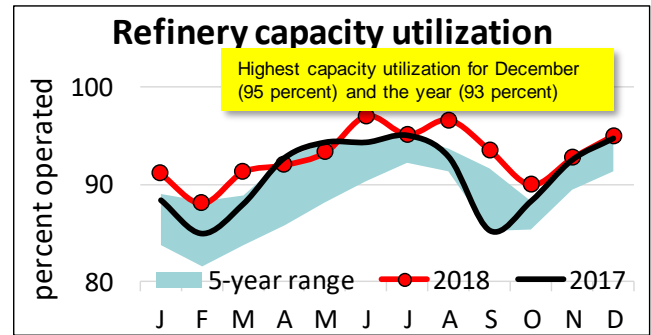
Industry operations

Record refinery throughput and capacity utilization for December (17.7 mb/d, 95 percent) and year (17.3 mb/d, 93 percent)



U.S. refineries set new records for the month of December with throughput of 17.7 mb/d and for 2018, averaging 17.3 mb/d. Refinery capacity utilization of 95.0 percent was at its highest on

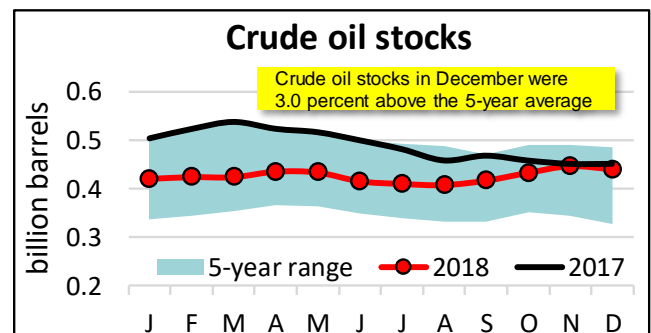
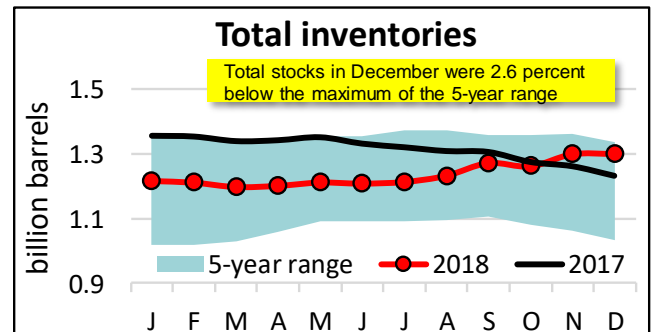
record, both for the month of December and for the year (93.0 percent, tied with 2004).



Inventories

Total petroleum inventories near the top of the 5-year range.

In December, total petroleum inventories were 1.30 billion barrels, which was an increase of 0.1 percent from November and 5.6 percent over December 2017. Total inventories are now 2.6 percent below the maximum of the 5-year range. As crude oil inventories decreased by 1.4 percent m/m in December, the increase in total inventories was driven by refined products, consistent with strong refinery throughput outpacing demand growth.



ESTIMATED UNITED STATES PETROLEUM BALANCE¹

(Daily average in thousands of 42 gallon barrels)

Disposition and Supply	December			Year-to-Date		
	2018 ²	2017	% Change	2018 ³	2017	% Change
Disposition:						
Total motor gasoline.....	9,150	9,247	(1.0)	9,308	9,330	(0.2)
Finished reformulated.....	3,007	2,991	0.5	3,124	3,089	1.1
Finished conventional.....	6,143	6,255	(1.8)	6,196	6,241	(0.7)
Kerosene-jet.....	1,647	1,756	(6.2)	1,719	1,673	2.7
Distillate fuel oil.....	4,151	3,975	4.4	4,123	3,938	4.7
≤ 500 ppm sulfur.....	3,924	3,739	4.9	3,982	3,771	5.6
≤ 15 ppm sulfur.....	3,911	3,738	4.6	3,969	3,765	5.4
> 500 ppm sulfur.....	227	236	(3.8)	141	167	(15.6)
Residual fuel oil.....	359	314	14.3	316	341	(7.3)
All other oils (including crude losses)	5,487	4,998	9.8	4,986	4,612	8.1
Reclassified ⁴	(69)	34	na	1	35	na
Total domestic product supplied.....	20,725	20,323	2.0	20,453	19,929	2.6
Exports.....	7,819	7,136	9.6	7,414	6,243	18.8
Total disposition.....	28,544	27,459	4.0	27,866	26,172	6.5
Supply:						
Domestic liquids production						
Crude oil (including condensate).....	11,655	10,040	16.1	10,767	9,244	16.5
Natural gas liquids.....	4,823	3,969	21.5	4,322	3,730	15.9
Other supply ⁵	1,279	1,257	1.7	1,247	1,213	2.8
Total domestic supply.....	17,757	15,267	16.3	16,336	14,188	15.1
Imports:						
Crude oil (excluding SPR imports).....	7,667	7,782	(1.5)	7,846	7,972	(1.6)
From Canada.....	3,218	3,651	(11.9)	3,642	3,425	6.4
All other.....	4,449	4,131	7.7	4,204	4,547	(7.6)
Products.....	2,134	2,153	(0.9)	2,216	2,160	2.6
Total motor gasoline (incl. blend.comp)....	444	430	3.3	658	648	1.5
All other.....	1,690	1,723	(1.9)	1,559	1,512	3.1
Total imports.....	9,801	9,935	(1.3)	10,063	10,132	(0.7)
Total supply.....	27,558	25,202	9.4	26,399	24,320	8.5
Stock change, all oils.....	(986)	(2,258)	na	(1,468)	(1,852)	na
Refinery Operations:						
Input to crude distillation units.....	17,672	17,562	0.6	17,284	16,848	2.6
Gasoline production.....	10,037	10,104	(0.7)	10,055	9,954	1.0
Kerosene-jet production.....	1,846	1,784	3.5	1,803	1,702	6.0
Distillate fuel production.....	5,477	5,408	1.3	5,147	5,024	2.4
Residual fuel production.....	446	373	19.6	422	427	(1.3)
Operable capacity.....	18,602	18,543	0.3	18,589	18,562	0.1
Refinery utilization ⁶	95.0%	94.7%	na	93.0%	90.8%	na
Crude oil runs.....	17,332	17,274	0.3	16,937	16,525	2.5

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 2018	November 2018	December 2017	% Change From	
				Month Ago	Year Ago
Stocks (at month-end, in millions of barrels):					
Crude oil (excluding lease & SPR stocks).....	440.2	446.6	421.6	(1.4)	4.4
Unfinished oils.....	86.3	92.6	86.3	(6.8)	(0.0)
Total motor gasoline.....	243.3	227.9	236.8	6.8	2.7
Finished reformulated.....	0.0	0.0	0.1	0.1	(8.0)
Finished conventional.....	25.5	23.5	24.5	8.5	4.2
Blending components.....	216.8	204.4	212.3	6.1	2.1
Kerosene-jet.....	40.6	37.7	41.3	7.7	(1.7)
Distillate fuel oil.....	131.2	124.8	145.6	5.1	(9.9)
≤ 500 ppm sulfur.....	120.8	113.9	135.5	6.1	(10.8)
≤ 15 ppm sulfur.....	117.2	110.5	116.0	6.1	1.0
> 500 ppm sulfur.....	10.4	10.9	10.1	(4.6)	2.5
Residual fuel oil.....	27.2	29.7	29.4	(8.4)	(7.4)
All other oils.....	331.7	340.2 R	270.6	(2.5)	22.6
Total all oils.....	1,300.5	1299.5 R	1,231.7	0.1	5.6